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Cow-Calf Emergency Disease Response Plan

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1.0 Introduction

A foreign animal disease (FAD) outbreak affecting cattle could have potentially catastrophic effects on livestock population. Such an incident in Colorado would be devastating to the State's beef production. The impact of a highly contagious disease in cow-calf operations may affect large numbers of cattle, resulting in significant economic consequences, including high death rates or high levels of illness in animals as well as loss of production.

Limiting the scope of an outbreak is dependent on the early detection and rapid response to eradicate the disease**.** The Colorado Department of Agriculture (CDA) *Cow-Calf Emergency Disease Response Plan* describes the response actions that will be implemented by the CDA in collaboration with the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), local emergency management personnel, local and state law enforcement, brand inspectors and the ranching industry partners to swiftly detect, control, and eradicate a disease outbreak on a cow-calf ranching operation.

1.1 Purpose

The purpose of the CDA *Cow-Calf Emergency Disease Response Plan* is to provide a framework to ensure a rapid and coordinated response to an outbreak of a highly contagious disease on a cow-calf enterprise within the State of Colorado. Whereas animal disease susceptibility and general operation of sheep production enterprises are quite similar to cow/calf operations, both shall be considered to be addressed by this plan. The goal of this plan is three-fold: to control and eradicate the disease on infected premises as quickly as possible; to help affected cow-calf enterprises to recover; and, to protect and maintain business continuity on unaffected premises during a disease outbreak.

This plan provides the operational considerations and details necessary to minimize the impact of an outbreak affecting a cow-calf operation and will be applicable to any highly contagious or economically destructive disease or event that causes significant morbidity or mortality in cow-calf herds.

1.2 Scope of Authority

As stated in Colorado Revised Statutes (CRS) 35-50-105, "The Commissioner of the Colorado Department of Agriculture is responsible for regulation related to livestock disease or other livestock emergencies among or affecting livestock in the state." As such, the CDA will serve as the State's lead agency during an outbreak of a highly contagious disease affecting livestock in Colorado.

Although CDA serves as the lead agency during an animal disease outbreak in Colorado, natural disasters, such as blizzards, floods or wildland fires, affecting livestock are managed at the local level. When local resources reach their capacity in responding to natural disasters, counties may request assistance from the State of Colorado where at such time the State may earmark specific

[1] **USDA National Agricultural Statistics Services, 2009 Colorado Agricultural Overview.**

funds to assist local response. Additional information on federal, state and local agencies that may have a role in an animal emergency response is located in Appendix B.

Since local resources are limited, beef producers are encouraged to work with their local emergency manager on how to better prepare their operations for an animal emergency. County emergency managers can assist producers with developing animal emergency response plans for their premises. To further assist cow-calf operators in preparing for an animal emergency, included in this plan are a series of emergency preparedness information and templates that will aid producers in preparing for a disaster (see Appendix M Livestock Emergency Response Planning Templates & Information).

Additionally, emergency managers can assist with coordinating resources between beef producers- neighbor helping neighbor. History has repeatedly shown the effectiveness of neighbor helping neighbor during an animal health emergency. When responding to a natural disaster or an outbreak of a highly contagious disease in cattle, local area producers will be immediately inform of the situation and may become a critical response component by providing resource provisions and communicating the threat to area neighbors.

1.3 Situation

Cow and calf operations are Colorado's largest agricultural segment totaling over three billion in cash receipts annually. With 2.6 million head of cattle and calves in the state, Colorado ranks 10th nationally in overall cattle and calves numbers.[1] According to the Colorado Beef Council, nearly one-third of Colorado's counties are classified as either economically dependent on the cattle industry or the cattle industry serves an important role in their economies.

1.4 Assumptions

- Response to an animal disease outbreak will begin at the local level.
- If an animal disease emergency occurs in Colorado's cow-calf operation, the most probable means of discovery will be by cattle producers, private practice veterinarians and / or trace information from an animal disease investigation in another state. Local livestock experts like brand inspectors and livestock extension agents may be involved in initial local detection and background information about livestock diseases and conditions.
- Private veterinary practitioners will likely be the first responders to any animal disease outbreak.
- A veterinarian is required to immediately notify the State Veterinarian or the USDA Area Veterinarian in Charge (AVIC) of any suspected foreign animal disease.
- An animal disease outbreak may occur through natural pathways or could be introduced as an act of terrorism.

[1] **USDA National Agricultural Statistics Services, 2009 Colorado Agricultural Overview.**

- Diagnosis of a highly contagious disease in Colorado, the United States or surrounding countries may significantly restrict the intrastate, interstate and international movement of animals (especially livestock) and animal products.
- Initiation and implementation of response actions for a suspected or positive foreign animal disease (FAD) will be under the jurisdiction of the CDA and carried out by the State Veterinarian or official designee in conjunction with the AVIC of USDA, APHIS. Producer input will be highly valued and integrated into the response.
- The State Veterinarian and the USDA APHIS AVIC will work in close coordination in any animal health emergency. There are established protocols for investigating and reporting potential FADs and new and emerging infectious animal diseases.
- Response measures for an animal disease emergency may involve the mutual aid support from sister counties and municipalities as well as local private industry support.
- Animal disease emergencies may lead to prolonged economic impacts requiring long term federal and state assistance programs for recovery.
- Owners losing livestock in an animal disease emergency or persons responding to the situation may require psychological counseling and support.

1.5 Plan Maintenance

The State Veterinarian is responsible for the management and maintenance of this plan, under the jurisdiction of the Colorado Agricultural Commission and the Commissioner of Agriculture or his designee. The CDA *Cow-Calf Emergency Disease Response Plan* will be reviewed and updated as required but at least annually in September to incorporate updates to Homeland Security Presidential Directive (HSPD) 9 – *Defense of United States Agriculture and Food*, Emergency Support Function (ESF) 11– *Agriculture and Natural Resources* and legislative updates as well as lessons learned that are identified in the debriefing process and after action reports following an actual event or training exercise.

2.0 Concept of Operations

The concept of operations provides the operational framework for activating this plan and how the CDA will classify the response. Additionally, this section provides an overview of the CDA's responder health and safety program and guidance on how the Department will interface with agencies, the livestock industry, media and the public during an emergency response event.

2.1 Animal Diseases Significant to Cattle

Animal diseases found in cattle vary in virulence, ease of transmission, mode of transmission, and host affinity. Diseases of concern are highly contagious diseases that cause significant morbidity and/or mortality in cattle. Such diseases often present similar clinical signs as diseases that do not result in a high level of morbidity and/or mortality. In this scenario, diagnostic testing is required to determine the specific disease agent. Upon diagnosis, if the disease

identified is not considered highly contagious it will be managed within normal business operations, management, and best production practices.

Animal diseases likely to cause high morbidity and/or mortality in cattle and trigger activation of this plan are FADs and new and emerging diseases. A list of FADs that cattle are susceptible to is provided in Appendix C. Additional information on disease transmission, vaccine availability and recommended control measures for listed FADs can also be found in Appendix C.

Animal diseases of concern are commonly categorized in the following manner.

- **Foreign Animal Disease** or exotic animal disease is defined as an important transmissible disease of livestock believed to be absent from the United States and its territories.
- **New or Emerging Diseases** are completely new diseases, or an old disease occurring in new places with new presentations, or newly resistant to available treatments.
- **OIE List of Reportable Diseases** is a unified list of reportable diseases maintained by The World Organization for Animal Health, once known as the Office of Internationale des Epizooties (OIE). For several years, the OIE created two lists (A and B) with different reporting obligations. In January of 2005, the lists were combined to form a single list with over 130 diseases of interest. Four criteria were used to develop the disease list: international spread, zoonotic potential, significant spread within a naïve population, and emerging diseases.
- **CDC Bioterrorism Agents/Diseases** are biological agents that are rarely seen in the United States. Centers for Disease Control and Prevention (CDC) prioritizes these agents into A, B & C categories. **Category A** agents and disease are easily transmitted from person to person, have a high mortality rates and have the potential for a major public health impact. **Category B** agents and disease are moderately easy to disseminate and result in moderate morbidity rates and low mortality rates. **Category C** agents and diseases include emerging pathogens that could be engineered for mass dissemination.
- **Zoonotic** diseases can be transmitted from animals to humans and /or humans to animals. According to the CDC, approximately 75% of recently emerging infectious diseases affecting humans are diseases of animal origin.

2.2 Colorado Reportable Diseases of Cattle

An additional animal disease category is the Colorado Reportable Disease List. A Colorado reportable disease is defined by Colorado Revised Statues CRS 35-50-103 as infectious or contagious disease or emerging disease of livestock that poses a significant risk to the livestock industry of the state resulting from infectious agents, such as viruses, riskettsia, bacteria, fungi, protozoa, internal or external parasites, or prions, or any reportable disease or emerging communicable disease that is capable of being transmitted from one animal to another animal or to a human, whether communicated directly or indirectly through an intermediate plant or

livestock host, vector or the environment. Colorado Reportable Diseases of Cattle are listed below.

