



Operation Palo Duro

February 21-23, 2007

Executive Summary

On February 21-23, 2007, the Texas Animal Health Commission (TAHC) and the United States Department of Agriculture Animal and Plant Health Inspection Service's Veterinary Services in Texas (USDA-APHIS-VS-TX) conducted a Foot and Mouth Disease (FMD) exercise called Operation Palo Duro in Amarillo, Texas. The overall purpose of the exercise was to examine the response to an FMD outbreak in the Texas Panhandle region. The exercise focused on five response areas, listed in the box below.

The primary goal of the exercise was to identify potential solutions to difficult policy questions and to inform current planning efforts for FMD. Operation Palo Duro was designed to achieve the following exercise objectives:

Operation Palo Duro Focus Areas

- *Euthanasia and disposal*
- *Vaccination*
- *Movement control*
- *Laboratory surge capacity*
- *Public information*

- Exercise the decision-making process for non-conventional methods of euthanasia and disposal in a mass depopulation event.
- Exercise the decision-making process for vaccination and assess the ability to conduct mass vaccination.
- Exercise the decision-making process for stopping and permitting movement.
- Address laboratory surge capacity for testing samples.
- Address business continuity for animal industries.
- Exercise joint information functions including the development and dissemination of public information.

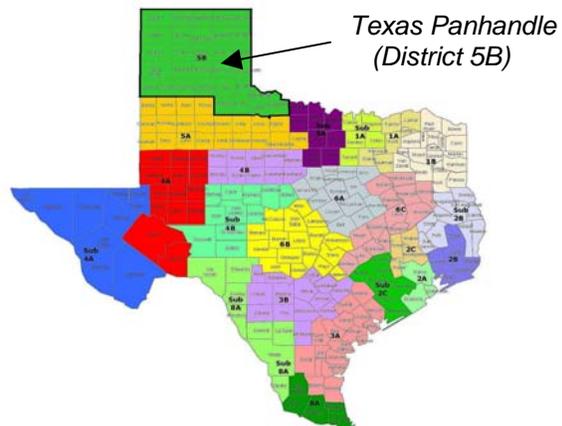
More than 26 federal, state, and local agencies and private sector organizations participated in the exercise. Participants included representatives from the U.S. Department of Agriculture (USDA), TAHC, Texas Veterinary Medical Diagnostic Laboratory (TVMDL), other state and local agencies, the National Guard, and the cattle, dairy, and swine industries.

TAHC asked The CNA Corporation (CNAC) to design, facilitate, and evaluate the exercise. Key successes, findings and recommendations are summarized below for the five focus areas. The After Action Report provides a more detailed summary of exercise events, the analysis of exercise outcomes, and the recommendations for improvement.

Scenario events

The exercise scenario involved a naturally-occurring FMD outbreak in the Texas Panhandle.

Day 0 (February 21): Limited play occurred on this day with a presumptive positive diagnosis for FMD at Texas Feedyard North in Dalhart, Texas, and suspected FMD cases at Texas Feedyard Tour in Amarillo, Texas.



Texas Disaster Districts

Day 1 (February 22): By the following morning, the Foreign Animal Disease Diagnostic Laboratory at the Plum Island Animal Disease Center had confirmed the presumptive positive case at Dalhart. Samples from Texas Feedyard Tour tested negative, while two presumptive positive diagnoses were reported for Texas Dairy South and Texas Feedyard South in Hereford.

Day 2 (February 25): For the third day of the exercise (February 23), the scenario jumped ahead in time by three days in order to handle issues related to the availability and use of FMD vaccine. At this time, there were four confirmed premises in Texas (two feedyards and two dairies) and two additional confirmed feedyards in Kansas and Oklahoma. Exercise participants did not have prior knowledge of the scenario.

| Scenario Premises | | | |
|--------------------------|-------------|-----------------|--------------------|
| <u>Name</u> | <u>Type</u> | <u>Location</u> | <u>Size (herd)</u> |
| Texas Feedyard North | Beef | Dalhart, TX | 75,000 |
| Texas Dairy South | Dairy | Hereford, TX | 3,500 |
| Texas Feedyard South | Beef | Hereford, TX | 55,000 |
| Texas Dairy Southwest | Dairy | Friena, TX | 3,000 |
| Oklahoma Feedyard | Beef | Guymon, OK | 30,000 |
| Kansas Feedyard | Beef | Garden City, KS | 90,000 |

Observations and recommendations

Euthanasia and disposal



The euthanasia and disposal branch discusses burial sites.

The high concentration of cattle in the Texas Panhandle presents logistical challenges to applying conventional depopulation and disposal practices. Successes observed during the exercise included the following:

- Policy makers considered unconventional forms of euthanasia and made decisions regarding their use.
- Players within the Incident Command Post (ICP) collaborated with the Disaster District Committee (DDC) agency representatives (e.g., the Texas Commission on Environmental Quality, Department of Public Safety), local government, and industry to develop plans for euthanasia and disposal.
- Players considered the issue of milk from infected dairies and addressed how to dispose of milk.

Issues and recommendations:

- The ICP objectives of conducting depopulation and disposal within 72 hours and 96 hours, respectively, were not feasible. A concept of operations for mass euthanasia and disposal in the Texas Panhandle region that establishes achievable goals and objectives should be developed.
- Procedures are needed for the use of gunshot as an alternative method of euthanasia, and other potential methods (e.g., drugs that could be administered in feed) should be researched.

Vaccination

The exercise was an opportunity to familiarize response personnel with the North American FMD Vaccine Bank Program (NAFMDVB). Vaccine was considered to be an important tool in disease eradication. However, players discovered the program is limited in terms of how quickly vaccine can be produced. Successes observed during the exercise included the following:

- Players used the USDA vaccine bank decision tree to guide vaccination decisions. For example, policy makers decided on a policy of “vaccinate to kill” with the goal of eventually regaining an “FMD-free” status for the U.S.
- The ICP developed plans to receive and administer the vaccine in coordination with industry and DDC.

Issues and recommendations:

- Personnel at all levels of operations were unfamiliar with the NAFMDVB and its associated policies. Furthermore, decision-making regarding vaccine use required the consideration of both operational and strategic concerns. Further planning and education is needed to prepare personnel to effectively make decisions during an emergency. One option is the establishment of a vaccine advisory group that includes a variety of representatives to develop recommendations for senior leadership.
- Vaccine receipt, staging, storage, and distribution could require considerable resources, and plans should be established to ensure that vaccine distribution is conducted rapidly. Strategic National Stockpile (SNS) plans could be adapted for FMD vaccine staging, storage, and transport.

Movement control

Animal industries ship and receive animals daily and require daily shipments of feed and other supplies and services. Movement control was an important aspect of the response, but it also had a significant impact on business continuity. Players addressed these issues, and successes observed during the exercise included the following:



Cattle at a Texas feedyard

Players addressed these issues, and successes observed during the exercise included the following:

- Many decisions related to stopping movements were discussed, and players decided on courses of action regarding the initial hold order and quarantine
- Permitted movements were also considered, and policy makers set guidelines regarding the movement of animals to slaughter.

Issues and recommendations:

- Like vaccination policy, setting quarantine zones required a combination of both local/operational and strategic viewpoints. FMD response plans should clarify the roles of different entities in making these decisions. As recommended above, an advisory group could be a way to merge different viewpoints into clear recommendations.
- Industry representatives had numerous questions about the requirements for permitting movement (e.g., sampling, inspection, and decontamination) as well as the procedures and processes for obtaining permits. These questions require further consideration and clarification.
- Local representatives were concerned about supporting the initial 48-hour hold order. Resource availability for enforcing hold orders should be reviewed, and procedures should be established for enforcement.



The Disaster District Committee discusses resources available for FMD response operations.

Laboratory surge capacity

Sample collection and processing were required to support surveillance in zones surrounding the infected premises and movement permitting requirements. This created a large demand for laboratory surge capacity that players worked to address. Successes included the following:

- The National Animal Health Laboratory Network (NAHLN) was activated, and samples were sent to TVMDL in College Station.
- Additional surge capacity was provided through other NAHLN labs.
- TVMDL established plans for sample collection and transport by coordinating with the DDC and the 6th Civil Support Team (CST).

Issues and recommendations:

- It was unclear whether the request to transport samples from the Amarillo airport to College Station via fixed wing aircraft could be filled. This issue should be resolved and documented in sample collection and transport procedures along with other plans made during the exercise.
- Players felt that it would have been helpful if NAHLN could have provided capacity estimates at the time of activation as it took quite some time for them to call all the labs individually.
- Investigate the validation and use of the CST to further augment NAHLN capacity.

Public information

Public information officials from several state and industry organizations staffed a joint information center (JIC) to address public concerns and develop public messages that supported the response. Successes included the following:

- Players formed an “FMD Issues Team” of public affairs personnel.
- Industry associations used pre-existing public information response plans that they brought with them for the exercise.
- To reconcile public messaging with negative press coverage, players focused on alleviating public fears by explaining what was happening and why.

Issues and recommendations:

- Information sharing was a challenge. Public affairs organizations should review public information response plans and procedures and ensure that they address communications and information sharing between the JIC, Area Command, ICP, and other response nodes.
- Some public information resources, such as the call center location and public service announcements (PSAs), were not pre-identified or pre-prepared. Public affairs organizations should prepare call center plans and PSAs before an outbreak to avoid delays during a response.
- Some public information players were unfamiliar with FMD response. Additional training could help public affairs personnel understand key response issues.



Civil Support Team members explain equipment for FMD response operations.

Operation Palo Duro: Policy and Decision-making in Response to an FMD Outbreak

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Executive summary

On February 21-23, 2007, the Texas Animal Health Commission (TAHC) and the United States Department of Agriculture Animal and Plant Health Inspection Service's Veterinary Services in Texas (USDA-APHIS-VS-TX) conducted a Foot and Mouth Disease (FMD) exercise called Operation Palo Duro in Amarillo, Texas. The overall purpose of the exercise was to examine the response to an FMD outbreak in the Texas Panhandle region. More than 26 federal, state, and local agencies and private sector organizations participated in the exercise. Participants included representatives from USDA, TAHC, Texas Veterinary Medical Diagnostic Laboratory (TVMDL), other state and local agencies, the National Guard, and the cattle, dairy, and swine industries.

The primary goal of the exercise was to identify potential solutions to difficult policy questions and to inform current planning efforts for FMD outbreaks. The exercise was designed to achieve the following objectives:

- Exercise the decision-making process for non-conventional methods of euthanasia and disposal in a mass depopulation event.
- Exercise the decision-making process for vaccination and assess the ability to conduct mass vaccination.
- Exercise the decision-making process for stopping and permitting movement.
- Address laboratory surge capacity for testing samples.
- Address business continuity for animal industries.
- Exercise joint information functions including the development and dissemination of public information.

TAHC asked The CNA Corporation (CNAC) to design, facilitate, and evaluate the exercise. Key successes, findings, and

recommendations are summarized below for five focus areas: euthanasia and disposal, vaccination, movement control, laboratory surge capacity, and public information. This after action report provides a detailed summary of exercise events, the analysis of exercise outcomes, and the recommendations for improvement.

Euthanasia and disposal

The Texas Panhandle has a high concentration of large cattle feeding operations. Conducting rapid euthanasia and disposal on premises with 50,000 or 75,000 head of cattle is a logistical challenge. Players dealt with this challenge during the exercise and considered alternative methods. Successes observed included the following:

- Policy makers considered unconventional forms of euthanasia and made decisions regarding their use.
- Players within the Incident Command Post (ICP) collaborated with the Disaster District Committee (DDC) agency representatives (e.g., the Texas Commission on Environmental Quality, Department of Public Safety), local government, and industry to develop plans for euthanasia and disposal.
- Players considered the issue of milk from infected dairies and addressed how to dispose of milk.

Issues and recommendations:

- The ICP objectives of conducting depopulation and disposal within 72 hours and 96 hours, respectively, were not feasible because of the large number of animals on the infected premises. A concept of operations for mass euthanasia and disposal in the Texas Panhandle region that establishes achievable goals and objectives should be developed.
- Players decided to use sharpshooters for euthanasia, but there were no pre-existing state protocols for how to implement this decision. Procedures for the use of sharpshooters should be developed, and other potential methods—such as drugs that could be administered in feed or water—should be researched. The National Animal Health Emergency Management System (NAHEMS) Operational Guidelines for

Euthanasia contains information that can be used to formulate site-specific plans.

- Many participants were unfamiliar with indemnity and related policies. Legal officials should clarify questions and policies related to emergency burial, indemnity, and applications of other statutes, such as the Stafford Act.

Vaccination

The exercise provided an opportunity to familiarize response personnel with the North American FMD Vaccine Bank (NAFMDVB) Program. Vaccine was considered to be an important tool in disease eradication. However, players discovered that the program is limited in terms of how quickly vaccine can be produced. Successes observed during the exercise included the following:

- Players used the USDA vaccine bank decision tree to guide vaccination decisions. For example, policy makers decided on a policy of “vaccinate to kill” with the goal of eventually regaining an “FMD-free” status for the U.S.
- The ICP developed plans to receive and administer the vaccine in coordination with industry and the DDC.

Issues and recommendations:

- Personnel at all levels of operations were unfamiliar with the NAFMDVB and its associated policies. Furthermore, decision-making regarding vaccine use required the consideration of both operational and strategic concerns. Further planning and education are needed to prepare personnel to effectively make decisions during an emergency. One option is the establishment of a vaccine advisory group that includes a variety of representatives to develop recommendations for senior leadership.
- Vaccine receipt, staging, storage, and distribution could require considerable resources, and plans should be established to ensure that vaccine distribution is conducted rapidly. Strategic National Stockpile (SNS) plans could be adapted for FMD vaccine staging, storage, and transport.

Movement control

Animal industries ship and receive animals daily. They also require daily shipments of feed and other supplies and services. Movement control was an important part of the eradication strategy, but it also has a significant impact on business continuity. Players addressed these issues, and successes observed during the exercise included the following:

- Many decisions related to stopping movements were discussed, and players decided on courses of action regarding the initial hold order and quarantine.
- Permitted movements were also considered, and policy makers set guidelines for the movement of animals to slaughter.