- Anaplasmosis (Clinical Disease Only)
- Anthrax
- Brucellosis
- Bovine Spongiform Encephalopathy (BSE)
- Malignant Catarrhal Fever
- Paratuberculosis (Johne's Disease)
- Pseudorabies
- Rabies
- Scabies
- Trichomoniasis
- Tuberculosis
- Tuleremia
- Vesicular Stomatitis
- Vesicular Diseases of all livestock
- All infectious disease or parasites of livestock not previously known to exist in Colorado
- Any disease of unusual morbidity or mortality that does not fit the normal expected clinical picture.
- Any Suspected FAD

2.3 Incident Command System & Response Levels

Since incidents will vary in size and scope, the level of activation will depend on the nature of the outbreak. Not all cattle disease incidents will require local, state, or federal emergency response functions. Many incidents are handled routinely by private practice veterinarians and/or veterinarians employed by the State Veterinarian or an APHIS Veterinarian Medical Officer (VMO). The cow-calf industry has also invested time and resources in developing plans to deal with their own livestock incidents and situations. It is important to work towards integration of the response planning from private industry, the local community, and from the state/federal plans.

In the event of a highly contagious disease outbreak in cattle, the CDA will manage the incident using the National Incident Management System (NIMS). NIMS provides standardized incident management processes, protocols and procedures for all emergency responders. CDA will also manage each incident using the Incident Command System (ICS), as mandated by NIMS. Designed to be a flexible all-hazard incident management tool, ICS allows decision makers to fill ICS positions to meet the complexities and demands of the incident. For example, a localized disease event may only require the incident commander position to be filled; where as a regional or more wide-spread disease outbreak may require all positions in an ICS incident organization chart to be filled. See Appendix D for an ICS incident organization chart designed for an animal disease outbreak.

CDA will also follow NIMS incident typing and will respond to an animal health emergency using the following activation levels. NIMS incident typing will assist decision makers in determining resources required for specific incidents. Table 1 CDA Response Levels & National Incident Management System (NIMS) Incident Typing System summarizes level of response, lead agencies, and NIMS protocol for each level of response.

2.3.1 Level 5 Response

A level 5 response refers to a situation with little complexity that could be managed with one or two single resources. This level of response would be of a short duration and likely would consist of one 12-hour operational period or less.

2.3.2 Level 4 Response

A level 4 response is normally limited to one 12-hour operational period and requires minor state resource input to manage the incident. This level of response does not require an incident action plan (IAP) and can be managed using the resources and personnel of the CDA Animal Industry Division. Level 4 activities will include those identified for Level 5 and also the following additions:

- Elevated animal origin verifications.
- Notification of private practice veterinarians of specific clinical symptoms of the disease(s) in question.
- USDA AVIC is notified of situation.
- Review of the *Cow-Calf Emergency Disease Response Plan* relative to a potential response to the disease in question.
- Notification of beef industry representative(s) of the disease outbreak and clinical symptoms.

2.3.3 Level 3 Response

A level 3 response reflects the elevated surveillance, preparation and response that may be initiated by the state if there is a presumptive positive or confirmed diagnosis of a FAD in Colorado. A level 3 response may trigger activation of the Colorado Emergency Operations Center (EOC) and deployment of the Eastern Colorado Incident Management Team (ECIMT).

The ECIMT is a Type 3 incident management team (IMT) that will be activated to support incident management for incidents that exceed departmental capability to manage the incident effectively. Type 3 IMTs are deployed as a team of 10-20 trained personnel to manage major and/or complex incidents requiring a significant number of local, regional, and state resources. A level 3 response may evolve into multiple operational periods that require a written IAP for each operational period. Level 3 activities will include those activities identified for all proceeding levels and also the following:

- Import/export of affected, potentially affected or possibly all animals from the impacted states will be suspended, pending control and eradication of the disease.

- Relevant state resources will be inventoried and contract mechanisms supporting the logistics portion of a potential response will be reviewed and made ready for use.
- Public relations material will be reviewed, made current, and vetted with key collaborators in preparation for release. CDA and APHIS will be consulted for their message map on the appropriate disease, its implications for public health, animal health, and the livestock industry.

2.3.4 Level 2 Response

A level 2 response reflects a full-scale multi-state response that may require regional and / or national resources to effectively manage the incident. Level 2 activation is in response to a large, complex incident that will involve multiple operational periods. A written IAP is required for each operational period. A Rocky Mountain Type II or equivalent IMT may be deployed to support management of the incident. A Type 2 IMT is deployed as a team of 20-35 to manage incidents of regional significance and other incidents requiring a large number of local, regional, state, and national resources.

2.3.5 Level 1 Response

A level 1 response will be declared for the most complex incidents that require national resources to safely and effectively manage the incident. A level 1 response will be managed by a Type 1 IMT. A Type 1 IMT is deployed as a team of 35-50 to manage incidents of national significance and other incidents requiring a large number of local, regional, state, national, and federal resources over multiple operational periods.

2.4 Incident Complexity Analysis

The exact moment when an incident shifts from one level of complexity to the next is often a matter of perception. The State Veterinarian / Commissioner or designees must assess the complexity of an incident and authorize a level of response to meet the needs of the event. An Incident Complexity Analysis may be completed to assist in determining the appropriate level of response. The assessment tool consists of a series of questions regarding the incident and associated information that when answered will help determine the appropriate level of response and resources required to meet the needs of an incident. An example of an Incident Complexity Analysis worksheet is located in Appendix E.

Table 1. Response Levels and National Incident Management System Incident (NIMS) Typing [1]

Response Level	NIMS Incident Type	Lead Agency	Emergency Response Actions*	Source of Resources
Level 5– Local Response	Type 5	CO Dept of Ag	- One 12hr. Operational Period - Incident action plan not required* - Emergency Operations Center not activated - Incident Commander position staffed	- Local
Level 4 – Limited State Response	Type 4	CO Dept of Ag	- One 12hr. Operational Period - Incident action plan not required* - Emergency Operations Center not activated - ICS command and general positions activated as needed	- CDA Animal Industry Division
Level 3–State Response	Type 3	Joint Command: - CO Dept of Ag - USDS APHIS VS	- May extend into multiple operational periods - IAP may be required* - ICS some/all command and general positions activated - A Type III IMT like ECIMT will manage incident - State EOC may be activated	- Local (Support) - State - May require regional resources
Level 2 – Multi-State Response	Type 2	Joint or Unified Command National and regional coordination required	- Extends into multiple operational periods - IAP required - ICS some/all command and general positions activated - Rocky Mountain Type II or equivalent IMT will managed the incident. - State EOC activated	- Local (Support) - State - Regional - May require national resources
Level 1 – National Response	Type 1	National Unified Command	- Extends into multiple operational periods - IAP required for each operational periods - ICS all command and general positions activated - Type I IMT will manage incident - State EOC activated	- Local (Support) - State - Regional - National

*** IAPs are required for all HAZMAT incidents regardless of the type of incident.**
[1] Based on the Department of Homeland Security, National Incident Management System, 2009
For all incidents triggering activation of this plan, the Public Information Officer(s) will be Industry's contact for information on the incident.

2.5 Responder Health and Safety Program

A fundamental requirement for CDA is ensuring the safety of Department employees involved in responding to a disease outbreak. To meet this obligation, the CDA Homeland Security Director developed the responder health and safety program. The CDA Responder Health and Safety Program is composed of three components: (1) Personal Protective Equipment *GUIDELINES* for CDA Employees – General Guidance Document; (2) CDA – Respiratory Protection Program; and (3) Medical Monitoring and Rehabilitation. Combined, these documents / programs provide a means to assess employee fitness for emergency work, provide for personal health protection via the use of protective equipment and decontamination procedures and monitor vital signs and provide support to assure employees maintain fitness levels needed to conduct assigned activities.

2.5.1 Personal Protective Equipment

This General Guidance Document provides a plan to be followed to assure a safe working environment while allowing flexibility to meet varying needs that might be expected in a livestock emergency environment. The guidance is just that, guidelines that incident commanders, operations section chiefs, Foreign Animal Disease Diagnostician **(**FADD) veterinarians, team or task force leaders or the like can utilize in assessing and deciding upon equipment and procedures they will utilize when conducting their assigned missions. See Appendix F for Personal Protective Equipment (PPE) guidance for zoonotic and non-zoonotic diseases.

Producers or the general public need to realize rather high levels of protection may be utilized initially as the agent at that point may be unknown. Once the agent is identified, levels of protection can be adjusted, generally decreased, to fit specific challenges an agent might pose. It is likely the latter level will be quite similar to producer placed biosecurity programs.

Of special note is the fact Colorado is a “non-Occupational Safety and Health Administration (OSHA)” state. This means state employees are not subject to the same regulations as are production facilities and their respective employees. The CDA program has essentially been placed to close this gap. Even so, producers remain responsible to follow appropriate OSHA programs related to their facilities. State employees can not provide any equipment or certain training to private employees though they may recommend specific levels of PPE be utilized for different operational activities.

2.5.2 Respiratory Protection Program

Whereas disease agents often utilize the respiratory system as a portal of entry and further where the use of chemicals in cleaning and disinfection or those that are inherently present on livestock operations may pose health risks, the department operates a respiratory protection program. Individuals who may be deployed to an incident have completed a medical questionnaire that has been reviewed and approved by a medical doctor familiar with such programs. These individuals have been trained and fit tested to utilize specific respiratory equipment. Production facilities may or may not have similar programs in place. It is anticipated if they do not, employees could

still work in less hazardous areas or accommodations could be made to have employees trained and tested for such activity.

2.5.3 Medical Monitoring and Rehabilitation

Individuals who work in emergency response will attest to the hard work and long hours needed to complete tasks that must be done. In so doing, individuals can place themselves at risk for underlying problems that can lead to debilitating injuries or even death such as a preexisting cardiac issue leading to a heart attack under physical stress. Medical monitoring affords an opportunity to identify underlying problems and hopefully mitigate them before they become quite serious. Such monitoring occurs when risks exist and is conducted both prior to assignment and throughout the assigned work period. Rehabilitation periods are scheduled to allow responders a break in which to rest, rehydrate and get something to eat if need be.

Production workers generally have scheduled breaks to eat or get something to drink. These may need to be extended and rehydration beverages or food provided dependent upon work schedules. Medical monitoring of production employees might possibly be arranged via local public health or emergency medical service departments.

2.6 Communication Plan

External communication during an outbreak will be the responsibility of the State Veterinarian and the CDA Director of Communications. The State Veterinarian, with assistance from the CDA Liaison Officer will direct and maintain communication with federal, state, and local government agencies and partners that have a statutory responsibility in emergency response (see Appendix G for the regulatory network's contact information). Engaging producers located in the area affected by the outbreak and producers near or adjacent to the outbreak premises will be a priority for the CDA Communication Director. Establishing an information flow with local producers to communicate the threat and to define mitigation steps will be a critical step in reducing the spread of disease. Additionally, the CDA Communication Director will communicate and collaborate with industry representatives such as Colorado Cattlemen's Association (CCA), Colorado Livestock Association (CLA) and Colorado Farm Bureau (CFA) and others throughout the incident.

Correspondence and communication with the media and public regarding the incident will be directed and managed by the CDA Director of Communications. The CDA Director of Communications or assigned designate will assume the ICS role of Public Information Officer (PIO) upon activation of this plan. Should a Type III or higher ranked IMT assume command, the CDA Director of Communications will become a PIO team member under direction of the Incident Commander (IC). All information gathered and prepared will be vetted by affected parties and approved by the IC and Commissioner of Agriculture or designee prior to release to the media or public.

3.0 Disease Outbreak Response

This section describes the processes and protocols utilized by the CDA during a disease outbreak affecting cattle. These processes and protocols are designed to enable execution of the responsibilities of the CDA and to integrate federal, state, local, and industry efforts into an effective and coordinated approach to a disease outbreak in cattle. Responding to a disease outbreak in cattle will involve the following actions. A description and timeline of each action phase follows.

- **Disease Detection** -- Investigate Suspected Animal Disease and Initiate Preliminary Control Measures
- **Disease Control** -- Quarantine Infected and Exposed Premises and Control Movement of Animals
- **Surveillance** – Develop a Surveillance Plan based on Epidemiological Investigation
- **Epidemiology** -- Determine the Extent of the Outbreak and/or Confirm Non-Infected Premises
- **Stabilization** -- Control, Prevent Spread of, and, as Possible, Eradicate Disease
- **Business Continuity** -- Protect Economic Viability and Continuity of Operations
- **Recovery** -- Return Affected Premises to Normal Business Operations

Table 2. Timeline for Disease Control Response Activities[1]					
Disease Outbreak Response Actions*, †	**12 hours** **Within a confirmed positive case**	**24 Hours** **Within a confirmed positive case**	**48 Hours** **Within a confirmed positive case**	**24 Hours** **Within determination of need**	**72 Hours** **Within determination of need**
Disease Control -- Quarantine Infected and Exposed Premises and Control Movement of Animals					
Mobilize livestock disease-related incident command personal.					
Establish initial control areas.					
Enhance biosecurity procedures on infected, contact and susceptible premises.					
Establish quarantine zones for infected and contacted premises and/ or broader movement restrictions.					
Surveillance -- Develop Surveillance Plan Based on Epidemiological Investigation					
Develop a surveillance plan and implement existing diagnostic support.					
Epidemiology -- Determine the Extent of the Outbreak and / Or Confirmed Non-Infected Status					
Implement epidemiological surveillance and diagnostic support plan in at-risk species and notify other states of trace-outs.					
Stabilization -- Control, Prevent Spread of, and, as Possible, Eradicate Disease					
Begin treatment, inoculation, and /or depopulation of animals at identified site.					
Begin decontamination and disposal procedures at identified site.					
Business Continuity -- Protect Economic Viability and Continuity of Operations					
Implement procedures for the creation of bio-secure transportation corridors to market or other key facilities for disease –free goods and animals.					
Develop procedures for managing contaminated products.					
Establish storage and /or disposal areas for animals or products stopped in transit.					

[1] **Based on Department of Homeland Security, Federal Emergency Management Agency. *Livestock and Poultry Disease Emergencies Capability*, August 2009.**

* **Disease Detection and Recovery Actions are not in the scope of the above timeline.**

† **Communication with neighboring states will be initiated within 4 hours of a confirmed positive case.**

4.0 Disease Detection – Investigate Suspected Animal Disease and Initiate Preliminary Animal Movement Restrictions

4.1 Foreign Animal Disease Investigation

Upon notification of a suspected case of a FAD, the Colorado State Veterinarian or USDA AVIC will dispatch a FADD to conduct a Foreign Animal Disease Investigation (FADI). See Appendix H for VMO territories in Colorado. The investigation is conducted using a standardized format developed by USDA. Information and data collected during the FADI includes a general assessment, gathering site information and samples, and epidemiological data (see Appendix I for an example of a FADI Data Collection Form). In addition, the FADD collects the following information about the facility:

- Premises Identification Number (PIN)
- Type of facility
- Plat map description
- GPS Coordinates
- Type and number of buildings
- Available resources
- Number of personnel or employees

The goal of the investigation is to confirm or rule out the presence of disease in a rapid and efficient manner. As such, the FADD examines the animals on site and packages the appropriate diagnostic samples for delivery to a state and federal diagnostic laboratory (see the Colorado Animal Emergency Response Organization (CO AREO) for Standard Operational Procedures (SOPs). Information from the investigation is reported to the State Veterinarian who in consultation with the FADD and the AVIC determines the potential for the presence of an animal disease is “unlikely”, “potential” or “highly likely”. This decision is critical and determines turnaround times on diagnostic samples and aids in establishing appropriate disease control measures. The priority established will determine where the samples are sent and how they are handled for transportation, and the level of response the lab gives the samples. Operations in the collection, shipping and management of laboratory samples shall be in accordance with the USDA Memo 580.4. Initially if the FAD suspects a condition such as Foot & Mouth Disease (FMD) he is the IC on site and will confer with the appropriate people but he will be the initial individual to implement the hold order and to immediately start the epidemiological investigation.

In most cases, preliminary results are available within 24-48 hours. However, during the investigation, the State Veterinarian may implement certain movement restrictions for livestock and/or other products. Decisions relative to movement controls would be based on the general clinical assessment, morbidity and mortality of the disease outbreak and the risk to other animal facilities. A description of zones, areas and premises used for restricting movement is located in Section 4.2.

4.2 Hold Order

There are three possible outcomes of an FADI: negative, presumptive positive, or confirmed positive. In the event a FAD is suspected as the initial outcome of the FADI, the State Veterinarian may issue a hold order as authorized by CRS 35-50-103 to restrict animal movement. CRS 35-50-103 defines a hold order as a temporary order issued by the state veterinarian when an infectious disease is suspected in livestock to isolate any specific livestock premises, county, district; and specify sanitary measures, pending completion of testing. The State Veterinarian may authorize the hold order through accredited veterinarians or through another appointed official.

4.3 Quarantine

A preliminary / presumptive positive test result must be confirmed by the National Veterinary Services Laboratories (NVSL). Once the appropriate NVSL lab has verified the testing results are a confirmed positive, the State Veterinarian as the Commissioner of Agriculture's designee may place the infected premises under quarantine. CRS 35-50-103 defines quarantine as "an order issued by the commissioner when testing has confirmed the presence of an infectious or contagious disease in livestock, which order isolates specific livestock, premises, counties, districts, or sections of the state; restricts the movement of livestock; and specifies sanitary measures."

4.4 Response Plan Activation Sequence

The activation of an emergency plan is at the discretion of the State Veterinarian. Upon confirmation from the Colorado State University Veterinary Diagnostic Laboratory of a presumptive positive or from NVSL of a presumptive or positive to a highly contagious animal disease in cattle or sheep the State Veterinarian will activate the *Cow-calf Emergency Disease Response Plan*.