Issues and recommendations:

- Like vaccination policy, setting quarantine zones required a combination of both local/operational and strategic viewpoints. FMD response plans should clarify the roles of different entities in making these decisions. As recommended above, an advisory group could be a way to merge different viewpoints into clear recommendations.
- Industry representatives had numerous questions about requirements for permitting movement (e.g., sampling, inspection, decontamination) as well as the procedures and processes for obtaining permits. These questions require further consideration and clarification.
- Local representatives were concerned about supporting the initial 48-hour hold order. Resource availability for enforcing hold orders should be reviewed, and procedures should be established for enforcement.

Laboratory surge capacity

Sample collection and processing were required to support surveillance in zones surrounding the infected premises and requirements for permitting movement. This created a large demand for laboratory surge capacity that players worked to address. Successes included the following:

- The National Animal Health Laboratory Network (NAHLN) was activated, and samples were notionally sent to TVMDL in College Station. This was the first time NAHLN was activated in an exercise.
- Additional surge capacity was provided through other NAHLN labs.
- TVMDL established plans for sample collection and transport by coordinating with the Disaster District Committee (DDC) and the 6th Civil Support Team (CST).

Issues and recommendations:

- It was unclear whether the request to transport samples from the Amarillo airport to College Station via fixed wing aircraft could be filled. This issue should be resolved and documented in sample collection and transport procedures along with other plans made during the exercise.
- Players felt it would have been helpful if NAHLN had provided capacity estimates at the time of activation as it took quite some time for them to call all the labs individually.
- Investigate the validation and use of CSTs to further augment NAHLN capacity.

Public information

The exercise presented a number of challenges for public affairs staff as they worked to address public concerns and develop public messages that supported the response. Successes included the following:

- Players established an “FMD Issues Team” of public affairs personnel.
- Industry associations used pre-existing public information response plans that they brought with them for the exercise.
- To reconcile public messaging with negative press coverage, players focused on alleviating public fears by explaining what was happening and why.

Issues and recommendations:

- Information sharing between the Joint Information Center (JIC) and other exercise nodes was a challenge. Public affairs organizations should review public information response plans and procedures and ensure that they address communications and information sharing among the JIC, Area Command, ICP, and other response nodes.
- Some public information resources, such as the call center location and public service announcements (PSAs) were not pre-identified or pre-prepared. Public affairs organizations should prepare call center plans and PSAs in advance of an outbreak to avoid delays during a response.
- Some public information players were unfamiliar with FMD response. Additional training could help public affairs personnel understand key response issues.

Introduction and exercise overview

The Texas Animal Health Commission (TAHC), in collaboration with the U.S. Department of Agriculture (USDA), organized Operation Palo Duro¹, an emergency response exercise held on February 21-23, 2007, in Amarillo, Texas. The overall purpose of this exercise was to examine Foot and Mouth Disease (FMD) preparedness during a notional disease outbreak. The scenario focused specifically on the beef cattle, dairy, and pork industries in the Texas Panhandle region. More than 26 agencies and organizations participated in the exercise.

TAHC asked The CNA Corporation (CNAC) to design, facilitate, and evaluate this multi-day exercise. This after action report documents the exercise, provides an analysis of exercise outcomes, and presents recommendations for TAHC and exercise participants to use to improve the response to future disease outbreaks and other emergencies. This introduction section provides background on the Texas Panhandle and a description of the exercise design.

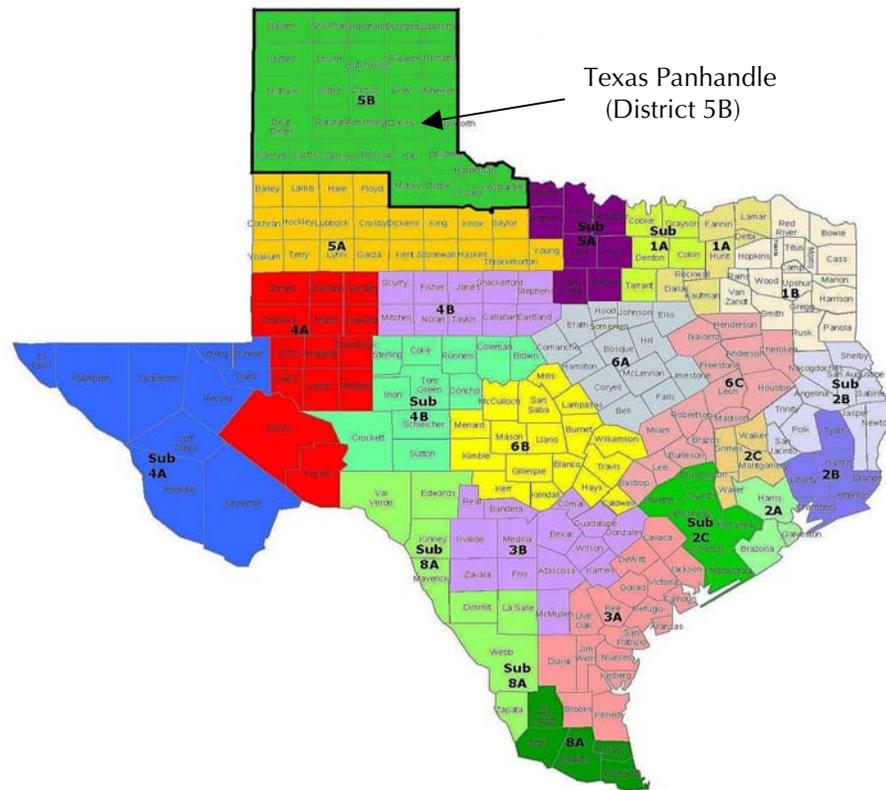
Background: the Texas Panhandle

The Texas Panhandle is an area bordered by Oklahoma to the north and east, and by New Mexico to the west. Exercise participants defined the Panhandle as the boundaries of Texas Disaster District Committee (DDC) 5B, which comprises the 31 northernmost counties in Texas, as seen in Figure 1.

The Texas Panhandle is one of the largest agriculture-based economies in the United States. As the largest city in the area, Amarillo is considered the regional economic center for the Texas Panhandle as well as eastern New Mexico and the Oklahoma Panhandle.

-
1. The exercise is named for Palo Duro Canyon, which is located in the Texas Panhandle about 25 miles south of Amarillo.

Figure 1. Texas disaster districts



Major industries include cattle, cattle feeding, dairy, and swine:

- **Beef cattle industry:** Texas is by far the largest beef state in the nation, containing about 14.5 percent of the nation’s cattle population [1]. The small town of Hereford, also known as the Beef Capital of the World, has 3.5 million head of cattle within a 100-mile radius. Within 250 miles of Amarillo, the world’s most modern packing plants boast an annual slaughter capacity of over 6.5 million head and the ability to slaughter over 27 percent of the fed cattle produced in the major cattle feeding states [2].
- **Dairy industry:** The combined dairy industry in New Mexico and Texas is the third largest milk production area in the nation. Over recent years, the dairy industry in the Texas Panhandle has experienced rapid expansion due to several factors, including favorable land prices, climate, and environmental conditions. This has led to the growth of dairy

operations in Hereford, Texas [3], and the expansion of the Hilmar Cheese Company (the largest single-site cheese and whey product manufacturer in the world) in Dalhart, Texas [4]. The continuing growth of the dairy industry is expected to move Texas from the eighth largest dairy state to the sixth or fifth largest in the next few years.

- **Cattle feeding industry:** The Texas Panhandle is part of the nation's largest cattle feeding area, which consists of Texas, Oklahoma, and New Mexico. The \$7 billion cattle feeding industry produced 6.7 million fed cattle in 2005, which is 30 percent of the nation's fed beef [5]. Amarillo is the location of the Texas Cattle Feeders Association's headquarters.
- **Swine industry:** Over 90 percent of all swine production in Texas is concentrated in the Texas Panhandle [6]. According to the National Agricultural Statistics Service, the Northern four counties of the Texas Panhandle combined with Texas County Oklahoma account for 2.42 million swine. Texas has two distinct swine industry sectors: the large, non-commercial *transitional* sector, which consists of operations that usually have a small number of swine, and the small commercial sector, which consists of operations with large numbers of swine on their premises.

In addition to cattle and calves, Texas is the leading producer of sheep, goats, horses, ponies, burros, and donkeys. The production of these types of livestock is concentrated outside the Texas Panhandle. However, several of these species are also susceptible to FMD, and all face ramifications from any stop movement orders.

Exercise planning and design

CNAC worked with the TAHC to establish an exercise planning group that included representatives from a variety of federal, state, and local agencies and industry. The planning team members are listed in table 1.

Table 1. Exercise planning team members

Texas Animal Health Commission (TAHC)
U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Services (APHIS) Veterinary Services (VS)
Texas Veterinary Medical Diagnostic Laboratory (TVMDL)
Department of Public Safety (DPS) Disaster District Committee (DDC) 5B
City of Amarillo
Texas National Guard Civil Support Team (6th CST)
Texas Cattle Feeders Association (TCFA)
Texas Pork Producers Association (TPPA)
Texas Association of Dairymen (TAD)
West Texas A&M University (WTAMU)

CNAC conducted a series of meetings and communications with this group to guide the exercise design process. During these meetings, the planning team established a general concept for the exercise, set specific exercise objectives, and reviewed and commented on exercise materials.

Exercise goals and objectives

Operation Palo Duro focused on decision-making and response operations during a notional FMD outbreak. The goal of the exercise was to identify potential solutions to difficult policy questions and to inform current FMD planning efforts at federal, state, local, and industry levels. Exercise planners set these specific objectives for Operation Palo Duro:

- Exercise the decision-making process for non-conventional methods of euthanasia and disposal in a mass depopulation event.
- Exercise the decision-making process for vaccination and assess the ability to conduct mass vaccination.
- Exercise the decision-making process for stopping and permitting movement.
- Address laboratory surge capacity for testing samples.
- Address business continuity for animal industries.

- Exercise joint information functions including the development and dissemination of public information.

Exercise scenario

The exercise scenario involved an accidental outbreak of FMD in the Texas Panhandle. Key scenario events are summarized below.

Day 0 (February 21): Limited play occurred on this day, with a presumptive positive diagnosis for FMD at Texas Feedyard North in Dalhart, Texas, and suspected FMD cases at Texas Feedyard Tour in Amarillo, Texas.

Day 1 (February 22): By the following morning, the Foreign Animal Disease Diagnostic Laboratory (FADDL), located at the Plum Island Animal Disease Center, had confirmed the presumptive positive case at Dalhart. Samples from Texas Feedyard Tour tested negative, while two presumptive positive diagnoses were reported for Texas Dairy South and Texas Feedyard South in Hereford.

Day 2 (February 25): For the third day of the exercise (February 23), the scenario jumped ahead in time by three days in order to handle issues related to the availability and use of FMD vaccine. At this time, there were four confirmed premises in Texas (two feedyards and two dairies) and two additional confirmed feedyards in Kansas and Oklahoma. Table 2 describes these premises.

Table 2. Scenario premises

| Name | Type | Location | Size (herd) |
|-----------------------|-------|-----------------|-------------|
| Texas Feedyard North | Beef | Dalhart, TX | 75,000 |
| Texas Dairy South | Dairy | Hereford, TX | 3,500 |
| Texas Feedyard South | Beef | Hereford, TX | 55,000 |
| Texas Dairy Southwest | Dairy | Friona, TX | 3,000 |
| Oklahoma Feedyard | Beef | Guymon, OK | 30,000 |
| Kansas Feedyard | Beef | Garden City, KS | 90,000 |

Exercise participation and structure

More than 200 individuals from 26 organizations participated in Operation Palo Duro. Table 3 lists the participating organizations.

Table 3. Operation Palo Duro participating organizations

| | |
|---|---|
| Texas Animal Health Commission | Texas Forest Service |
| USDA Animal and Plant Health Inspection Service | American Red Cross |
| Texas Veterinary Medical Diagnostic Laboratory | The Salvation Army |
| Texas Department of Public Safety | City of Amarillo |
| Governor's Division of Emergency Management | Panhandle local governments |
| Texas Military Forces (National Guard 6th Civil Support Team) | Texas Cattle Feeders Association |
| Texas Commission on Environmental Quality | Texas Pork Producers Association |
| Texas Department of Criminal Justice | Texas Association of Dairymen |
| Texas Department of Transportation | Texas Sheep and Goat Raisers Association |
| Texas Parks and Wildlife Department | Texas Farm Bureau |
| Texas Department of State Health Services | West Texas A&M University |
| Texas Department of Agriculture | Texas A&M University |
| | National Center for Foreign Animal and Zoonotic Disease Defense |
| | Texas Cooperative Extension |
| | States of New Mexico, Kansas, Oklahoma, and Colorado |

Operation Palo Duro was a combined command post and decision-making exercise driven by injects delivered throughout the incident command post operating cycle. Players were assigned to the following nodes based on their roles during an outbreak response:

- Incident Command Post (ICP)
- DPS Disaster District Committee (DDC) 5B
- Local government
- Industry
- Joint Information Center (JIC)
- Policy/Area Command.

Each node was located in a different room in the Amarillo Civic Center that simulated the real world separations of these entities in Amarillo, Austin, and elsewhere. Players convened three times each day for simulated conference calls to provide situation updates. Players were allowed to communicate within or between their assigned nodes face-to-face, by phone, by email, or through written requests. They were also allowed to reach out to individuals and or-

ganizations outside the Civic Center, such as the FADDL and the National Animal Health Laboratory Network (NAHLN).

The nodes were expected to initiate their own command and control, both internal to the node and between nodes, according to existing procedures and chains of command. During the exercise, a lack of communication between nodes and within the ICP was observed, and suggests that more fundamental training and drills would have helped prepare exercise participants.

Exercise artificialities

The following artificialities were inherent in the exercise design and were used to facilitate communication and coordination among players:

- Participants were located in the same Amarillo facility when in reality they would be working from a variety of command centers and offices within and outside of Texas.
- Communications occurred through simulated exercise channels (e.g., face-to-face, written requests) and did not use all of the actual communications channels that would be employed in an emergency.

The exercise focused on two specific points in time:

- The morning the first premises was confirmed to have cases of FMD (Day 1).
- Three days later (Day 2) when vaccine was set to arrive.²

Fictional premises and supporting data were created to prevent actual businesses from being associated with FMD in any exercise documentation.

2. This jump was based on an assumption provided by the North American FMD Vaccine Bank for previous exercises. During this exercise, however, vaccine bank representatives said that vaccine would take longer to produce and deliver than was assumed in the exercise scenario.