The State Veterinarian will immediately contact the Commissioner of Agriculture, Deputy Commissioner, the USDA APHIS VS Colorado AVIC, and the CDA Homeland Security Director and relay all known information on the positive test notification. The State Veterinarian should be prepared to make recommendations with respect to any gubernatorial declarations and/ or activation of the state EOC (SEOC) and appropriate level of response. Specifically, the State Veterinarian will relay the following information:

- Name and contact information of the verifying laboratory official reporting the confirmatory test
- Name and location of the infected premises including Global Positioning System (GPS) and Colorado Livestock Security System (CLSS) Premises Identification Number (PIN) if available.
- Type of production facility and number of cattle and/or sheep on the infected premises.

If notification of a presumptive positive or NVSL confirmed positive of a highly contagious animal disease is after normal working hours, on a weekend or holiday, the State Veterinarian

will communicate with the Commissioner, Deputy Commissioner, the AVIC, and the CDA Homeland Security Director at their afterhours contact numbers. Based on direction from the Commissioner, Deputy Commissioner and AVIC, the State Veterinarian will take appropriate action to activate the response level based on incident type –see Table 1.

4.5 Producer's Role During an Outbreak

In the event of an animal disease outbreak, livestock producers may be called upon to help mitigate or control the disease outbreak. Critical roles producers may be asked to fill during an animal health emergency may include:

- Assisting with communication and information flow to neighboring producers;
- Serving as local Subject Matter Experts and assisting in the identification of needs and development of IAPs; and,
- Providing labor, feed and/or equipment resource to help meet the immediate needs of an emergency response.

Upon confirmation of a presumptive positive or NVSL confirmed positive of a highly contagious animal disease, cattle producers in the area of the outbreak will be notified of the situation and may at that time be asked to assist the CDA's response by fulfilling one of the above roles.

5.0 Disease Containment -- Quarantine Infected and Exposed Premises and Control Movement of Animals

Upon confirmation of a suspected or confirmed case of a highly infectious animal disease, the State Veterinarian will implement a series of response actions to control the spread of disease and minimize the impact of an outbreak. Though actions will vary based on the disease agent, the following section presents a series of possible control activities that may be utilized to contain a highly infectious disease in cattle.

5.1 Movement Restrictions

Movement restrictions for cattle, sheep, beef & lamb products, vehicles and possibly people may be used to prevent the further spread of disease. Once an outbreak has been confirmed, the Infected Premises will be placed under quarantine (see Section 4.3 for additional information on livestock quarantines). Diseased or disease exposed animals will need to remain on the premises until the necessary control measures are determined by the State Veterinarian. A control zone, which includes any contact premises (farms or areas with a connection to the Infected Premises), will be established. Road blocks and/or check points and possibly decontamination stations may be needed at ingress and egress locations in the control zone. Additional zones may be designated to control and monitor the disease. Personnel within the Brands Division of CDA will be called upon to establish and enforce animal movement check points or like restrictions. The Colorado Department of Public Safety- Homeland Security Section will aid in coordination of stop movement orders upon roadways within the state. Descriptions and a diagram of Premises, Zones and Area designations follow.

5.2 Premises, Zones and Area Designations

The designation of Control Areas and Zones is essential to successful quarantine and movement control activities. The State Veterinarian shall determine premises classification in the event of a presumptive positive or confirmed case of a highly contagious livestock disease. He/she shall work with the AVIC and FADD veterinarians, emergency responder teams, and the SEOC to establish area and zone designations that will allow for the targeting, implementation and enforcement of quarantine and movement controls.

Control Area – The Control Area consists of the Infected Zone, a Buffer-Surveillance Zone, and when vaccination is used, a Buffer Vaccination Zone.

Buffer Vaccination Zone – Emergency vaccination (if available) may be used to slow the spread of the highly contagious animal disease. The area where vaccination is being – or has been – practiced will be known as the Buffer Vaccination Zone.

Buffer Surveillance Zone – The Buffer Surveillance Zone immediately surrounds both the Infected Zone and if established, the Buffer Vaccination Zone.

Infected Zone – The Infected Zone encompasses the perimeter of all suspect and infected premises. The Infected Zone also includes contact premises as required by the situation.

Surveillance Zone – The Surveillance Zone is established within the Free Zone, along its border with the Buffer-Surveillance within a Control Area. Surveillance in the Surveillance Zone will focus on premises determined to be at the highest risk of infection.

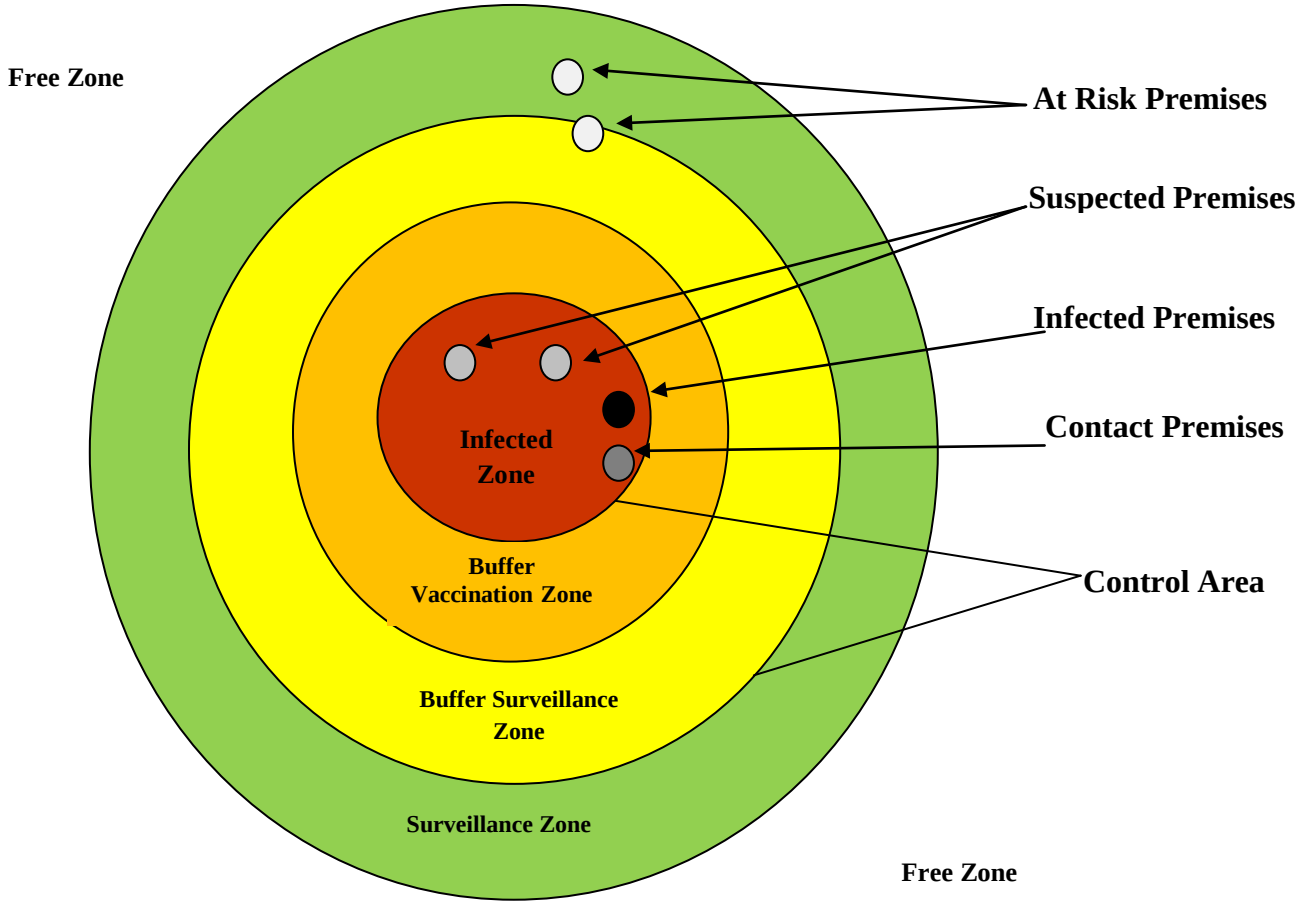
At-Risk Premises – Premises within the Buffer-Surveillance Zone that have clinically normal susceptible cattle and/or sheep are known as At-Risk Premises. Surveillance on the At-Risk Premises will be appropriate to detect the presence and/or to prove the absence of the disease on the premises.

Contact Premises – Contact premises are those premises with susceptible animals that have been determined to have been exposed directly or indirectly the FAD agent, but on which a highly contagious FAD has not been diagnosed**.**

Infected Premises – Infected premises are premises with the presumed or confirmed animal disease based on clinical signs and/or laboratory results.

Suspect Premises – A suspect premises is a premises on which it is reasonable by virtue of clinical signs of illness, morbidity or mortality to believe that some risk of highly contagious cattle or sheep disease may exist.