Participants were educated about these artificialities prior to the start of the exercise, and most did not find them to detract from play. In a few cases, however, they did lead to implementation issues. In particular, some players had difficulty assimilating what had occurred before or during the time jumps, and this delayed their reaction to the scenario. Although a situation brief was provided, more detailed supporting material could have been helpful to players.

In addition, a few of the participants arrived expecting a training-style exercise with a focus on ICP processes and procedures (e.g., development of the Incident Action Plan), and experienced difficulty operating within this exercise, which was designed to address the larger issues of policy. These participants were members of the USDA Incident Management Team (IMT), which was not represented on the exercise planning team. In the future, all key participants should be included in the planning process to better set player expectations.

Evaluation methodology

During the exercise, CNAC observed exercise play and collected data to support a reconstruction of exercise events and an analysis of the objectives. These data included notes from the exercise delivery team, logs kept by participants during the exercise, materials produced by participants during the exercise (e.g., situation reports), and participant feedback forms.

Following the exercise, we compiled these data and produced a timeline of key events (see Appendix A). We used this exercise timeline and the supporting data we collected to identify both successes and issues related to the exercise objectives. Finally, we developed recommendations focused on improving agency organizations, plans, policies, procedures, equipment, training, communications, and decision-making. These recommendations are designed to support current FMD planning efforts at the federal, state, local, and industry levels.

Organization of this report

Operation Palo Duro successfully demonstrated many of Texas' animal health emergency response capabilities and addressed many important policy questions at the federal, state, local, and industry levels. Our analyses in the next sections focus on the following areas, which stem from the exercise objectives:

- Euthanasia and disposal
- Vaccination
- Movement control
- Laboratory surge capacity
- Public information

Each of these sections provides a more detailed description of exercise events related to each area, describes the successes and unresolved issues, and presents recommendations to address the issues.

The next section highlights additional observations from exercise participants, and the final section compiles the recommendations in a consolidated list. The appendices document resource lists and other information produced by participants during the exercise.

Euthanasia and disposal

One exercise objective was to exercise the decision-making process for the use of non-conventional methods of euthanasia and disposal in a mass depopulation event. The high concentration of cattle in the Texas Panhandle presents logistical challenges to applying conventional depopulation and disposal practices to a disease outbreak.

Event summary

February 21 (Day 0)

On this day there was a presumptive positive diagnosis of FMD at Texas Feedyard North in Dalhart, and a second suspected infected premises at Texas Feedyard Tour in Amarillo. A site team was notionally dispatched to the first premises, and a second site team of players visited Texas Feedyard Tour to begin planning for euthanasia and disposal.

February 22 (Day 1)

Lab results for Texas Feedyard Tour were negative while the diagnosis of FMD at the Dalhart feedyard was confirmed FMD positive. In addition, there were two new presumptive diagnoses at a feedlot and dairy, both located in Hereford. The Incident Action Plan (IAP) completed on Day 1 included the following incident objectives related to euthanasia and disposal:

- Perform appraisal and depopulation of all FMD positive animals within 72 hours of diagnosis.
- Complete proper disposal of all carcasses within 96 hours of a positive diagnosis.

Euthanasia and disposal plans were documented in the IAP and the 2:00 p.m. situation report (SITREP) issued on Day 1. Euthanasia was

to be carried out by first using xylazine to sedate cattle. After sedation, cattle would be euthanized by captive bolt followed by exsanguination and rumenal opening for release of gas. Front end loaders would be used to move the carcasses into tractor-trailers, lined with impervious material, for transport to burial sites located on the premises.

Prior to depopulation, each pen of cattle would be appraised and documented. The disposal group set the goal of accomplishing disposal of all animals by burial in approved sites 48 hours after completing depopulation.

At 1:17 p.m., the ICP requested approval from the policy node to depopulate only the cattle showing clinical signs of FMD and to vaccinate the remainder. This request was turned down; the policy node directed that all clinical locations be depopulated.

At 2:00 p.m., the policy node received confirmation from FADDL that the second feedlot in Hereford was confirmed positive for FMD. The dairy in Hereford was also confirmed that afternoon at 5:00 p.m.

At 2:56 p.m. on Day 1, the ICP requested that the policy node consider the use of gunshot as a method of euthanasia. The policy node reported at the 4:00 p.m. briefing that gunshot was an acceptable form of euthanasia if trained sharpshooters were used and appropriate protocols and safety precautions were established. The development of these protocols and the requirements for sharpshooters was left to the ICP.

February 25 (Day 2)

On the morning of Day 2, the exercise stepped forward three days in time to February 25. At this point, there was an additional confirmed positive premises in Texas at a dairy in Friona. In addition, two feedlots in Kansas and Oklahoma had confirmed positives.

According to the plans made by the players on Day 1 (February 23), controllers reported that euthanasia and disposal of one-third of the herd at Texas Feedyard North in Dalhart were completed by the morning of Day 2 (February 25). It was also reported that Texas

Feedyard South in Hereford did not have sufficient land available to complete burial of all the cattle on site.

In the 2:00 p.m. SITREP issued on Day 2, players reported that all susceptible species within the 10-km quarantine zone would be depopulated. It was also reported that euthanasia of all cattle at Texas Feedyard North were depopulated the previous day (contrary to the morning report) and that burial would be completed on February 26. The explanation given by the players was that they had increased personnel to operate 24/7. We discuss this explanation in more detail below.

Successes and unresolved issues

Successes observed during the exercise included the following:

- Policy makers considered unconventional forms of euthanasia and made decisions regarding their use in accordance with USDA's National Animal Health Emergency Management System (NAHEMS) Guidelines.
- Players within the Incident Command Post (ICP) collaborated with the Disaster District Committee (DDC) agency representatives (e.g., the Texas Commission on Environmental Quality, Department of Public Safety), local government, and industry to develop plans for euthanasia and disposal, and to select appropriate burial sites.
- Players considered the issue of milk disposal from infected dairies and addressed how to perform the disposal.

Next we discuss the key issues that arose during play.

Incident objectives for euthanasia and disposal were not feasible

Players set the initial objective of depopulating the 55,000-head herd at Texas Feedyard North within 72 hours. For disposal, the objective was to complete it within 96 hours. We discuss both of these objectives below.

Euthanasia

As players within the ICP developed the plans for euthanasia, various estimates were made of the time necessary to depopulate the herd:

- The site branch estimated that a rate of 50 head per hour could be achieved using captive bolt at 10 sites. Assuming each site was operating 24 hours a day, then euthanasia of 55,000 head could be completed in 4.6 days.
- During the site visit on Day 0, it was estimated that it would take three minutes per head to euthanize cattle. At this rate and with 10 sites operating 24 hours a day, it would take 11.5 days to complete euthanasia.

The latter estimate was used by exercise controllers to (optimistically) present in the morning brief on Day 2 that only one-third of the herd at Texas Feedyard North had been euthanized at this point in time. Later in the day, some players made the assumption that the number of personnel was doubled to operate 24/7, and said that euthanasia had been completed in two days. However, both calculations above assumed 24/7 operations³ and resulted in estimates that far exceed the goal of 72 hours. Furthermore, many of the other players working within the ICP commented in person or in exercise feedback forms that it was impossible to complete the euthanasia of 55,000 head of cattle in two days.

Carcass disposal

The preferred method of disposal was on-site burial. Players worked with environmental and industry representatives to select on-site burial locations at each infected premises. They also worked with the DDC to identify the necessary resources to dig the burial pits and move the euthanized cattle from pens to pits.

On Day 0, the site team met with a local construction contractor to discuss burial plans. He estimated that it would take 11 days to bury the 70,000 head of cattle at Texas Feedyard Tour. Participants in

3. Nighttime operations could pose additional safety concerns that prohibit 24/7 operations.

the discussion agreed that there was enough earthmoving equipment and personnel in the area to handle a single feedyard. However, these resources were owned by a large number of contractors, and participants said it would take up to 24 hours to get the equipment on site. Additional resources from outside the immediate area would be required to conduct operations at more than one feedyard.

Other actions were necessary to ensure burial. These include emergency approval from the Texas Evacuation Safety System (TESS) (1-800-DIG-TESS), which ensures there are no buried utility lines. Under non-emergency conditions, TESS approval can take two days (according to participants). In addition, there may be deed-recording requirements. Participants were unsure what waivers or other measures could be taken to authorize emergency burial.

For premises that did not have enough land available for burial, participants discussed a number of options, including landfilling and using land adjacent to the premises.

Again, the goal to dispose of all cattle within 96 hours of diagnosis is unrealistic. Many factors limit the ability to do this quickly when dealing with such a large herd size.

Procedures are needed for the use of sharpshooters

As players discussed the use of gunshot for euthanasia, a number of questions arose concerning how it would be implemented. While many players had experience with captive bolt, none were familiar with the use of gunshot for mass euthanasia. Safety personnel were initially concerned that it posed too many safety concerns. Others wondered how many shots per hour could be achieved, as well as how many rifles and shooters would be required. The sources of sharpshooters were another question. Participants suggested the Texas Military Forces (TXMF). However, a TXMF representative advised that they do not have the appropriate weapons for this activity.

Many participants were unfamiliar with indemnity policies

USDA regulations [7] provide for indemnity payments to owners of animals that are required to be destroyed because of FMD. The regulations authorize payments based on the fair market value of the animals destroyed, as well as for destruction and disposition. Additional payments may be made for cleaning and disinfection or for materials destroyed due to contamination by the disease.

This indemnity authority is closely linked to the state's agreement to enforce quarantine restrictions, orders, and directives that comply with the eradication needs of each disease. When the USDA/APHIS Administrator has established this agreement, federal assets may be used to assist the state in their control and eradication of the disease. The state is still expected to be the lead in eradication efforts pursuant to their own laws and regulations.

Texas provides most of its animal disease authority through the TAHC. TAHC has broad authority in an emergency response to control movement, establish quarantines, and require slaughter. After proper notice of quarantine, orders may be issued to livestock owners for depopulation. Many of these costs are reimbursable [8].

Many indemnity-related issues arose during the exercise and are described below.

Indemnity payments may only be 50 percent of the market value

During the exercise, estimates of indemnity payments were made. These estimates assumed that owners would be compensated for 100 percent of the market value of their cattle. However, federal compensation is not intended to reimburse producers for all disease-related losses. The federal government compensates producers for livestock affected by certain diseases primarily to provide an incentive for owners to participate in eradication programs. According to regulations, federal compensation for FMD-related losses would be 50 percent of the expenses of purchase, destruction and disposition of animals, and contaminated equipment and items. Additional compensation could be paid by the state. It is important to note that the regulations authorize the USDA Secretary to make other arrangements for the payment of expenses upon finding that

an extraordinary emergency exists. However, the players did not discuss this authority and how it might be used in regards to indemnity payments during the exercise.

Depopulation orders do not require owner consent

In many concentrated animal feeding operations (CAFOs), the cattle are owned by a large variety of owners and many could have bank liens. During the exercise, industry representatives noted that it could take weeks to obtain the signatures of all owners of cattle in a CAFO.

It does not appear that consent is required prior to depopulation. Under Texas regulations, the Executive Director of TAHC is authorized to issue an order to require the slaughter of livestock if necessary to eradicate or control the disease and protect other livestock. If slaughter is ordered, the person who is the owner or caretaker of the livestock must dispose of the livestock under the direction of authorized agents of the commission.

An indemnity agreement signed by the owner is required for payment. Players planned to appraise and collect documentation on the cattle prior to euthanasia. But the indemnity agreement could have been completed after depopulation.

Indemnity payments for other losses

The CAFO owners also suffered a significant loss in this scenario and wondered whether indemnity or other compensation was available. Industry representatives also pointed out that CAFO owners might hold agister's liens, which would allow them to withhold payment for their services once cattle are sold. When industry representatives asked whether their lien positions would be maintained when issuing indemnity, the tentative answer from the policy group was "no." The policy group suggested that other sources of compensation might be available by seeking a special appropriation or a Stafford Act declaration.

It's unclear, however, whether compensation is available under these other sources. For example, a foreign animal disease would likely receive an emergency declaration, rather than a major disas-

ter declaration, under the Stafford Act. Compared to a major disaster, forms of assistance available under an emergency declaration are relatively limited.

Some CAFO owners felt they had little incentive to support disease eradication efforts. Many thought the best economic decision would be to lay off employees and take other measures to minimize financial loss. This perception could also prevent timely disease reporting.

Similar questions were raised regarding indemnity payments for milk that had to be destroyed and payment for land sites used for burial. Milk is eligible for payment according to regulations, but there is no provision for indemnification for land.

Recommendations

In preparation for a mass depopulation and disposal event, animal health authorities should address the following recommendations in coordination with other state, local, and industry agencies and organizations:

- Develop a concept of operations for mass euthanasia and disposal in the Texas Panhandle. The National Animal Health Emergency Management System (NAHEMS) guidelines contain information that can be used to formulate site-specific plans.
 - Establish realistic assumptions regarding the time needed for depopulation and disposal.
 - Develop prioritization criteria for applying resources across and within premises.
 - Develop detailed procedures for the use of sharpshooters, including the training and other requirements for personnel.
 - Include resource lists necessary for conducting depopulation and disposal (lists developed during the exercise are a

starting point and are included in Appendix B), and identify the sources and availability of those resources.⁴

- Establish emergency contracts or other mechanisms to ensure that these resources will be available in an emergency.
- Ensure that CAFOs pre-identify on-site burial locations in accordance with environmental permits and other relevant requirements.
 - Include the site capacity.
 - Investigate whether TESS can approve these sites in advance.
 - Clarify deed recording requirements and incorporate them into this process.
- Clarify questions and policies related to emergency burial, indemnity, and applications of other statutes, such as the Stafford Act.
 - Review the decision on the agister's lien and whether the lien would be maintained in making indemnity payments
 - Clarify the applicability of indemnity payments for milk and disposal sites.

Research should focus on helping to clarify issues related to euthanasia and disposal. Potential research topics include the following:

- Study the administration of captive bolt and gunshot in a research setting to develop better estimates of throughput.
- Investigate alternative forms of euthanasia, such as drugs that could be administered in feed or water.
- Investigate the use of cost-based appraisal (e.g., based on how much it costs to feed and raise the animal) versus fair market value for indemnity. The latter is based on weight and may

4. Players in the ICP assumed that there was enough xylazine (Rompum) on hand to meet their needs. Players in the policy node, however, thought that the supply of this drug was severely limited.

not be accurate since there is not a market for 750-pound feeder animals. A cost-based approach may more accurately represent the expenses of raising the animal to its present weight or capacity.

- Conduct further research into issues related to milk, such as the longevity of the virus in milk, and appropriate methods for virus inactivation and milk disposal.

Vaccination

One goal of Operation Palo Duro was to exercise the decision-making process for vaccination and assess the ability to conduct mass vaccination. The exercise provided an opportunity to familiarize response personnel with the North American FMD Vaccine Bank (NAFMDVB) Program. Vaccine was considered to be an important tool in disease eradication.

Event summary

February 21 (Day 1)

At 10:00 a.m. on Day 1, USDA activated the NAFMDVB. The Chief Veterinary Officer (CVO) of USDA noted that he would consult and inform animal health officials in both Canada and Mexico of the decision to activate the vaccine bank. NAFMDVB officials said that Texas would receive 350,000 doses in seven days and that an additional one million doses would be available one week later.⁵

At 1:00 p.m., the ICP asked the policy node whether the NAFMDVB had been activated. The policy node said “yes” and requested that the ICP develop recommendations for the use of the vaccine per the vaccine decision tree [9].

At 1:20 p.m., the ICP asked the policy node whether they might depopulate only clinical animals on a feedlot and then vaccinate the remaining animals. The policy node rejected this request and advised that depopulation of all animals must be carried out if there were clinical cases on the premises. Vaccine would only be used to prevent further spread of disease into other locations.

5. These figures were provided for exercise purposes and are estimates of the actual number of doses available.

Later that day, the policy node discussed the decision of whether to “vaccinate to live” or “vaccinate to kill.” Players decided that vaccinated animals might be allowed to live for short periods, such as six months to a year. This would allow some feedlot cattle to be “finished” and reach full market value, but it would not allow for all dairy cattle to live out their useful lifespan. Players acknowledged, however, that the decision might change if the disease has exceeded the nation’s capacity to contain and eradicate it. Policy players also noted that a 60-day withdrawal period would be needed before a vaccinated animal could go to slaughter because of the oil used in the vaccine. The vaccination site is in the neck or shoulder.

February 25 (Day 2)

At the request of the ICP, the policy node decided that producers could vaccinate their own animals, but vaccination would need to be accomplished with regulatory oversight. This oversight could be provided by accredited veterinarians, or state or federal officials, provided they receive an orientation about the FMD vaccine and the associated regulatory issues.

The ICP began working on the operational issues associated with distributing vaccine. Industry representatives developed plans for administering vaccine and made estimates for how long it would take to vaccinate animals on premises in the surrounding areas (see Appendix C). Personnel within the DDC addressed some of the logistics associated with receiving the vaccine and identified warehouse space for staging the vaccine.

Successes and unresolved issues

Successes observed during the exercise included the following:

- Players used the NAFMDVB decision tree to guide decisions regarding the use of vaccine. For example, policy makers decided on a policy of “vaccinate to kill” with the goal of eventually regaining an “FMD-free” status for the U.S.
- The ICP developed plans to receive and administer the vaccine in coordination with industry and the DDC.

Next we discuss the key issues that arose during play.

Some ICP personnel were not familiar with the vaccine decision tree

The policy node directed the ICP to make a recommendation on the use of vaccine, but some of the personnel working in the ICP had no background knowledge about the FMD vaccine decision tree and found themselves looking at it for the first time. Some wondered whether they were now playing as the “Area Command” instead of the ICP. Policy players also suggested that the ICP should weigh trade costs versus eradication speed to determine how quickly the U.S. might attain “FMD-free” status, and they later defined timely eradication to be six months to one year. Players were also surprised by how long it would take to receive the first shipment of vaccine and the limited amount that was initially available.

The ICP asked industry representatives to help develop vaccine priorities. These representatives suggested that cattle with greater than 60 days left in a feedyard until ready for harvest should be the first priority to receive vaccine. Vaccine should then be distributed among the remaining cattle based on the length of time present in the feedyard (e.g., those with the longer residencies being the higher priority).

The logistics of vaccine receipt, staging, storage, and distribution were not completed during the exercise

Players began addressing vaccine distribution with a focus on administering vaccine in the feedyards. The DDC identified warehouse space at the Amarillo Airport to receive the vaccine. However, players did not complete plans for the full range of logistics from vaccine receipt, staging, and storage to distribution to the feedyards. This was due in part to the fact that on Day 2 of the exercise, vaccine arrival was still several days out. Thus, players dealt with more immediate concerns, such as sample collection and carcass disposal. However, players acknowledged the complexity and scope of this issue, and some recommended establishing a second ICP just to handle operations associated with vaccination.

Recommendations

Several areas of vaccine preparedness could help ensure that Texas and the USDA are prepared to use FMD vaccine in an emergency. Recommendations include the following:

- Educate state veterinarians about the North American FMD Vaccine Bank program and its associated capabilities and protocols. For example, state veterinarians should be aware that the vaccine bank stores vaccine antigen concentrates, not actual vaccine and understand what the estimated capacity and timelines are for production and delivery.
- A process for making vaccination decisions is needed. The policy node did not want to dictate how vaccine should be used since it did not have access to the local information. However, if the decision is expected to be made at the operational level, these personnel also need to become familiar with the vaccine bank program and understand the policy guidelines. One option would be to establish a “Vaccine Advisory Group” with representatives from the different response nodes as well as subject matter experts. In a similar exercise, the state of California established such a group [10]. This group advised state decision-makers on strategies for use of FMD vaccine, but left the ultimate decision to leadership.
- Establish plans for the receipt, staging, storage, and distribution of vaccine. Pre-event plans can ensure that vaccine distribution is conducted rapidly. In pre-exercise planning meetings, local representatives suggested that the Texas Department of State Health Services’ (DSHS) Strategic National Stockpile (SNS) plans (which are required by the Centers for Disease Control and Prevention so that states can distribute antibiotics and vaccines in a public health emergency) could be adapted for use.
- Conduct further research and outreach to support science-based vaccination decisions that also consider the policy impact. Examples include further study of the science and costs associated with the prioritization of animals within a premises and across the region for vaccination, research into alternative vaccine delivery systems, and outreach with the World Organization for Animal Health (OIE) on vaccination issues.

Movement control

One objective was to exercise the decision-making process for stopping and permitting movement. Closely related to this issue is a second objective to address business continuity for animal industries. Animal industries ship and receive animals daily, and require daily shipments of feed and other supplies and services. Movement control was an important aspect of the response, but it also had a significant impact on business continuity.

Event summary

February 21 (Day 1)

At 9:30 a.m. on Day 1, the ICP issued quarantine orders for the three affected premises. A 48-hour hold order on the 31 counties in the Texas Panhandle was later established. At 9:45 a.m., the DDC began planning to support the monitoring and enforcement of quarantine zones.

At 10:20 a.m., the policy node discussed establishing federal quarantine boundaries, but noted that those measures would be used to supplement the state's quarantine. They had not yet received recommendations from the ICP about where those boundaries should be. At about the same time, TAHC officials requested a USDA Declaration of Extraordinary Emergency via the state Governor. APHIS-VS officials advised the ICP to "spend it like you got it" in the meantime, meaning that it might take a couple of days to finalize and announce the Declaration, but they anticipated that it would be issued.

At 11:00 a.m., the policy node considered the Houston Livestock Rodeo Show, which was scheduled to start on February 24. This actual event was highlighted in exercise injects. The policy group decided not to recommend canceling the event. However, they discussed the need to stop trucks that were moving from the now-

quarantined areas and send them to an isolation area. All susceptible animals at the show would need to be observed carefully.

At 11:50 a.m., the DDC discussed how to handle animals already in transit now that the stop movement order was in place. Due to the lack of facilities to hold animals, they would be sent back to the site of origin. About one hour later, swine industry representatives said they would not allow swine in transit back on site, as it would jeopardize the herds. They advised that these animals be sent directly to a renderer. At noon local officials advised that the enforcement of the stop movement order was not feasible due to resource limitations.

At 2:15 p.m., the policy group discussed moving animals to slaughter if they did not have clinical signs and had not been at an infected location. The group decided that animals near finishing could go ahead and move to slaughter, as long as there was no indication of virus on the premises. Some animals in each group must be tested, and all animals should be inspected carefully before movement.

The policy group also decided that vaccinated animals could move to slaughter after the 60-day vaccine withdrawal period. Negative animals in the surveillance zone could also move to slaughter. The ICP would be responsible for developing movement protocols and procedures.

At 3:00 p.m. the policy node considered a question from the swine industry about whether swine not known to be infected could move to slaughter once the 48-hour hold order had elapsed. The policy node said “yes,” but required testing of each group (tracheal swab with negative polymerase chain reaction [PCR] test result) and visual inspection of each animal.

February 25 (Day 2)

At 8:00 a.m. on Day 2, it was announced that the USDA Declaration of Extraordinary Emergency was signed and that a federal quarantine would be issued for the same boundaries as the state quarantine.

At 10:45 a.m. on Day 2, swine industry representatives addressed the requirement to sample and inspect shipments of hogs to slaughter made during Day 1. They were concerned about where the resources to carry out these requirements would come from and how the permits would be issued. Industry representatives were later advised that accredited swine industry veterinarians could inspect the animals and collect samples.

At 11:00 a.m., the policy node addressed questions regarding movement of animals between premises owned by the same farm. The policy node decided that movement within or out of the quarantine area would require a permit. This included movement between farms that have the same owner but different locations.

Between 11:00 and noon, there were several discussions on quarantine zones and their sizes. The policy node clarified that the federal quarantine would be issued in support of the state and that the ICP was responsible for establishing zones and markers. The policy group advised that the NAHEMS guidelines provided information to support the determination of ring sizes. They also noted that APHIS could make subject matter experts available to discuss this issue with ICP epidemiologists.

At 2:00 p.m., the swine industry learned that Oklahoma and Kansas would accept animals for slaughter provided they met the protocols for testing and inspection. This was important because there are no hog processing facilities in the Texas Panhandle and animals must be moved out of state for slaughter.

Successes and unresolved issues

Many decisions related to stopping and permitting movements were discussed, and key decision points included the following:

- A 48-hour stop movement order was issued for the 31 counties of DDC 5B.
- Initial ring sizes of 10 km for quarantine and 15 km for surveillance were selected.

- A federal quarantine was implemented in support of the state quarantine.
- Movement of animals to slaughter was allowed with a permit.

The following issues require further consideration.

Establishing quarantine zones requires a combination of local knowledge and strategic guidance

Some players were initially unclear about who would take the lead in establishing quarantine zones. The policy group felt the ICP should take the lead, and the ICP wondered whether USDA would establish zones using federal authority. The policy group discussed using geographic markers that can be easily understood by responders and the general public rather than just drawing quarantine circles around each infected location. Because this requires local knowledge, the initial recommendations for quarantine zone sizes and boundaries needed to be made by local commanders.

Policy makers need to also consider the requirements set by trading partners or by international agencies (e.g., OIE guidelines). Because the policy node felt it would be difficult to retract zone sizes after they were established, players said it was important that they are set up the “right” way initially. This may result in erring on the side of including a larger area, because it will be difficult to explain if the area needs to be enlarged later. On the other hand, it is also difficult to prove that an area is “free” of disease and thus remove that area from quarantine status. This suggests establishing smaller zone sizes. These are policy-level considerations, and policy makers must work with local commanders to address them.

Expectations of industry in carrying out permit requirements are not clear

Movement control measures enacted during the exercise had a significant impact on business continuity. Industry representatives had numerous questions, not all of which were answered. Swine industry players learned that they might need to assist in inspecting animals and collecting samples for the movement of hogs to slaughter.

However, they and other industries were uncertain about many other aspects of permitted movement, including the following:

- The process for obtaining movement permits for livestock and animal support (e.g., feed).
- The protocol for decontaminating trucks hauling hogs to slaughter and the organization responsible for carrying out decontamination and paying for the equipment and supplies.
- What to do with hogs in transit that were directed back to the site of origin—swine facilities would not take them back and recommended that they be sent to a renderer for disposal.

Enforcement of a 48-hour hold order could be difficult

The local node considered the requirements for enforcing a 48-hour hold order on the 31 counties. They noted that it would take 72 hours to get resources from outside. Thus, local DPS resources would have to enforce the order. Players felt that some of the smaller counties would have trouble supporting this.

Industry representatives raised the concern that feedyards do not have control over trucks or drivers, so they needed support from law enforcement, commodity suppliers, and transport organizations to keep trucks from leaving the premises without taking adequate precautions against spreading the disease.

There was also concern regarding the potential for a large number of livestock trucks to be on the road at the time the hold order was issued. These could include a variety of animals, such as cattle, swine, sheep, and goats. Players noted that the Panhandle had no large capacity swine slaughter facility and that the options for slaughtering those animals in-transit were limited. As discussed earlier, swine facilities would not allow animals to return back to their facilities.

Recommendations

Recommendations include the following:

- Clarify responsibilities and guidelines for setting quarantine zones in policies, plans, and procedures. These decisions will require a combination of both local/operational and strategic viewpoints (e.g., OIE guidelines). As recommended in the vaccination section, an advisory board could be a way to combine various considerations into policy recommendations.
- Clarify the role of industry in supporting the requirements for permitted movement (e.g., sampling, inspection, and decontamination) as well as the procedures and processes for obtaining permits.
- Review resource availability for enforcing hold orders, and establish plans for supporting road closures, roadblocks, and security at premises. Consider ways of providing incentives to the public and industry to participate in the order. In addition, plans are needed to deal with animals in transit.
- Pre-identify alternate locations where animals can be off loaded and cared for until movement restrictions are lifted. Consider the needs of each species in selecting these locations. Such pre-event preparations could help voluntary compliance with movement restrictions and ensure animal health and well-being.

Laboratory surge capacity

One of the exercise objectives was to address laboratory surge capacity for testing samples. TVMDL representatives participated within the ICP as members of the Sampling and Disease Reporting Unit in the Planning Section and the Site Branch in the Operations Section. Officials from the NAHLN had pre-arranged to be available for the exercise and participated via phone.

Event summary

February 22 (Day 1)

One of the incident objectives set by the ICP on Day 1 was to “implement surveillance of all premises with susceptible species within the control zone using the appropriate frequency to detect the disease in a timely manner.” At the start of the exercise, all samples were directed to FADDL.