Figure 1. Premises, Zones and Area Designations



5.3 Biosecurity and Disease Control Measures

USDA APHIS defines biosecurity as the use of certain management practices designed to prevent the introduction and spread of disease. Also, biosecurity helps to mitigate the effects of the disease once it has been introduced into a herd, flock or area. Facing unique biosecurity challenges different from other livestock operations, cow-calf and sheep producers incorporate biosecurity measures into their daily operations as part of livestock health and management. A list of biosecurity measures for routine operations in cow-calf operations is located in Appendix L.

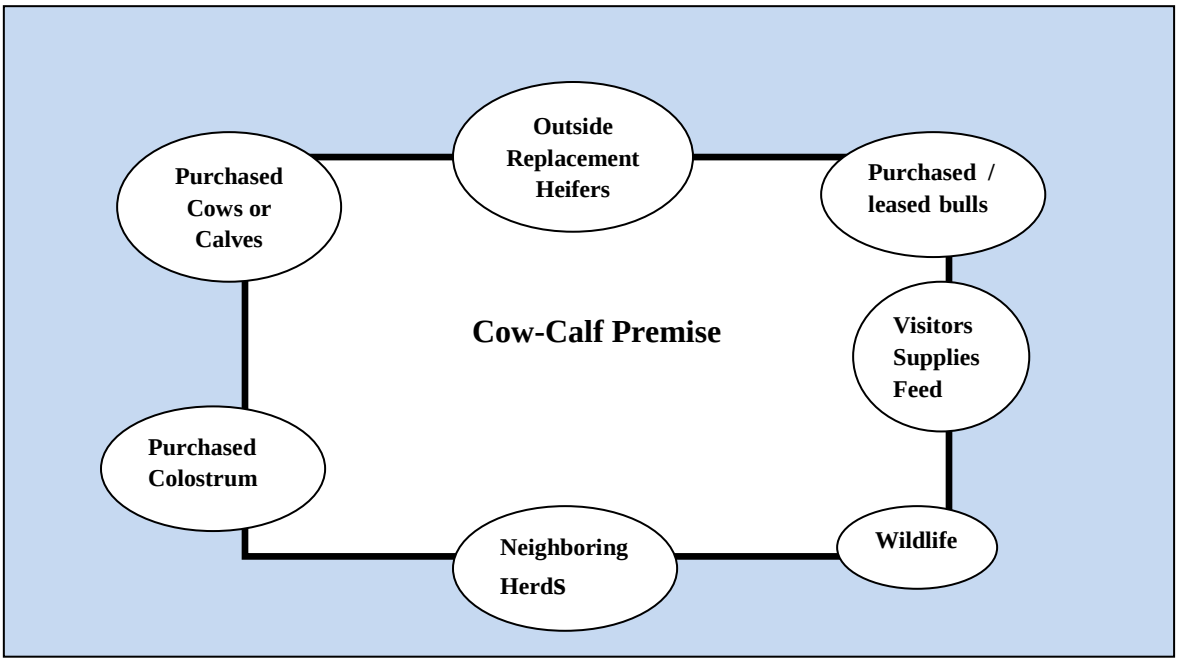
Unlike concentrated animal feeding operations, cow-calf premises typically involve large areas of pasture lands and often involve off-site grazing pastures. Unique issues beef producers are faced with when addressing biosecurity are:

- Cow-calf operations generally have an extensive open area to manage
- Cow-calf operations often have a large perimeter to secure

- Cattle may have contact with neighboring herds along the fence line
- Cattle located in pastures may be in close contact with wildlife
- Replacement purchases and new bulls to the herd are a significant disease risk.

Possible modes of disease being introduced into cow-calf premises are illustrated in Figure 2- Biosecurity Risks for Cow-Calf Operations.

Figure 2. Biosecurity Risks for Cow-Calf Operations [1]



[1] Farm and Ranch Biosecurity, 2002. Cooperative effort between the University of Nebraska, Iowa State University, and Kansas State University

Specifically, highly contagious diseases can enter a cow-calf operation via the following pathways:

- The introduction of disease cattle or healthy cattle incubating disease
- The introduction of healthy cattle who have recovered from disease but are now carriers
- Vehicles, equipment, clothing and shoes of visitors or employees who move between herds
- Contact with infected wildlife or wildlife as carriers of disease
- Contact with inanimate objects that are contaminated with disease organisms
- Carcasses of dead cattle or other animals that have not been disposed of properly
- Contact along fence line with infected neighborhood herd

When developing biosecurity plans, cow-calf and sheep producers should assess real risk and the specific circumstances of their premises to determine what biosecurity methods would be effective and cost-effective in reducing risk. Biosecurity recommendations for cow-calf operations are located in Appendix L.

During a health emergency in cattle, the State Veterinarian may prescribe additional biosecurity measures for premises located in defined zones for each of the target areas. Biosecurity measures will be dependent upon the disease and its mode(s) of transmission.

5.3.1 Site Security

Any site that is under investigation as an infected premises, a suspect premises, or a contact premises shall take steps to prevent all non-essential traffic from entering the premises. All traffic should be prohibited unless directly involved in the care and feeding of cattle or involved in the emergency response. Additional site security procedures that may be recommended include:

- Establish one ingress and one egress location into the facility. All other access points must be blocked or gates locked to prevent unregulated entry or exit from the facility. If possible, the ingress and egress location should be located on a level and solid surface with access to water (by hose or tanker truck) for cleaning and disinfection purposes. Vehicles transporting workers or supplies may need to park at the access gate and shuttle people and supplies in through a safe corridor system or transport on foot – exceptions would be large truck transport vehicles.
- All non-essential work on the farm shall cease and access to the facility will be restricted to essential personnel. Essential personnel are defined as having a direct role in the care of the animals or in response. All vehicles and equipment on the premises may be prohibited from leaving the premises unless approved by the State Veterinarian. Cleaning and disinfection may be required of such vehicles.
- All essential personnel are required to wear PPE determined necessary to protect or prevent the spread of disease and to mitigate any zoonotic disease potential. Personnel entering the premises will be required to wear disposable or adequately cleaned and disinfected boots, coveralls, gloves, head/hair covering and possibly masks. The level of protection will be determined by the specific diseases, area and nature of work individuals are to engage in. These items must be put on prior to entry onto the premises, or a specified area therein, and must be removed and thoroughly disinfected or disposed of prior to leaving.
- Verify premises log book is complete. Deliveries for farm essentials shall be by appointment only.

5.3.2 Cleaning & Disinfection Procedures

Cleaning and disinfection is a means to control the spread of disease by attempting to eliminate targeted disease causing microorganisms and prepare the premises for the reintroduction of livestock. Cleaning and disinfection procedures are essential both during and after an animal

disease event. Cleaning and disinfection materials that should be available at designated entry/exit point on the infected premises includes: brushes, buckets, hoses, water, disinfectant and a pressure washer. Cleaning and disinfection must be performed on all personnel, equipment, and vehicles leaving the infected premises or control area. Listed in Appendix J is a list of disinfectants approved by EPA for specific diseases. Specific cleaning and disinfection procedures that may be required by the State Veterinarian include:

- Establishing a designated decontamination area / corridor on the premises. This is an area where personnel, vehicles, and equipment will undergo cleaning and decontamination before leaving the premises. This area should be close to the entry / exit point, on a hard surface and have access to water.
- Establishing a designated area for personnel to don and doff personal protective equipment and protocols for disposing of or treating contaminated personal protective equipment.
- Implementing a shower in/shower out policy for all essential personnel coming in direct contact with cattle or sheep and areas where they are housed.
- Establishing a pest, especially rodent, control program.

5.3.3 Cleaning and Disinfecting Specific to Cow-Calf Operations

Recommendations for cleaning and disinfecting a cow-calf operation as a result of a disease outbreak will be based on the nature of the disease agent, its mode of transmission and its persistence in the environment. Cleaning and disinfecting considerations specific to a cow-calf enterprise are noted below.

<u>Calving Barns</u>

Calves born to first-calf heifers and calves born in a barn setting are at a higher risk of being exposed to pathogens then calves born to mature cows or in a range setting. Thorough cleaning and disinfection of the calving area is essential to reduce the risk of disease spread. Livestock specialists recommend using Clorox bleach and water to clean smooth surfaces of pens. Further recommendations include removing all wet and soiled straw or sawdust from the pen and work lime or lye into the soil. Clean, dry sawdust or straw should be laid down as the last step. All calving equipment such as chains and pullers and feeding equipment such as bottle nipples and esophageal tubes should be cleaned and disinfected prior to use. Strict biosecurity measures should be adhered to in a calving barn.

<u>Feed Handling and Water Tanks</u>

Dirty water tanks are an excellent source of certain diseases. It is recommended that water tanks be cleaned every two weeks. Feedstuff should be obtained from reputable sources and maintained in clean, rodent free storage facilities. Feed accumulation in feed bunks should be avoided.

Waste Management

Waste management on a cow-calf operation is not as an intense process as on confined operations however, a manure management plan should be part of regular business operations. Removing manure frequently and spreading it thinly on unoccupied fields will reduced the risk of disease spread on the premise. Livestock specialists recommend removing manure in calving areas at least once a week.