In anticipation of authorization to process samples, TVMDL dispatched its Emergency Processing Unit (a mobile sample processing facility) to Amarillo, which would be ready to receive samples on the morning of the next day.

At 1:10 p.m., the TVMDL Executive Director received a request from a cattle breeders association to support a voluntary testing program. The Executive Director forwarded the request to the Area Command with the recommendation that the request be honored until it interfered with any workload related to the response.

During the course of Day 1, a sample collection plan was developed and the following was documented in the 2:00 p.m. SITREP on Day 1:

- The sample size and protocol are that 150 samples will be required for herds greater than 2,000 animals (i.e., to detect a 2 percent infection rate with 95 percent confidence).
 - For Texas Feedyard North (in Dalhart), 11 CAFOs are located within 15 km of the index herd for a total of 1,650 samples.
 - For Texas Feedyard South and Texas Dairy South (both in Hereford), 17 CAFOs are located within 15 km of the index herd for a total of 2,550 samples.
- The sample size and protocol for groups over 50 head, but fewer than 100 head, will be 50 samples plus one sample (i.e., sample every other animal); in herds of fewer than 50, there will be a sample for every animal.
- Preferred samples from non-clinical animals are nasal /pharyngeal swabs and then blood in that order.
- High-risk surveillance (i.e., those animals or people that can be directly linked to the index premises) will consist of (1) all animals moved out of Texas Feedyard North, Texas Feedyard South, and Texas Dairy South during the past 21 days (except those going directly to slaughter), (2) the daily dead animals picked up for rendering within the last 21 days, (3) all feedlot and dairy employees who could transmit the disease as fomites, (4) animals and people on adjacent premises located within 60 feet of the index premises, and (5) all milk and feed trucks that have entered or exited the index premises within the past 21 days.
- Low-risk surveillance would be for animals located within the DDC 5B area (see figure 1) that do not meet the above criteria.

At 1:30 p.m., TVMDL requested clarification from the policy group on NAHLN laboratory capacity. The policy group responded that NAHLN could be activated and had a capacity of 8,500 samples per day. Also, samples could now be diverted to TVMDL for processing.

February 25 (Day 2)

On Day 2, the volume of samples requiring testing exceeded the capacity of TVMDL. To decrease the load on NAHLN, the policy group consulted with the National Surveillance Unit of APHIS to provide revised sampling requirements to be applied per pen as follows:

- If fewer than 20 animals in the herd, take samples from all.
- If 20-50 animals, take samples from 15.
- If more than 50 animals, take samples from 20.

Players estimated the sample testing requirements to be 49,300 samples per week, which included both animal movement (e.g., swine to slaughter) and surveillance. TVMDL had the capacity to handle 21,600 per week by the second week and requested that NAHLN test the remaining 27,700 per week.

NAHLN provided TVMDL with contacts for its Tier I labs in California, New Mexico, Colorado, and Kansas, and its Tier II labs in Louisiana and Nebraska. TVMDL contacted these labs and received information on their capacities, which are detailed in table 4.

Table 4. Comparison of NAHLN and Texas laboratory capacity

| Tier | Lab | Week 1 capacity (samples/day) | Week 2 capacity (samples/day) |
|------|------------|----------------------------------|----------------------------------|
| I | California | 1,000 | 2,500 |
| I | New Mexico | 100 | 400 |
| I | Colorado | 300 | 800 |
| I | Kansas | 0 ^a | 100 ^a |
| II | Louisiana | Not contacted | |
| II | Nebraska | 3,000 | 3,000 |
| | Texas | 1,800 | 3,600 |

- a. This lab reported not having the appropriate reagents to conduct testing and could not begin testing immediately. It estimated that it might be able to handle 100 per day if it obtained the reagents.

Players estimated that Texas and the Tier I laboratories could process about 43,000 samples per week.⁶ This left an estimated 6,000 samples per week that would need to go to Tier II or other labs.

Lab personnel requested support from the 6th Civil Support Team (CST). The policy node agreed to call up the CST to provide the following assistance:

- Sample collection in the quarantine zone.
- Sample delivery to TVMDL branch labs.
- Packaging of samples.

Although it has testing capabilities, the policy node decided the CST could not be used to perform PCR tests because it was a not certified and validated laboratory for FMD testing.

The CST worked with the DDC and laboratory personnel to make the following arrangements:

- Station the TVMDL mobile laboratory unit in Amarillo to prepare and package samples for shipment to College Station.
- Establish a sample transfer site in the sampling zone.
 - Establish two pickups daily from the sampling zone to the mobile lab at 10:00 a.m. and 6:00 p.m.
- Establish one run daily from the mobile lab to Amarillo airport.
- Request a fixed wing aircraft to transport the samples from the airport to College Station.
- Those samples requiring transport from College Station to Plum Island would be sent via commercial air or FedEx.

These decisions were designed to ensure a 24-hour turnaround time from sample collection to test results.

⁶ This estimate appears to be based on an assumption of a 6-day week.

Successes and unresolved issues

This exercise marked the first time that TVMDL participated in an exercise and also marked the first time that NAHLN was activated in an exercise. Many other decisions and actions necessary to ensure that samples are efficiently packaged, transported, and processed were successfully exercised, including the following:

- Activating the NAHLN and directing samples to be processed at TVMDL in College Station.
- Working with NAHLN representatives to determine the surge capacity available.
- Establishing plans for sample collection and transport with the DDC and CST.

One unresolved issue was whether arrangements could be made to transport the samples from the Amarillo airport to College Station via fixed wing aircraft. It was not determined during the exercise whether this would occur. The backup plan was to use FedEx, which players thought would be more costly.

Recommendations

TVMDL should work with the DDC and CST to incorporate plans made during the exercise into a formal protocol for sample collection, transport, and processing. Follow-up on the availability of fixed wing aircraft should occur, and the resolution should be included in the protocol.

Players felt that it would have been helpful if NAHLN had provided capacity estimates at the time of activation as it took quite some time for them to call all the labs individually. Perhaps NAHLN could identify and document this capacity in advance and routinely update it. The capacity estimates could then be obtained more quickly during an event.

To support the use of NAHLN, the following issues require further clarification:

- Determine whether enough reagents are available to support the NAHLN capacity.
- Establish procedures for the collection and transport of samples to the other NAHLN laboratories.
 - Logistical plans established during the exercise did not include samples sent to other NAHLN labs.

Finally, investigate the use of CSTs to further augment the capacity available through the NAHLN. Players suggested that CSTs could potentially be validated and certified through the NAHLN. The CSTs would also need access to the necessary reagents.

Public information

One objective of Operation Palo Duro was to exercise joint information functions, including the development and dissemination of public information. Public information officials from several state and industry organizations staffed a joint information center (JIC) to support the response.

Event summary

During the exercise, the JIC operated from a room adjacent to the room in which the ICP operated. This design simulated the real-world separation of the JIC, which could be set up in Amarillo or Austin, away from the actual ICP location. The main line of communication between the JIC and the ICP was between the TAHC Public Information Officer (PIO), located in the JIC, and the ICP PIO, who was a member of the USDA Incident Management Team (IMT) sent to staff the ICP.

Players in the JIC represented various agencies from the state of Texas; cattle, dairy, and pork industries; the Oklahoma Department of Agriculture; and Texas A&M University. Most of these players were part of an existing “Beef Issues Team” that meets and communicates regularly.

Throughout both days of the exercise, players in the JIC prepared public messages regarding the evolving FMD outbreak and developed public information responses to the injects listed in Table 5. Other key actions included the following:

- Conducted a joint USDA-TAHC audio technical briefing on February 20 that explained the presumptive positive test results.
- Issued press releases in response to newly confirmed test results on February 21 and 23.

- Issued local media advisories announcing press conferences on February 21 and 23.

Table 5. List of injects provided to the JIC

| Day | Source | Content |
|-----|---|---|
| 1 | Coalition for the Ethical Treatment of Animals (CETA) | Press release: Concerned about the treatment of animals that will be de-populated; demand to be present to observe euthanasia |
| 1 | Texas Animal Health Commission | Call center report: Citizens are concerned about the safety of beef, dairy, and other meat products |
| 1 | Department of Homeland Security (DHS) | Advisory: DHS raises threat level for agriculture industry |
| 1 | LA Dept. of Agriculture & Forestry | Press release: LA agency advising livestock owners |
| 1 | CA Dept. of Food & Agriculture | Press release: CA announces ban on all susceptible animals, animal products, feed, and equipment from Texas |
| 1 | Texas Animal Health Commission | Call center report: Owners of animals want information on how to get their animals tested for FMD |
| 1 | Texas Restaurant Association | Press release: Concerned about the impact on local businesses/economy |
| 1 | The Dallas Herald | Newspaper article: Concern among ranchers in Howard County, TX |
| 1 | NM State Police | Police report: Report on possible violation of movement order |
| 2 | CA Dairy Association | Press release: Requesting allocation of vaccine |
| 2 | Serra Club ^a | Press release: Concerned about effects of carcass disposal on environment |
| 2 | Texas Animal Health Commission | Call center report: Public concerned about the safety of eating meat or milk from vaccinated cattle |

a. The “Serra Club” represented a fictional environmental advocacy group.

Successes and unresolved issues

Successes observed during the exercise included the following:

- Players quickly formed an “FMD Issues Team.” Its role was similar to the existing “Beef Issues Team,” but with a focus on FMD. This team can continue to facilitate communication on FMD issues among the participants following this exercise.

- Industry associations had pre-existing public information response plans that they brought with them for the exercise. The plans guided many of their discussions and actions during the exercise.
- Players addressed the reconciliation of public messaging with negative press coverage. Players felt that it would be difficult to convince the public that beef was safe for human consumption while the media could be broadcasting images of cattle being burned and buried. They developed message points designed to alleviate public fears by explaining what was happening and why.

Key issues that arose during play are discussed below.

Information sharing was a challenge

The separation of the JIC from the ICP resulted in limited information sharing between the two sets of players. This was in part a result of the exercise design. However, it also indicates that information sharing could be an issue in a real emergency because the JIC will probably be removed from the ICP. This physical separation led to the following problems:

- The JIC did not receive the ICP SITREPs and IAP on Day 1 and did not share information on their actions with the ICP.
- The JIC had limited access to subject matter experts who were busy working in the ICP or elsewhere.
- JIC personnel were concerned that they might lose oversight over local reporters if they could not quickly stem the spread of false information and rumors.

On Day 2, information sharing continued to be limited as PIO players in the JIC and ICP dealt with public messaging related to vaccination. The two sets of players developed independent priorities for public messaging. The JIC focused on:

- Sustainment of consumer confidence.
- Reiterating the fact that FMD is only an agricultural disease.

- Protection of rural Americans, family farms, local industries and economies, and the country's food supply.

As a representative of USDA, the ICP PIO focused on the issue of international trade.

Some public information resources are not pre-identified or pre-prepared

When players in the JIC discussed plans for establishing a call center, they discovered that a call center location has not been pre-identified. Players discussed various options for locating the call center, including locations at TAHC, USDA, or the National Cattlemen's Beef Association. Similarly, when players discussed releasing public service announcements (PSAs) to address the FMD outbreak, they noted that none of the organizations present in the JIC had pre-produced such materials. Having to develop plans to activate and staff a call center or write PSAs during a crisis could delay the public information response.

Some public information players were unfamiliar with FMD response

On several occasions, players had difficulty crafting public messages because they were not familiar with the different aspects of FMD response, such as quarantine orders, the use of vaccine, and the entry of vaccinated meat into the food supply. The JIC had to locate officials who could explain these topics in more detail. In a real emergency, this could delay the release of information by public affairs staff.

Another noteworthy aspect of FMD response was the decision to use unconventional methods of euthanasia (gunshot). Anticipating the need to explain this to the public, the policy node advised the ICP to notify the JIC before the use of gunshot was implemented.

Recommendations

Public affairs personnel should address the issues discussed above in their response plans and procedures and consider the following recommendations:

- Ensure that adequate emergency public information response plans and procedures exist to support the response to an FMD outbreak.
 - Standard Operating Procedures for the JIC should include procedures for communicating with the ICP and other response entities. The inclusion of a USDA liaison in the JIC could facilitate communications.
 - Consider establishing the JIC closer to the outbreak or establishing a smaller, satellite JIC near the outbreak.
 - Pre-identify the location of the call center and ensure that plans are in place to staff and operate it.
 - Prepare public service announcements specific to FMD prior to an outbreak.
- Plan to include a state PIO within the ICP to address state and local public information issues.
- Ensure that the PIOs, call center personnel, and other personnel are trained to carry out these plans and procedures.

Other observations

This section includes a summary of additional observations compiled from participant feedback forms and notes. This section focuses on areas outside of those already addressed in the context of the exercise objectives.

General successes/lessons learned

- The exercise provided a training opportunity to learn Incident Command System (ICS) structure and processes.
- The exercise provided a networking opportunity to develop working relationships.
- There is still a lot of preparation that is needed.
- Local and industry representatives are necessary to provide information about the local area.
- The large number of susceptible animals in the region requires rethinking the management of an outbreak. The animal industry on the High Plains is unique, and solutions for other areas will not be effective here.
- Business continuity will be difficult to maintain.
- Vaccine takes too long to deliver.
- Industry concerns were relayed to policy makers and other participants, and industry began to effectively participate as part of the response team through the liaison position.

ICP operations

- Many personnel working in the ICP were inexperienced or had little training. As a result, they were unfamiliar with their

roles and responsibilities, the chain of command, and basic ICP processes and procedures (e.g., the use of forms).

- The USDA IMT did not integrate well with the other staff in the ICP. It did not reach out to incorporate industry or other available expertise.
- Operating decisions made at the state and federal levels do not adapt well to local action.
- The Planning and Operations Sections of the ICP did not communicate well. For example, the epidemiological group in the Planning Section did not receive the epidemiological reports from the Operations Section.
- The DDC was not integrated into the ICP and acted independently. The DDC needs representatives in different branches of the ICP.
- The Logistics Section should include local, regional, and DDC participants. Any equipment or resources that were available locally should be utilized first. The Logistics Section realized this fact on Day 2 and incorporated DDC and local personnel in all discussions about needs before making a request at the state or national level.
- A good organizational chart needs to be developed for the ICP with a true unified command of animal health and public safety. (Note the Texas Foreign and Emerging Disease Response Plan includes a comprehensive ICP organizational chart.)
- The ICP needs better mapping capability and data (e.g., resource lists).
- Command staff meetings were too large and too long. This delayed information flow down to the other ICP members.

Notifications

Notification to other states would occur once there is a confirmed case. Until then, information about the presumptive positive would be held at the highest levels of USDA. The policy group discussed

whether there should be a notification, at least to neighboring states, of either the highly likely sample that was sent to Plum Island or the initial PCR positive test result. There are pros and cons to this issue. If other states are notified, they can begin leaning forward to consider their response actions. However, the policy group also recognized that it could be dangerous to lean forward too much and risk alarming the public or affecting the markets when the final test result could still be negative for FMD. The policy group agreed that USDA should consider this issue further.

Industry

- The initial role of industry representatives was unclear. As the exercise progressed, industry representatives were given more to do. However, they still were never fully utilized.
- Industry should develop industry-specific plans, guidelines, and protocols.
- Packers, truckers, renderers, and other support industries should have been involved in the exercise.
- Bankruptcy lawyers should have been involved in the exercise along with the Attorney General's office.

Exercise implementation

- Conduct more pre-exercise training, such as Incident Command System (ICS) training and more detailed information on how to play.
- Provide more injects or more structure to facilitate communications between nodes.
- Provide more detailed information between time jumps, such as the SITREPs and IAPs. Such material could have been provided at the end of Day 1 for players to read prior to the next day of play.
- Provide more active exercise control (e.g., stop meetings or conversations that are too long).

- The exercise met policy objectives.
- The exercise design provided a realistic environment.

Summary of recommendations

The following table consolidates all of the report recommendations and suggests which agency or organizational level (federal, state, local, industry) should be responsible for addressing them. This table is provided as a starting point for agencies to develop implementation steps and corrective actions designed to address the issues raised in this report and continue preparing for the response to a foreign animal disease outbreak.

Table 6. Summary of recommendations

| Subject | Recommendation | Page number | Responsible agency level | Supporting agency level |
|---------------------------|---|-------------|--------------------------|-------------------------|
| Euthanasia and disposal | Clarify questions and policies related to emergency burial | 25 | State | Local, industry |
| Euthanasia and disposal | Clarify questions and policies related to indemnity and applications of other statutes, such as the Stafford Act | 25 | Federal | State |
| Euthanasia and disposal | Develop a concept of operations for mass euthanasia and disposal in the Texas Panhandle. | 25 | Local, industry | State |
| Euthanasia and disposal | Ensure that CAFOs pre-identify on-site burial locations in accordance with environmental permits and other relevant requirements | 25 | State | Local, industry |
| Euthanasia and disposal | Policies and procedures for the use of sharpshooters should be developed | 24 | Federal | State, local |
| Euthanasia and disposal | Other potential methods—such as administering drugs in feed or water—should be researched. | 25 | Federal | State, local |
| Euthanasia and disposal | Research should focus on helping to clarify issues related to euthanasia and disposal. | 25 | Federal | |
| Laboratory surge capacity | Determine whether enough reagents are available to support the NAHLN capacity. | 42 | Federal | |
| Laboratory surge capacity | Establish procedures for the collection and transport of samples to the other NAHLN laboratories. | 42 | Federal | State |
| Laboratory surge capacity | Investigate the use of CSTs to further augment the capacity available through the NAHLN. Players suggested that CSTs could potentially be validated and certified through the NAHLN. The CSTs would also need access to the necessary reagents. | 42 | Federal | State |

Table 6. Summary of recommendations

| Subject | Recommendation | Page number | Responsible agency level | Supporting agency level |
|---------------------------|---|-------------|--------------------------|-------------------------|
| Laboratory surge capacity | Players felt that it would have been helpful if NAHLN could have provided capacity estimates at the time of activation as it took quite some time for them to call all the labs individually. Perhaps NAHLN could identify and document this capacity in advance and routinely update it. The capacity estimates could then be obtained more quickly during an event. | 41 | Federal | State |
| Laboratory surge capacity | TVMDL should work with the DDC and CST to incorporate plans made during the exercise into a formal protocol for sample collection, transport, and processing. Follow-up on the fixed wing aircraft should occur, and the resolution should be included in the protocol. | 41 | State | Local |
| Movement control | Clarify responsibilities and guidelines for setting quarantine zones in policies, plans, and procedures. These decisions will require a combination of both local/operational and strategic viewpoints (e.g., OIE guidelines). Establish an advisory board to combine various considerations into policy recommendations. | 35-36 | Federal, state | Industry, local |
| Movement control | Clarify the role of industry in supporting the requirements for permitted movement (e.g., sampling, inspection, and decontamination) as well as the procedures and processes for obtaining permits. | 36 | Federal, state | Industry, local |
| Movement control | Local representatives were concerned about supporting the initial 48-hour hold order. Resource availability for enforcing hold orders should be reviewed and procedures established for enforcement. | 36 | Local | State |

Table 6. Summary of recommendations

| Subject | Recommendation | Page number | Responsible agency level | Supporting agency level |
|--------------------|--|-------------|--------------------------|--------------------------|
| Other | Conduct more pre-exercise training, such as Incident Command System (ICS) training | 48-49 | State | Local, federal, industry |
| Other | Review and update ICP organizational structure, plans, and procedures in light of the exercise. Consider how best to incorporate the DDC, industry, and the USDA IMT within the ICP. | 49 | State | Local, federal, industry |
| Other | Industry should develop industry-specific plans, guidelines, and protocols. | 51 | Industry | State, local, federal |
| Other | Review notification protocols surrounding presumptive and confirmed laboratory results | 50-51 | Federal | State |
| Public information | Ensure that adequate emergency public information response plans and procedures exist to support the response to an FMD outbreak. | 47 | State, industry | |
| Public information | Ensure that the PIOs, call center personnel, and other personnel are trained to carry out these plans and procedures. | 47 | State | Industry, federal |
| Public information | Plan to include a state PIO within the ICP to address state and local public information issues. | 47 | State | Industry, federal |
| Vaccination | Educate state veterinarians about the North American FMD Vaccine Bank program and its associated capabilities and protocols. | 29 | Federal | State |
| Vaccination | Conduct further research and outreach to support science-based vaccination decisions that also consider the policy impact. | 29 | Federal | State, local, industry |
| Vaccination | Establishment a vaccine advisory group that includes a variety of representatives to develop recommendations for senior leadership. | 29 | State | Local, federal, industry |

Table 6. Summary of recommendations

| Subject | Recommendation | Page number | Responsible agency level | Supporting agency level |
|-------------|--|-------------|--------------------------|-------------------------|
| Vaccination | Vaccine receipt, staging, storage, and distribution could require considerable resources, and plans should be established to ensure that vaccine distribution is conducted rapidly. Strategic National Stockpile (SNS) plans could be adapted for FMD vaccine staging, storage, and transport. | 29 | Federal, state | Local, industry |

Appendix A: Key event summary

Table 7. Summary of key events during Operation Palo Duro

| Day | Time | Event |
|---------|-------|---|
| Feb. 19 | | Foreign Animal Disease Diagnostician called to Texas Feedyard North in Dalhart and observes signs consistent with FMD. Samples are collected and sent to Plum Island. A hold order is placed on the premises. |
| Feb. 20 | | PCR analysis positive for FMD virus at Texas Feedyard North. Virus isolation, surveillance, and trace out initiated. |
| Feb. 20 | | FADD called to Texas Feedyard Tour in Amarillo. Samples are collected and sent to Plum Island. |
| Feb. 21 | 13:00 | Site teams visit the Dalhart and Amarillo premises. |
| Feb. 22 | 9:00 | Lab results are negative for FMD at Texas Feedyard Tour and confirmed Type A FMD virus at Texas Feedyard North. New presumptive positive diagnoses for Texas Feedyard South and Texas Dairy South in Hereford, resulting in hold orders for both premises. |
| Feb. 22 | 9:00 | Delegation of authority meeting between the USDA IMT and TAHC. |
| Feb. 22 | 9:20 | Delegation of authority signed by TAHC. |
| Feb. 22 | 9:30 | Command Meeting. Quarantine orders issued for Texas Feedyard North, Texas Feedyard South, and Texas Dairy South. Will request Texas Governor declare an emergency and USDA declare an extraordinary emergency. Define Texas Panhandle as region 5B of Department of Public Safety (DPS) |
| Feb. 22 | 9:30 | Industry representatives send questions to the ICP regarding how animals will be cared for under the hold order (e.g., can they still bring in feed?). Also ask where the animals in transit will be sent. |
| Feb. 22 | 9:30 | TVMDL requests BSL-3 trailer from College Station – will take 24 hours to arrive. Can prepare up to 1,800 specimens/day. |
| Feb. 22 | 9:45 | DDC discusses anticipated quarantine zones and discusses preliminary plans to support them |
| Feb. 22 | 9:50 | Transfer of authority from TAHC to the USDA IMT. |
| Feb. 22 | 10:00 | Safety officer vetoes gunshot as option for euthanasia due to safety concerns. |
| Feb. 22 | 10:00 | North American FMD Vaccine Bank activated. Texas will receive 350,000 doses in 7 days. An additional one million doses will be available one week later. |
| Feb. 22 | 10:04 | Industry representatives discuss slaughter of animals from the area. Will packers and FDA accept animals for slaughter? |
| Feb. 22 | 10:08 | Unified command meeting held in the ICP. Discuss Houston Livestock Show. All movement within the 31 counties will be stopped for 48 hours. Discuss incident objectives. |
| Feb. 22 | 10:10 | DDC reports request for state Declaration of Emergency is in progress. |

Table 7. Summary of key events during Operation Palo Duro

| Day | Time | Event |
|---------|-------|--|
| Feb. 22 | 10:12 | Operations Section requests law enforcement support for roadblocks from DDC. DDC diverts request to local node. |
| Feb. 22 | 10:15 | Clarification of stop movement order – all susceptible species are quarantined for 48 hours. |
| Feb. 22 | 10:15 | Appraisal Unit requests current price list for cattle from CEAH. |
| Feb. 22 | 10:15 | Local node discusses the need to define personnel, truck, and equipment movements into and out of feedlots, and quarantine and kill zones. Players discussed the possibility of using a “strike truck” to go clean and disinfect other vehicles going in and out of quarantine areas. |
| Feb. 22 | 10:20 | TAHC requests USDA declaration of extraordinary emergency via the Governor – told to “spend it like you have it” in the meantime. |
| Feb. 22 | 10:45 | Local node fills requests for law enforcement officers to support roadblocks. |
| Feb. 22 | 10:50 | Site Branch reports additional information from FADD report. Texas Feedyard North has 650 pens. The infected animal is an 800-lb steer that has been in the yard for approximately 2 months. 25% of the pen is now showing clinical signs. Texas Feedyard South has 400 pens. 2 steers are infected but not confirmed. They are 700-lb animals that have been in the yard for one month. Texas Dairy South has 20 pens. The cows have been milking for 100 days. 25% of the dairy is showing clinical signs. |
| Feb. 22 | 10:51 | DDC discussed the staging of veterinary stockpile trailers in Dalhart and Hereford. |
| Feb. 22 | 11:00 | TX governor issues an emergency declaration for the FMD outbreak; Kansas and Colorado close borders to all FMD-susceptible livestock movement. |
| Feb. 22 | 11:00 | ICP command staff continues to craft IAP objectives. |
| Feb. 22 | 11:00 | C&D Unit begins planning for C&D points at request of Operations Section. |
| Feb. 22 | 11:20 | E&D Branch discusses requirements for land burial with environmental personnel. Need to be 300 feet from water sources, need DIG-TESS certifications. |
| Feb. 22 | 11:24 | APHIS advises the ICP that the National Veterinary Stockpile is available for request. Primary assets include PPE, C&D, and biosecurity resources. |
| Feb. 22 | 11:30 | DDC personnel discuss process for requesting National Veterinary Stockpile resources with USDA representative. DDC personnel note that the process is long and cumbersome. |
| Feb. 22 | 11:30 | Texas Department of Transportation (TxDOT) completes list of available equipment. Personnel are concerned that they lack enough equipment for cleaning and disinfection. |
| Feb. 22 | 11:30 | ICP asks policy node if there is a National or Texas statewide stop movement order. Policy node replies “no” on both. |
| Feb. 22 | 11:42 | HSAS level raised to Orange for the agriculture sector. |
| Feb. 22 | 11:50 | Local node discusses stop movement order and its impact. Need to ensure animals are fed. There are inadequate holding facilities available for diverting animals in transit. Animals should be sent back to their origin if it is within the stop movement zone. |

Table 7. Summary of key events during Operation Palo Duro

| Day | Time | Event |
|---------|-------|---|
| Feb. 22 | 12:00 | Incident Command conference call: stop movement order announced, incident objectives announced. A livestock movement protection plan will be in place within 38 hours for the entire district 5B. Availability of National Veterinary Stockpile equipment announced. Policy node announces decision not to cancel the Houston Livestock Show and Rodeo. Local node advised that enforcement of stop movement is not feasible. |
| Feb. 22 | 12:33 | C&D Unit determines that Virkon is the disinfectant of choice because it is environmentally friendly. |
| Feb. 22 | 12:38 | Industry representatives discuss support for depopulation. Need to use sedatives so that the animals are not dangerous. Do not recommend use of portable pens and chutes. Recommend using hospital pens. Industry recommends that the entire yard not be depopulated. Request to kill only those showing clinical signs and the surrounding pens. Industry would like to give yard the responsibility for working out exactly how animals are euthanized. |
| Feb. 22 | 12:40 | Local node reports that two county judges in the 31-county region have told their local Sheriff's Offices to stop livestock trucks and advise them to return to their origin. Swine industry will not allow animals back on premises because jeopardizes the herds. Need to send directly to renderer. |
| Feb. 22 | 12:46 | Decision to stage TxDOT equipment at locale TxDOT yard. |
| Feb. 22 | 12:51 | DPS to deploy personnel to close major roads into Texas Panhandle. |
| Feb. 22 | 12:55 | Site Branch discusses the epidemiological data for the 3 sites. |
| Feb. 22 | 13:00 | Policy node advises the ICP that the vaccine bank has been activated and it should make request for use per the decision tree. |
| Feb. 22 | 13:10 | Lab receives request to process samples from voluntary surveillance program. Lab replies that it can honor request until it receives direction to process samples in support of the state/federal surveillance efforts. |
| Feb. 22 | 13:15 | ICP requests permission from policy node to depopulate only the cattle at Texas Feedyard North with clinical signs and vaccinate the remainder. |
| Feb. 22 | 13:29 | ICP clarifies to industry representatives that stop movement order applies to all products, not just livestock. |
| Feb. 22 | 13:25 | Policy node denies request to vaccinate cattle at Texas Feedyard North due to the length of time necessary to receive vaccine and develop an immune response. |
| Feb. 22 | 13:45 | Virus isolation for Texas Feedlot South confirmed as Type A. |
| Feb. 22 | 13:54 | Industry representatives concerned about signing for animals – do not want to act for owner on indemnity. Question how indemnity is calculated. |
| Feb. 22 | 14:10 | First ICP situation report issued. |
| Feb. 22 | 14:20 | ICP PIO recommends holding off on announcing second confirmation until after the afternoon press conference. |
| Feb. 22 | 14:43 | Industry recommends appraisal be based on cost with current feedyard sheets. |
| Feb. 22 | 14:50 | Policy node sends vaccine decision tree to ICP. Advises that authorities are sufficient for pre-emptive slaughter and resources, including indemnity funds, are sufficient. |