Vehicles

During a disease outbreak, there will be a need for movement of vehicles into and out of the infected or contact premises to care for cattle. Depending on the mode of disease transmission, passage of vehicles should be kept to a minimum. When the disease in question can be spread by fomites, a stringent procedure for disinfection of vehicles exiting the premise may be required.

Corrals & Animal Handling Areas

Outdoor animal handling facilities such as chutes, alleyways and corrals are often overlooked and not cleaned consistently after use. After use, animal handling areas should be cleaned and disinfected and cleaned between different lots of cattle. Tack should also be disinfected regularly.

5.3.3 Wildlife Management

If an animal disease outbreak has potential wildlife impacts or can be spread by wildlife, the Colorado Division of Wildlife (DOW) will collaborate and lead all appropriate wildlife response activities. Appendix K provides additional information on the DOW role in an animal disease outbreak. An important question to ask would be: "Are there wildlife on or near the premises and are they affected by the disease?"

5.3.4 Public Health Involvement

If an animal disease outbreak is identified as a zoonotic disease and has potential public health impacts, the State Veterinarian or the CDA will contact the Colorado Department of Public Health and Environment (CDPHE) to seek assistance in the response to protect affected livestock personnel and the public's health. Appendix K provides additional information on the CDPHE's role in an animal disease outbreak. An important question to ask would be "Are there sick people?" CDPHE and/or local health departments will be involved with their epidemiological investigation.

6.0 Surveillance -- Develop Surveillance Plan Based on Epidemiological Investigation

Animal disease surveillance activities involve collecting and interpreting data from animal populations to determine their health status regarding diseases of concern. Surveillance programs are currently in place to assist in rapid detection of an animal disease incursion. Surveillance techniques are also used in an animal disease response to determine the extent of a disease known to be present, and during the recovery phase of a response to provide the necessary evidence for the elimination of the disease.

Surveillance methods that may be used during a disease outbreak include inspecting animals for clinical signs of the disease and clinical testing. Inspection of animals for clinical signs involves observing animals for any clinical presentation of the disease. For example, cattle infected with contagious bovine pleuropneumonia (CBPP) show signs of a high fever, decreased appetite, loss of milk production and painful and difficult breathing. Surveillance information is also obtained through the collection and testing of animal blood (serological testing), tissue, or skin scrapings. The speed at which these actions occur will have a direct effect on the extent and thus the outcome of an outbreak. Once control areas, zones and premises are identified, a surveillance plan for each area or zone will be developed by the State Veterinarian. The surveillance plan will include information on methods to collect, manage, and analyze animal health data. Since each animal disease outbreak is unique, the surveillance plan will be tailored to the disease agent. OIE surveillance recommendations for animal diseases are located in Appendix C.

7.0 Epidemiology -- Determine the Extent of the Outbreak and / or Confirm Non-Infected Status

To respond quickly and effectively to an animal disease event, the CDA animal health officials need to know which animals are involved, where they are located, and what other animals might have been exposed. The sooner reliable data is available, affected animals can be located, appropriate response measures can be established, and disease spread can be halted.

Thus, an important component of an animal disease outbreak investigation is to establish trace-forward and trace-backs from premises to determine both the source of the disease and the risk for disease transmission to other premises with susceptible species. Trace-backs are conducted to assist in identifying the source of the virus and to help determine how the disease was introduced to the facility. Trace-back procedures include collecting information from producers on the origins of all cattle (and possibly other animals), beef products, feed, equipment and vehicles, (livestock trucks, feed trucks, veterinary trucks) and people (sales and feed representatives, visitors, veterinarians and brand inspectors) that have visited the premises prior to the outbreak. Trace-backs are usually applied for a minimum of 2 times the maximum incubation period before the onset of clinical signs.

Trace-forward procedures gather similar information on animal, people, and equipment movements off the farm to identify other premises that possibly received infected animals, animal products or contaminated equipment or personnel. Trace-forward is usually applied up to the time quarantine is imposed. OIE tracing recommendations for FADs significant to cattle are located in Appendix C.

It is recommended that beef and sheep producers maintain herd records on a regular basis to assist in both trace-forward and trace-back procedures when needed. The following are types of records that may be traced during a disease investigation.

- **Herd Inventory**
  Herd information, specifically: animal ID, breed, age, species and, origin. Animals that die or are culled from the herd should be identified.

- **Herd Movement**
  Animal movement to-and-from the farm logs, such as: date of movement, animal identification, origin, destination, reason, driver, vehicle used, previous owner name and contact information. Cull animals sold number, date, and location.

- **Farm Services**
  Visitor logs with names, phone number, reason for visit, time since last contact with livestock, and facilities entered. Visitors include all non-employees (veterinarians, brand inspectors, health inspection personnel, feed salesman, inseminators, livestock dealers, repairmen, neighbors, etc.) May also include equipment, feed, semen / embryo movement logs (dates origin, application site, volume, and application method. Effluent disposal information if moved off-site may also be traced.

- **Animal Health Information**
  Vaccination and treatment records including animal ID, date, reason for treatment / vaccination, and medication (product used). Records of any postmortem examination and / or testing of any dead stock by the producer or veterinarian should be maintained and made available for review.

- **Farm Employees**
  Employee record (name, address phone number, time card or work schedules does the employee have contact with other livestock?)

- **Pets and Animals**
  Pets and other animals located on the premises

Additionally, it may be required that affected producers participate in an animal identification system. Descriptions of two programs available to Colorado beef producers follow.

7.1 Colorado Livestock Security System

The Colorado Livestock Security System (CLSS) is currently under development by the CDA. The CLSS is a repository of Colorado livestock ownership data that can be accessed and utilized during an animal disease outbreak to assist in the tracing of animals and premises. Data for the CLSS are derived from existing data sources and integrated into one system that can be accessed by CDA animal health officials during an animal emergency. CLSS enables CDA to inform producers quickly when a disease or natural disaster event may impact their area or the species of animals that they own or house.

7.2 USDA Animal Disease Traceability Databases

The USDA holds some information on livestock disease traceability due to its different state-federal cooperative disease programs. USDA uses this data to locate premises, animals, or group

of animals to: (1) increase the United States' disease response capabilities; (2) limit the spread of animal diseases; (3) minimize animal losses and economic impact; (4) protect producers' livelihoods; and, (5) maintain market access.

8.0 Stabilization -- Control, Prevent Spread of, and as Possible, Eradicate Animal Disease

Elimination, if possible, of a highly contagious disease involves a series of activities that will be implemented by the State Veterinarian in collaboration with the USDA AVIC. Actions taken will be based on the particular circumstances of the outbreak including: the disease agent, epidemiology of the disease, magnitude of the outbreak, vaccine availability and resource availability. Descriptions of possible response actions to eliminate an animal disease are described in the following section.

8.1 Appraisal & Indemnity

According to the U.S. Code of Federal Regulations 9CFR53.3 a percentage of fair market value will be paid to the owners for livestock that must be depopulated or materials that must be destroyed to prevent the spread of an animal disease.

Additionally, CRS 35-50-113 grants the CDA Commissioner the authority under certain circumstances and upon the recommendation of the State Veterinarian, to authorize the payment of indemnity to any livestock owner whose herd is depopulated due to exposure or diagnosis with an infectious or contagious disease.

With qualifying events, appraisal and indemnification process outlined in 9CFR53.3 is the most efficient appraisal process for livestock owners. The process outlined in CRS 35-50-113 is a cumbersome and often time-consuming procedure used in situations where depopulation of livestock is deemed necessary by the Commissioner and the State Veterinarian. For both processes, fair market value of livestock must be mutually agreed upon by the owner and state or federal officials prior to depopulation. Valuation is generally based upon prevailing market value of the class of livestock and their stage or production. Under certain situations, such as with genetic seedstock animals, a physical appraisal may be required to establish value.

In previous highly infectious disease outbreaks, the cost of euthanasia, carcass disposal and decontamination were paid for by the USDA. Colorado will follow USDA procedures to request assistance with indemnification of beef or sheep producers in response to an eligible disease event.

8.2 Depopulation

CRS 35-50-113 authorizes the State Veterinarian to order euthanasia, mass depopulation and carcass disposal to mitigate an animal disease in Colorado and is an integral part of a comprehensive response plan. In the event that a highly contagious animal disease in cattle is confirmed in the state of Colorado, cattle depopulation and carcass disposal may represent the most effective means of disease control and eradication. If deemed necessary by the State

Veterinarian to contain a disease outbreak, the CDA will take every measure to ensure rapid and humane depopulation of all animals affected by the disease outbreak. The State Veterinarian will develop a comprehensive depopulation and disposal plan based on guidance from the American Veterinary Medical Association (AVMA) Guidelines on Euthanasia, National Agricultural Biosecurity Center, Kansas State University, or other resources.