Table 7. Summary of key events during Operation Palo Duro

| Day | Time | Event |
|---------|-------|---|
| Feb. 22 | 14:56 | The ICP sends a request to the policy node to consider the use of gunshot for euthanasia. |
| Feb. 22 | 14:51 | Industry requests support for disinfection so their employees can go home. |
| Feb. 22 | 14:55 | Swine industry asks what steps they need to take to start animals moving once the 48 hour hold order has elapsed. |
| Feb. 22 | 15:00 | Site Branch requests EMTs to be at first aid stations on premises. |
| Feb. 22 | 15:00 | Policy node advises that swine can be moved to slaughter with the requirement that samples are collected and tested (tracheal swab and negative PCR result) and that all animals are visually inspected. |
| Feb. 22 | 15:25 | The industry node asks where roadblocks are so that it can re-route feed trucks. They are instructed to disinfect the trucks and direct them to lagoons. |
| Feb. 22 | 15:30 | C&D Unit assigns two strike trucks at front gate of Texas Feedyard North. |
| Feb. 22 | 15:39 | Industry concerned their employees will not show up to work. |
| Feb. 22 | 15:50 | C&D Unit reports that strike trucks and personnel have been dispatched to the five sites requested at Dalhart to begin C&D operations. |
| Feb. 22 | 16:07 | Situation conference call between nodes. Second confirmation announced. Policy group announces that NAHLN labs can now run samples – overall NAHLN capacity is 8,500 samples/day. Policy group announces activation of the vaccine bank – will vaccinate animals to slaughter. There will be a 60-day withdrawal period for vaccine before slaughter. Gunshot is approved for depopulation with appropriate protocols and safety. |
| Feb. 22 | 16:30 | Policy node requests ICP develop recommendations for use of vaccine per the vaccine bank decision tree. |
| Feb. 22 | 16:30 | Press conference held (notional). |
| Feb. 22 | 17:00 | Virus isolation for Texas Dairy South confirmed as Type A. |
| Feb. 22 | 17:00 | Policy node requests ICP determine movement restriction zone post 48 hours. |
| Feb. 22 | 17:30 | IAP for the next operational period completed for the ICP. |
| Feb. 23 | 8:00 | USDA Declaration of Extraordinary Emergency signed (\$3 billion). Federal quarantine issued in support of state quarantine. |
| Feb. 23 | 8:09 | Morning briefing; 10-km quarantine zones and 15-km surveillance zones established around the four infected premises. 350,000 doses of Type A vaccine are due to arrive in Amarillo, TX on March 1. One-third of depopulation is complete at Texas Feedyard North. Swine are permitted to move to slaughter with inspection and sampling. |
| Feb. 23 | 8:23 | ICP command meeting; Discuss focus for the day. Learn about CETA press release on treatment of animals. |
| Feb. 23 | 8:30 | DDC combines with local node to form a MACC. MACC conducts morning briefing. Decides to put liaisons with the ICP Sections. |
| Feb. 23 | 8:35 | Site Branch in ICP makes plans for handling multiple sites. |
| Feb. 23 | 8:51 | Two C&D Strike Trucks dispatched to the Friona, TX Dairy. C&D unit discusses need for more equipment and personnel. |
| Feb. 23 | 8:52 | Industry asked to estimate number of livestock and poultry within a 10km and 15km radius of each infected feedyard. |

Table 7. Summary of key events during Operation Palo Duro

| Day | Time | Event |
|---------|-------|---|
| Feb. 23 | 9:06 | National Guard discusses weapon availability with MACC for use of gunshot in euthanizing animals. National Guard concerned weapons are not the correct caliber. |
| Feb. 23 | 9:12 | ICP discusses vaccine priorities – seek recommendations from industry. |
| Feb. 23 | 9:17 | The Operations Section informs the Incident Commander that the DDC is not even considering vaccination because there are 300,000 head of cattle. Advise there is no capacity for pre-emptive slaughter. |
| Feb. 23 | 9:20 | ICP requests clarification from policy group on questions from swine industry. Discuss lab surge capacity necessary to support the samples. Suggest revising case definition to exclude PCR. Lab representatives discussed use of CST to do PCR – issue is they are not certified. |
| Feb. 23 | 9:39 | Industry asked to estimate number of animals they could vaccinate. Estimate a rate of 125 head/chute if you have to restrain and tag. Would require working 24/7 with multiple chutes. Begin working on more detailed estimates. |
| Feb. 23 | 10:00 | Disposal unit discusses euthanasia and disposal plans. Question whether the owner will need to purchase adjacent land for burial – who should pay for this? Plan to dump milk in injection wells. Discuss alternative burial sites. |
| Feb. 23 | 10:24 | MACC discusses vaccine logistics. Vaccine will arrive at Rick Husband airport in Amarillo. It will be staged at the Amarillo Fairgrounds. |
| Feb. 23 | 10:37 | Conference call with APHIS EOC. ICP announces disposal completed at Texas Feedyard North contrary to morning briefing. Appraisal is also complete at that feedyard. Appraisal underway at other sites. Staging area has been established for heavy-duty equipment. Warehouse space at airport has refrigeration (for vaccine). 4 helicopters have been requested to monitor animal movement. |
| Feb. 23 | 10:45 | Swine industry discusses need for resources – cannot move to slaughter without resources to conduct inspection/sampling. The farms have serious space problems due to increasing population and stop movement order. Industry representatives are advised that swine company veterinarians who are accredited can collect samples and inspect animals. Other questions include: Who issues the permits? Is movement allowed between premises owned by a single farm? How can they move animals to the slaughter facilities, all of which are in other states, if they have stop movement orders in place? |
| Feb. 23 | 10:57 | ICP command receives clarification on declaration of extraordinary quarantine – USDA quarantine in support of state. ICP should establish zones and markers. OK and KS declared state emergencies and request extraordinary declaration as well. Also discuss need for alternate burial sites. Will continue to euthanize while issue of obtaining additional burial land is addressed. Discuss vaccine logistics and use of vet students to administer vaccine. 50 sharpshooters have been identified for the second premises, but need to develop an SOP. |
| Feb. 23 | 11:25 | Industry discussed concerns regarding vaccination: 1) where is the manpower coming from? 2) who is paying for the extra labor and when do they get paid? 3) where is the SOP? |
| Feb. 23 | 11:34 | Industry relays suggestions for vaccine priority to ICP: Priority is cattle with greater than 60 days left in yard until ready for harvest. Then work down from cattle that have been there the longest to those that have been there the shortest time. |

Table 7. Summary of key events during Operation Palo Duro

| Day | Time | Event |
|---------|-------|--|
| Feb. 23 | 13:12 | The policy node replies that they would like to use CSTs but that the current system has not been validated for PCR. However, they can assist in other ways. |
| Feb. 23 | 13:15 | Swine industry requests info from ICP regarding the decontamination protocol for trucks hauling live hogs to slaughter. Also ask where decon will occur and who will supply/pay for equipment and supplies. |
| Feb. 23 | 13:31 | Industry node requests information on whether CAFOs will be compensated. Industry told “no” and it is suggested they need to ask Congress for a special appropriation. |
| Feb. 23 | 14:00 | Policy node responses to ICP: ID for vaccinated animal should be a tamper-proof ear tag. They are checking to see if they are in the Kansas warehouse. Sampling/inspection of non-clinical bovines moving to slaughter should use the same criteria as for swine. Permit Section should make recommendations for movement of non-susceptible species. OK and KS will accept animals for slaughter. All must be inspected and test negative by established protocol. Producers can vaccinate with regulatory oversight by an accredited veterinarian or state/federal Official with appropriate orientation. Case definition should still include a PCR positive test results. Students can be used as AHTs. Any movement between premises must be permitted. The first shipment of 350,00 doses of vaccine is allocated for Texas. |
| Feb. 23 | 14:34 | Final conference call between nodes. USDA discusses need to identify and track the vaccinates. Discuss resources for vaccination and use of vet students. |
| Feb. 23 | 15:30 | Press conference held (notional). |

Appendix B: Resource lists and cost estimates

During Operation Palo Duro, exercise participants compiled lists of needed resources, inventoried DDC resources, and produced cost estimates for FMD response activities. This section includes the following:

- Resource lists:
 - C&D equipment
 - Safety equipment
 - Euthanasia equipment
 - Other equipment
 - Personnel.
- DDC available resources.
- Cost estimates.

Resource requests

Table 8. C&D equipment list

| Quantity | Description |
|-------------------|--|
| 8 | ¾- or 1-ton pickups for hauling 4 personnel |
| 1 per truck | 100-gallon fiberglass trucks for disinfectant |
| 1 per truck | 300 sfm gas-powered pressure washers |
| 1 per truck | Valves and connection lines from truck to pressure washers |
| 1 per truck | 100 ft pressure washer hoses |
| 1 per truck | 50 ft garden hoses |
| 1 per truck | Ladders (20 ft extension) |
| 6 per truck | Barrier cones |
| 4 per truck | Rolls of barrier tape (“Do Not Cross This Line”) |
| 4 per truck | Orange flags |
| 4 per truck | Orange flashing lights |
| 5 | Portable generator with lights and poles |
| 9 | Tool boxes equipped with channel locks, pliers, hammer, set of screwdrivers, socket sets, and black tape |
| 1 per truck | 5-gallon gas cans and fuel |
| 1 per truck | First-aid kits with eye washes |
| 4 cases | Paper towels |
| 2 boxes per truck | 50-gallon industrial trash bags |
| 2 boxes per truck | Duct tape |
| 2 cases | Disinfectant hand wash |
| 24 | Scrub brushes |
| 24 | Foot wash tubs or shallow wide rubber feed tubs |
| 24 | 5-gallon buckets |
| 25 cases | Virkon 5 – 10 pound tubs, 4 tubs per case |
| | Bottled water |
| | Food or snack packages |
| 16 | Shovels |
| 30 | 2-gallon pressure sprayers |
| 25 | Rain suits |
| 30 | Respirators |
| 30 pairs | Rubber boots, various sizes |
| 30 pairs | Rubber gloves |
| 20 boxes | Latex gloves, various sizes |
| 30 | Goggles or masks |
| 10 cases | Disposable coveralls, foot wraps, and head caps, various sizes |
| 100 pairs | White cotton gloves |

Table 9. Safety equipment list

| Quantity | Description | Source |
|----------|---|-----------|
| 50 | First-aid kits | Warehouse |
| 50 | Disposable camera (in vehicles to use for accident information) | |
| 50 | Eye wash kits | |

Table 10. Appraisal equipment list

| Quantity | Description | Source |
|----------|---------------------------|-------------------------|
| 15 | Dual cab 4x4 with toppers | Enterprise Rent-A-Truck |
| 15 | GPS units | |
| 15 | Digital cameras | |
| 30 | Cell phones | |
| | VS Form 1-23 | Warehouse |
| 100 | Tyvek suits | Warehouse |
| 50 | Rain suits | Warehouse |
| 50 pairs | 14" rubber boots | Warehouse |

Table 11. Disposal equipment list

| Quantity | Description | Source |
|----------|-------------------------|--------|
| 4 | Wilson portable corrals | |
| 8 | Alloy frames (x2) | |
| 104 | 10-foot panels (x2) | |
| 20 | 10-foot gates (x2) | |

Table 12. Euthanasia equipment list

| Quantity | Description | Source |
|-------------|---|-------------------|
| 3,500 vials | 100 mg/ml xylazine | Veterinary supply |
| 1,600 vials | 100 mg/ml xylazine | Veterinary supply |
| 400 | Tyvek suits, 200 large and 200 x-large | Warehouse |
| 50 | Bobcats with operators (100) | Contract |
| 100 | 7-9" boning knives | |
| 50 | Diamond steels | |
| 250 pairs | Rubber boots | Warehouse |
| 1250 pairs | Ear plugs | Warehouse |
| 300 sets | Protective eyewear | Warehouse |
| 100 boxes | Safety flex gloves | Warehouse |
| 100 | 6-lb cases Virkon powdered disinfectant | Warehouse |
| 25 | 5-gallon washtubs | Warehouse |
| 15,000 | Charges for captive-bolt gun | Veterinary supply |
| 3 cans | WD-40 spray lubricant | Local purchase |
| 1,000 | Tyvek suits, 500 x-large and 500 xx-large | Veterinary supply |
| 15 boxes | Safety flex gloves, 8 large and 7 x-large | Veterinary supply |
| 50 | Sorting paddles | Veterinary supply |
| 16 | Magrath hotshots | Veterinary supply |
| 144 | C cell batteries | Local purchase |
| 25 | Headgates | |
| 300 | 10-foot heavy-duty panels | |
| 150 | Alloy frames for panels | |
| 150 | 25-cal inline captive-bolt guns | |
| 100,000 | Charges for captive bolts | |
| 140 | 50-cc multi-dose syringes, pistol grip | |
| 100 | 20-foot heavy towing chain with hooks | |
| 50 | 12" boot scrub brushes | Warehouse |
| 30 | Two-way radios | MACC |
| 75 | 15 kW trailer generators with 3 light bars | Rental |
| 25 | Disposable Sharps containers | Warehouse |
| 20,000 | 18-gauge 1½" metal hub needles | Warehouse |
| 65 | ¾-ton dual cab 4x4 pickups with class 3 hitches | Rental |
| 50 | 12-14-foot flatbed trailers | |

Table 13. Other equipment

| Quantity | Description | Source |
|----------|---|--------|
| 10 | Semi-tanker trailers/trucks (salt water) to haul waste milk to deliver to injection wells | DDC |
| 2 | Refrigerator trucks | |
| 8 | 16-foot stake bed 2 ½-ton trucks with tool box | |
| 5 | Portable generator with light bars | |
| 25 | ¾-ton trucks | |
| 5 | Large box trucks | U-Haul |
| 30 | Dozers and operators | TXDOT |
| 30 | Loaders and operators | TXDOT |
| 20 | Dump trucks and operators | |

Table 14. Personnel requests

| Quantity | Description | Source |
|----------|--|----------------------|
| 2 | Counselors to assist personnel on euthanasia and disposal crews | |
| 6 | Veterinarians (2 at each premises) | Regional office |
| 12 | Support veterinary personnel (4 at each premises) | Regional office |
| 45 | Appraisers (15 3-man crews) | Contractors |
| 3 | Appraisal group leaders | Contractors |
| 8 | Personnel to take calls in permit office | DDC, TDA |
| 2 | Personnel (at each infected site) to determine how infection was introduced | |
| 50 | Approved marksmen/shooters (25 for daytime and 25 for night-time) | DDC |
| 50 | Law enforcement personnel for road block duty | MACC |
| 1 | FADD technical specialist | |
| 50 | VMDs | |
| 10 | VMD taskforce leaders | |
| 200 | AHTs | |
| 50 | Temporary general laborers | |
| 3 | Epidemiologists for Texas Dairy Southwest in Friona, TX | Regional office |
| 2 | Safety officers for Texas Dairy Southwest in Friona, TX | Regional office |
| 1 | FMD technical specialist | Regional office |
| 2 | Roadblock personnel | MACC |
| 3 | Epidemiologists to develop euthanasia/disposal protocol, sampling protocol, and investigative protocol for determining source and possible transmission routes/facilities. | DDC, Regional office |
| 1 | Air ops branch director for fixed wing aircraft | |
| 2 | Bilingual operators for 1-800 number call in line | |
| 20 | PIO handbooks for individual educational contact purposes | PIO |

DDC available resources

Table 15. Resources available from the DDC

| Quantity | Description | Source |
|----------|---|---------------|
| 1 | Dozer with trailer and operator | TXDOT (local) |
| 35 | Loaders | TXDOT (local) |
| 37 | 10-yard dump trucks | TXDOT (local) |
| 107 | 6-yard dump trucks | TXDOT (local) |
| 10 | 1,000-gallon spray trucks | TXDOT (local) |
| 6 | 250-gallon fuel trailers | TXDOT (local) |
| 8 | Changeable message boards | TXDOT (local) |
| 66 | Dozers | TXDOT (state) |
| 97 | Loaders | TXDOT (state) |
| 5 | High-pressure (10,000 psi) sprayers | TXDOT (state) |
| 294 | 500-gallon herbicide trucks | TXDOT (state) |
| 247 | Changeable message boards | TXDOT (state) |
| 30 | 2-man roadblock units | DPS |
| 2 | Units, HP | DPS |
| 6 | Units, CVE | DPS |
| 2 | Fixed wing aircraft | DPS |
| 2 | Helicopters | DPS |
| 26 | Investigators | TCEQ |
| 13 | Vehicles (3 are 4x4s), with GPS | TCEQ |
| 2 | Boats | TCEQ |
| 5 | Staff and vehicles – Amarillo area (available within 1 hour) | TDA |
| 12 | Staff and vehicles – Lubbock area (available within 4-6 hours) | TDA |
| 5 | Staff and vehicles – Odessa/El Paso area (available within 6-8 hours) | TDA |
| 15 | Staff and vehicles – Dallas area (available within 24 hours) | TDA |
| 12 | Staff and vehicles – San Antonio area (available within 36 hours) | TDA |

Cost estimates

Table 16. 60-day cost estimates for equipment and personnel

| Expense | Description | | | Subtotal | Total |
|--|---------------|------------|-------------------|--------------|--------------|
| Equipment | | | | | |
| Purchases | | | | \$335,563 | |
| Rentals – Regular | | \$140,600 | x 60 days | \$8,436,000 | |
| Rentals – TXDOT | | \$211,720 | x 60 days | \$12,703,200 | |
| | | | | | \$21,474,763 |
| Incident Command Post | | | | | |
| Regular salary | | \$48,592 | x 43 weekdays | \$2,089,456 | |
| Overtime | | \$28,930 | x 43 week days | \$1,243,990 | |
| | | \$86,790 | x 17 weekend days | \$1,475,430 | |
| Per diem | 103 personnel | | x \$39 | \$241,020 | |
| | | | x 60 days | | |
| Lodging | 103 personnel | | x \$61 | \$376,980 | |
| | | | x 60 days | | |
| Deployments – Airfare | 103 personnel | | x \$1,230 | \$380,070 | |
| | | | x 3 deployments | | |
| | | | | | \$5,806,946 |
| Feedlot staffing | | | | | |
| Veterinarians - Regular salary | 60 personnel | | x 43 weekdays | \$668,117 | |
| | | x \$32.37 | | | |
| | | x 8 hours | | | |
| Veterinarians - Overtime, week-days | 60 personnel | | x 43 weekdays | \$447,475 | |
| | | x \$43.36 | | | |
| | | x 4 hours | | | |
| Veterinarians - Overtime, weekend days | 60 personnel | | x 17 weekend days | \$530,726 | |
| | | x \$43.36 | | | |
| | | x 12 hours | | | |
| AHT - Regular salary | 200 personnel | | x 43 weekdays | \$1,603,040 | |
| | | x \$23.30 | | | |
| | | x 8 hours | | | |
| AHT - Overtime, weekdays | 200 personnel | | x 43 weekdays | \$1,059,864 | |
| | | x \$30.81 | | | |
| | | x 4 hours | | | |
| AHT - Overtime, weekend days | 200 personnel | | x 17 weekend days | \$1,257,048 | |
| | | x \$30.81 | | | |
| | | x 12 hours | | | |

Table 16. 60-day cost estimates for equipment and personnel

| Expense | Description | | Subtotal | Total |
|--|---------------|--|--------------|----------------|
| Per diem | 260 personnel | x \$39 x 60 days | \$608,400 | |
| Lodging | 260 personnel | x \$61 x 60 days | \$951,600 | |
| Deployments – airfare | 260 personnel | x \$1,230 x 3 deployments | \$959,400 | |
| Deployments – ground | 260 personnel | x 260 personnel x 3 deployments | \$23,400 | |
| | | | | \$8,109,070 |
| Appraisers | | | | |
| Veterinarians - Regular salary | 3 personnel | x 43 weekdays x \$32.37 x 8 hours | \$33,406 | |
| Veterinarians - Overtime, weekdays | 3 personnel | x 43 weekdays x \$43.36 x 4 hours | \$22,374 | |
| Veterinarians - Overtime, weekend days | 3 personnel | x 17 weekend days x \$43.36 x 12 hours | \$26,536 | |
| AHT - Regular salary | 45 personnel | x 43 weekdays x \$23.30 x 8 hours | \$360,684 | |
| AHT - Overtime, weekdays | 45 personnel | x 43 weekdays x \$30.81 x 4 hours | \$238,469 | |
| AHT - Overtime, weekend days | 45 personnel | x 17 weekend days x \$30.81 x 12 hours | \$282,836 | |
| Per diem | 48 personnel | x \$39 x 60 days | \$112,320 | |
| Lodging | 48 personnel | x \$61 x 60 days | \$175,680 | |
| Deployments – airfare | 48 personnel | x \$1,230 x 3 deployments | \$177,120 | |
| Deployments – ground | 48 personnel | x \$30 x 3 deployments | \$4,320 | |
| | | | | \$1,433,745 |
| Indemnity | | | | |
| Texas Feedyard North | 75,000 head | x \$900/head | \$67,500,000 | |
| Texas Feedyard South | 55,000 head | x \$900/head | \$49,500,000 | |
| Texas Dairy South | 3,500 | x \$900/head | \$3,150,000 | |
| Texas Dairy Southwest | 3,000 | x \$900/head | \$2,700,000 | |
| | | | | \$ 122,850,000 |

Table 16. 60-day cost estimates for equipment and personnel

| Expense | Description | Subtotal | Total |
|-----------------------|-------------|--------------|---------------|
| Air National Guard | | unavailable | |
| Vaccine storage | | unavailable | |
| Law enforcement - DPS | | unavailable | |
| | | Grand total: | \$159,674,524 |

Appendix C: Protocols and procedures

During Operation Palo Duro, exercise participants produced the protocols and procedures for cleaning and disinfection, sampling and surveillance, euthanasia, and vaccination.

Cleaning and disinfection (C&D)

During Operation Palo Duro, players came up with the following cleaning and disinfecting (C&D) procedures for personnel at local command posts.

- Foot washes will be placed at each entrance. Everyone must walk through foot washes entering and exiting buildings.
- A tank will be set up at the command post for those personnel carrying pump up hand sprayers to refill with Virkon-5 diluted solution. A designated person in the C&D section will mix the disinfectant at the command post.
- Personnel assigned to task force who will be crossing barrier zone, where C&D strike vehicles will not be available, will need to check out a 2-gallon hand sprayer from logistics. Pumps can be refilled at command post or nearest C&D strike truck. All vehicles crossing barrier zone will need to spray all wheels before leaving barrier zone.
- Material safety data sheets for Virkon. Material safety data sheets should be available for each person checking out portable hand sprayers.
- Public information such as local radio stations and/or television stations. Make local public aware of buffer zones and the need to disinfect vehicles leaving buffer zones to halt spread of FMD.

On February 22, 2007, the Operations section produced the following C&D protocol for vehicles:

- All delivery vehicles will enter the premises when possible the driver will not exit the vehicle. Vehicles will be cleaned and disinfected upon exiting premises. All non-essential services and personnel will be denied access.

Sampling and surveillance

The following were developed on Day 1:

- Sample size and protocol
 - Greater than 2,000: 150 samples (95% confidence, 2% infection)
 - Less than 50: 50 samples
 - 51 to 100: 50 + every other animal.
- High-risk
 - All animals moved out of Texas Feedyard North (excluding slaughter) within the past 21 days
 - Daily dead-animal pickups for rendering within 21 days
 - Employee transmission by fomites
 - Adjacent premises having closer than 60 feet of separation
 - Dairy milk trucks.
- Low-risk: All other at-risk animals not meeting above criteria within 5B.

On Day 2, the following protocol was recommended to address resource capacity:

- If less than 20 animals, sample all
- If 20 to 50 animals, sample 15
- If more than 50 animals, sample 20.

These guidelines should be applied per pen, not by herd or feedyard.

Euthanasia

Safety Procedures for Captive-Bolt Euthanasia:

1. Wear eye and ear protection when using captive-bolt equipment.
2. Prepare the captive bolt according to the instructions and being very careful not to point the device at yourself or anyone else.
3. Keep the device on SAFETY, and do not cock it until you are ready to fire it.
4. If the captive bolt does not fire, set it back to SAFETY and wait at least 30 seconds before trying to remove the cartridge from the chamber.
5. ALWAYS uncock the device before setting it down.
6. Keep the devices unloaded when they are not in use or being transported.

Vaccination

Exercise participants in the Situation Unit sent the following vaccination protocol to the Planning Section:

- **Feedlots:** Incident personnel will be dispatched to CAFO/feedlots to train personnel in FMD vaccine handling and administration procedures. At least one task force member will be available to supervise/assist CAFOs/feedlots in vaccination issues during vaccine administration. CAFO/feedlot personnel will administer FMD vaccinations and individual animal ID. No animals will be vaccinated within 60 days of slaughter.
- **Stocker cattle operations:** Task force personnel will be responsible for vaccinating stocker cattle within the 15K buffer as outlined below. No stocker cattle sentinel groups will be established unless there are no CAFO/feedlot groups available.

— Vaccination will begin at the 15 km boundary of Infected Premises and move inward in a ring vaccination manner. Sentinel groups (ideally, those animals within 60 days of slaughter from CAFOs/feedlots) of non-vaccinates will be maintained within the 10 to 15 km buffer zone along the outer 15 km boundary.

- **Animal ID:** All vaccinates will be identified with an ear tag provided by the task force. The tags will have a unique number and be easily distinguishable from other commonly used ear tags and have “FMD” visually readable from up to 10 feet, in addition to the unique number.

Table 17 contains the throughput estimates for carrying out vaccination.

Table 17. Throughput estimates for vaccination

| Sites | Capacity (heads) | Chutes | Days to vaccinate and tag | Days to vaccinate only |
|-----------|------------------|--------|---------------------------|------------------------|
| North | | | | |
| 1 | 30,00 | 1 | 1.00 | 0.69 |
| 2 | 83,000 | 4 | 6.92 | 4.80 |
| 3 | 40,000 | 3 | 4.44 | 3.09 |
| 4 | 5,500 | 1 | 1.83 | 1.27 |
| 5 | 0 | 4 | 0 | 0 |
| Total | 131,500 | | | |
| South | | | | |
| 1 | 0 | 3 | 0 | 0 |
| 2 | 40,000 | 3 | 4.44 | 3.09 |
| 3 | 5,000 | 1 | 1.67 | 1.16 |
| 4 | 20,000 | 1.5 | 4.44 | 3.09 |
| 5 | 3,000 | 1 | 1.00 | 0.69 |
| 6 | 3,500 | 1 | 1.17 | 0.81 |
| 7 | 5,000 | 1 | 1.67 | |
| Total | 76,500 | | | |
| Southwest | | | | |
| 1 | 45,000 | 3 | 5.00 | 3.47 |
| 2 | 55,000 | 4 | 4.58 | 3.18 |
| 3 | 25,000 | 1.5 | 5.56 | 3.86 |
| 4 | 70,000 | 4 | 5.83 | 4.05 |
| 5 | 5,300 | 1 | 1.77 | 1.23 |
| 6 | 8,500 | 1 | 2.83 | 1.97 |

Table 17. Throughput estimates for vaccination

| Sites | Capacity (heads) | Chutes | Days to vaccinate and tag | Days to vaccinate only |
|-------|------------------|--------|---------------------------|------------------------|
| 7 | 10,700 | 1 | 3.57 | 2.48 |
| 8 | 10,600 | 1 | 3.53 | 2.45 |
| 9 | 5,000 | 1 | 1.67 | |
| Total | 23,5100 | | | |

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