The State Veterinarian's depopulation plan will be dependent upon the type, number, and size of cattle to be depopulated. Table 3 provides an overview of the approved methods of depopulation for cattle and is broken out by the size of the cattle involved. Table 4 provides an overview of the advantages, disadvantages and considerations for human safety for depopulation methods appropriate for cattle. Carcass disposal will be carried out in collaboration with the CDPHE as defined in the CDA/CDPHE joint Interagency Agreement (IA) state statute, and state rule/regulations. Additional information on carcass disposal is located in Section 8.3.

8.2.1 Gunshot

Gunshot to the brain is an AVMA approved method to euthanize cattle. The caliber, projectile, and propellant load should be appropriate for the species. Full metal jacket ammunition should never be used. Muzzle energy charts should be used to determine the appropriate caliber and type of ammunition for the type of animal. Appropriate muzzle energy is three hundred foot-pounds of force for animals up to 400 pounds and 1000 foot-pounds of force for animals over 400 pounds.

8.2.2 Penetrating Captive Bolt

The AVMA has approved the penetrating captive bolt as a possible form of euthanasia for cattle. This is a gun like device that is placed against the skull of the animal and when fired a rod (bolt) in the gun is forced into the skull and into the brain tissue. The rod is attached to the gun and taken out when the skull is penetrated. This is usually fatal, but it is strongly recommended that an adjunct measure such as exsanguinations or "pithing" be administered to ensure death. This method is practical for numerous animals, and is especially useful for animals over 200 pounds.

8.2.3 Electrocution

This is a two-step process that passes electricity through the brain and stuns the animal. The second step passes electricity through the body and stops the heart. This method is very dangerous to personnel, requires special equipment, and an electrically safe environment in which to conduct such activity. For cattle, electrocution as a depopulation method should only be applied using specialized slaughter plant equipment that applies a minimum of 2.5 amp across the brain. A 120 volt electrical cord does **not** apply sufficient amperage to induce unconsciousness.

Table 3. Methods of Depopulation Appropriate for Cattle [1,2]				
	Calf	**Heifer**	**Cow**	**Bull**
Gun Shot	Yes	Yes	Yes	Yes- requires specialized gun
Penetrating Captive Bolt	Yes	Yes	Yes	Yes-requires specialized captive bolt gun
Electrocution (Head to Heart)	Yes	Yes	Yes	Yes
Barbiturates	Yes	Yes	Not Practical	Not Practical

[1] **American Veterinary Medical Association.** *AVMA Guidelines on Euthanasia*, 2007.
[2] **American Association of Bovine Practitioners,** *Practical Euthanasia of Cattle: Considerations for the Producer, Livestock Market Operator, Livestock Transporter, and Veterinarian*, 1999.

8.2.4 Barbiturates

Barbiturates and pentobarbital combinations are used to depress the central nervous system, causing deep anesthesia that progresses to respiratory and cardiac arrest. This method is considered to be very humane but it does require intravenous injection into the animal and would render the carcasses useless for rendering.

Table 4. Considerations for Approved Depopulation Methods for Cattle [1,2,3]

Depopulation Method	Human Safety Risk	Advantages	Disadvantages	Equipment
Gun Shot	Bullet poses considerable risk	Recommended for animals that cannot be restrained or are difficult to handle.	- May not kill animal - May present biosecurity risk from leaking body fluids - May preclude evaluation of brain if damaged by shooting	- Skilled and licensed operator - Appropriate firearm and ammunition for cattle - .22 caliber long rifle" for calves
Penetrating Captive Bolt	Moderate	- Safer for operator than free bullet method - Reduces the need to move animals	- May be a two-step process based on size - Misplaced captive bolt gun may compromise animal welfare - Captive bolt gun must be maintained, cleaned - Several must be used to reduce over heating	- Different sizes of captive bolt guns for different size cattle.
Electrocution	High – requires considerable operator knowledge	- No tissue or blood exposure - physically demanding for operator - Requires monitoring to ensure	- Restrain is necessary - Two-step process for large animals	- Electrical supply - Electrodes
Barbiturates	Low	- Humane & rapid killing of animals	- Animals must be restrained - Administered by a trained professional - Limited access to drugs	- Syringes & needles - Drug to be injected

[1] **American Veterinary Medical Association.** ***AVMA Guidelines on Euthanasia,*** **2007.**
[2] **American Association of Bovine Practitioners,** ***Practical Euthanasia of Cattle: Considerations for the Producer, Livestock Market Operator, Livestock Transporter, and Veterinarian,*** **1999.**
[3] **United States Animal Health Association,** ***Foreign Animal Disease*** **, 2008**

8.3 Disposal

An essential component in eradicating a disease is the proper disposal of all animals carcasses. The goal of carcass disposal is to facilitate the decomposition of carcasses and the destruction of any pathogenic disease agent present. Methods utilized should limit the potential for the spread of the disease or exposure of susceptible species to disease and limit any potential adverse environmental impact. Commonly used disposal methods include: burial, composting, incineration, alkaline digestion and rendering. When applicable, cattle carcasses will be disposed of on the infected premises to limit the potential spread of disease. However, factors such as the number, size and species of livestock, the location of the infected premises, the soil types and groundwater locations, and the particular disease agent will determine the most appropriate method of carcass disposal. The State Veterinarian will collaborate with the AVIC

and the CDPHE Solid and Hazardous Waste Program personnel to determine the location and type of disposal method. Possible methods of carcass disposal are outlined below. Additional information on each option is located in Table 5. Cattle Disposal Methods: Considerations.

8.3.1 Rendering

Rendering is a process of both physical and chemical transformation resulting in three end products, carcass meal, melted fat, and water. The main carcass rendering processes include size reduction followed by cooking and separation of fat, water, and protein materials. The resulting carcass meal can often be used as an animal feed ingredient.

8.3.2 Composting

Composting involves a phased decomposition of animal carcasses over a period of time. The process involves the breakdown of organic materials by microorganisms such as bacteria and fungi which results in the release of heat, water, CO_2 and other gases. The process can be complex and requires an appropriate site, proper management and a carbon source such as, wood chips, straw, cornstalks or similar products.

Windrow composting technique takes place in a static pile. The site is usually built in open spaces with no walls or roofs and not protected from weather. Windrow composting is often used for disposal of large animals.

Bin composting is the simplest form of a contained composting method, where carcasses and composting material are confined within a structure built from any materials that are structurally adequate to confine the compost pile material.

8.3.3 On-Site Burial

Burial of deceased livestock can take place onsite or in an approved landfill. Both burial methods are subjected to Code of Colorado Regulation (CCR) 6 1007 Parts 2-3, which lists the following requirements:

- Every part of all dead animals must be buried by at least two feet of soil.
- No dead animals shall be placed in any body of water or seasonal creek or pond.
- Surface water should be diverted from the pit utilizing an up gradient diversion berm or other method.
- All dead animals must be buried at least 150 feet down gradient from any groundwater supply source.
- In no case should the bottom of the burial pit be closer than five feet to the ground water table.
- Burial sites should be located more than one mile from any residence.

8.3.4 Landfill Burial

The use of permitted landfills for carcass and material disposal may be an option. The necessary equipment, personnel, procedures and containment systems are already in place. Transport of

the carcasses to the landfill can pose some risk of disease spread and landfill personnel would have to adhere to additional biosecurity measures.

8.3.5 Incineration

There are three broad categories of incineration: open-air, fixed facility, and air-curtain. Open air includes burning carcasses in an open field. Examples of fixed facilities are crematoria, small carcass incinerators at veterinary colleges, large waste incineration plants, on- site incinerators, and power plants. Air-curtain incineration involves a machine that fan-forces a mass of air through a manifold that accelerates the incineration process generally conducted in an earthen trench. Air-curtain incineration has been used in Colorado to dispose of animals infected with a prion that causes chronic wasting disease.

8.3.6 Alkaline Hydrolysis

Alkaline Hydrolysis is a process that uses a caustic agent, such as sodium hydroxide and heat to hydrolyze carcasses into a sterile solution and calcium products. The process requires expensive equipment and provides only low volume capacity; therefore, this method has limited application in a disease outbreak situation.

Table 5. Cattle Disposal Methods: Considerations[1,2]

Disposal Method	Advantages	Disadvantages	Required Resources
Mass Burial On Site	-- Removal of large amounts of biomass -- Facilities can be decontaminated immediately upon removal of livestock -- Risk of disease spreading is reduced upon burial of livestock.	-- May serve as a containment site rather than decomposing livestock -- Requires multi-agency approval -- Significant site planning -- Public opposition -- Potential environmental contamination -- Safe management of fluids from decay process	-- Excavation equipment -- Cover material -- Appropriate landscape
Landfill	-- Cost /ton is manageable in many instances -- Infrastructure is in place to accept large quantities of materials quickly. -- Back up safety and compliance teams exist -- Subtitle D liner systems for containment are in place	-- Requires transporting carcasses off-site -- Permitting process may lead to delay in burial -- Operator may refuse to accept materials -- Safe management of fluids from decay process -- Standard practices are different for each site	-- Approved landfill site
Composting	-- Removal of large amounts of biomass -- Produces a humus-like product containing nutrients and organic matter that can be recycled onto cropland -- Cost effective	-- Slow carcass decay -- Poor odor retention -- Leachate production	-- Carbon source ie- sawdust, straw, corn stover -- Appropriate composting site -- Tractor or skid loader -- Long stem dial-type composting thermometer
Incineration **Fixed Facility**	-- Biosecure	-- Fixed capacity -- Public Opposition -- Expensive to operate -- Incinerators are incapable of handling large volumes of carcasses	-- Fuel -- Incineration facility
Air-Curtain	-- Mobile	-- Fuel intensive -- Logistically challenging	-- Fuel -- Air-curtain incineration facility
Alkaline Hydrolysis	-- Combine sterilization and digestion into one process -- reduction of waste volume and weight by as much 97%. -- Complete destruction of pathogens including prions.	-- Currently limited capacity for destruction of large volumes of carcasses in US -- Potential issues regarding disposal of effluent	-- Jacketed stainless steel pressure vessel. -- Sodium hydroxide or potassium hydroxide -- Water, energy for steam generation
Rendering	-- Good biosecurity at rendering plants -- High rendering temperatures destroy disease pathogens -- Environmentally sound	-- Requires transporting carcasses off-site -- Cost of transportation to rendering plant -- Capacity constraints in handling surges -- Some geographic area not served	-- Rendering Plant

[1] **National Agricultural Biosecurity Center, Kansas State University, *Carcass Disposal: A Comprehensive Review* (2004)**
[2] **Council for Agricultural Science and Technology, *Ruminant Carcass Disposal Options for Routine and Catastrophic Mortality* (2009)**

8.4 Alternatives to Depopulation

In most disease outbreaks, depopulation will be the primary method utilized to stop transmission and spread of the disease agent within affected animals on diseased premises. However, under certain circumstances, additional methods may need to be implemented to achieve full eradication of the disease or when stamping out is not possible. At this point, alternatives such as vaccination and controlled animal movements may be implemented by the State Veterinarian in collaboration with the AVIC.

8.4.1 Vaccination

Vaccination is a tool that can be utilized in conjunction with other emergency management controls to alleviate a disease outbreak. Policy frameworks for the use of vaccines during an outbreak include:

- Using vaccines as a primary disease control strategy without stamping out.
- Using vaccines in conjunction with a stamping out strategy to assist in eliminating a disease agent.
- Using vaccines during a long-term campaign to eradicate a well established disease.
- Not using a vaccine in disease response efforts due to: 1) unavailability; 2) does not meet safety standards; and, 3) additional reasons involving trade and marketing.

New technology in vaccine development has resulted in some 'marker' vaccines. This type of vaccine allows, via serological testing, animal health officials to distinguish vaccinated animals from naturally infected animals. Such a distinction is critical when providing proof to world animal health organizations which regulate disease free status that has implications for world trade of livestock and livestock products.

8.4.2 Vaccination Strategies

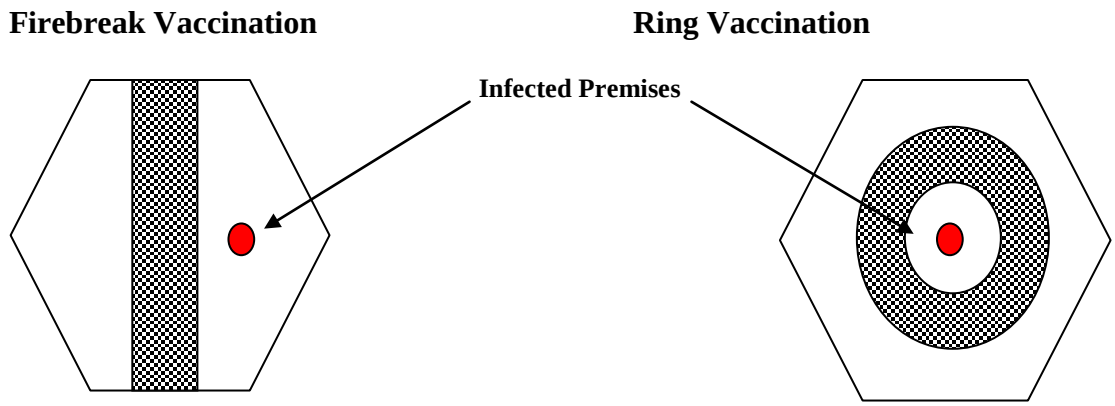
Vaccines can be utilized for different purposes during an animal health emergency. Strategies for vaccine use are described below.

A suppressive vaccination strategy is used as a disease control measure to reduce the viral shedding of livestock that have been exposed to the disease agent. This type of strategy is more commonly used in situations of intensive farming, usually due to resource constraints, such as constraints on carcass disposal.

A preventive vaccination strategy is used for high- risk animals not included in the control area but in close proximity to the infected premises to be considered at risk for exposure. This strategy is an alternative to the traditional stamping-out policy. Numerous factors should be considered prior to implementing this strategy such as: acceptance of vaccine internationally and the effectiveness of the vaccine. A preventive vaccination is also an option for threatened or endangered species that may be considered at risk due to exposure the disease agent.

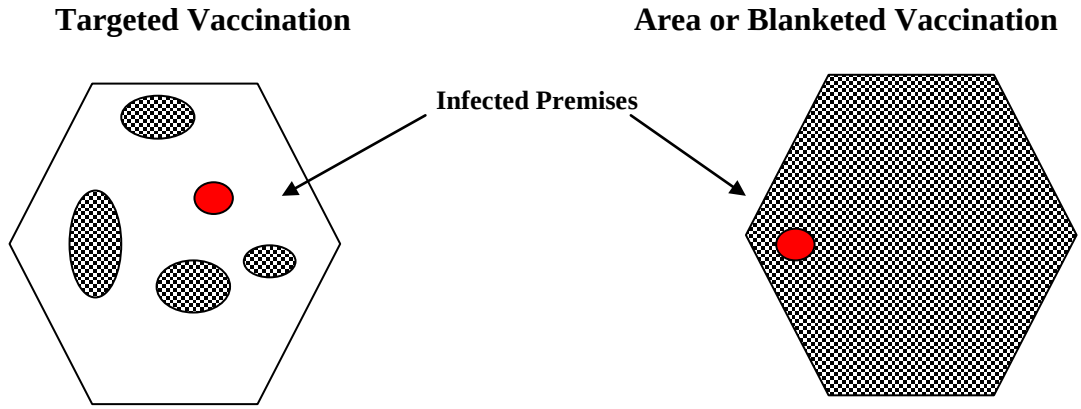
A barrier vaccination policy can be used to implement a preventive vaccination strategy. This policy is based on a spatial pattern developed to create a barrier between the infected premises and at risk premises. The intent of a barrier vaccination is to inhibit the disease transmission rate by vaccinating all suspected livestock. Common types of vaccination barriers are illustrated below. The area of the barrier will be dependent upon the epidemiology of the pathogen, livestock density, and available resources-see Figure 3. Barrier Vaccination Examples.

Figure 3. Barrier Vaccination Examples



A targeted vaccination policy can also be used preemptively. The targeted vaccination is commonly used to vaccinate livestock in facilities with a high animal density. Targeted vaccination may also be used to protect threaten and endangered species see Figure 4. Targeted and Area Vaccination Diagram.

Figure 4. Targeted and Area Vaccination Diagram



Area or Blanketed Vaccination also known as a mass vaccination entails vaccinating all livestock within a delineated geographical area. The defined area may be an isolated area, a large region or state. Often area vaccinations are used when traditional stamping out methods

are not meeting disease control objectives (see Figure 3. Targeted and Area Vaccination Diagram).

8.4.3 National Veterinary Stockpile

The National Veterinary Stockpile (NVS) is the Nation's repository of vaccines and other critical veterinary supplies and equipment needed for emergency response. The NVS is designed to augment state and local resources in the fight against dangerous animal diseases that could potentially devastate American agriculture, seriously affect the economy, and threaten the public's health. Homeland Security Presidential Directive 9 (HSPD-9) established the NVS in 2004. The Directive requires APHIS to be able to deploy the NVS to the site of a dangerous animal disease outbreak within 24 hours.

To accomplish this critical mandate, the NVS defined agents of greatest interest to animal health and has prioritized its resources accordingly. The NVS currently holds or has systems in place to provide:

- Personal protective equipment (PPE) for 310 responders for 10 days in a high-risk environment.
- Further PPE to protect 3,000 responders for 40 days
- Anti-viral medications for 3,000 responders for 6 weeks
- Satellite data and voice equipment that is portable and capable of establishing temporary command posts
- C & D equipment
- Vaccines and other supplies.

9.0 Business Continuity -- Protect Economic Viability and Continuity of Operations

Maintaining business continuity and the movement of livestock and animal food products that are unaffected by a disease outbreak is a critical component of the CDA *Cow–Calf Emergency Disease Response Plan*. The movement of livestock and animal food products will be at the discretion of the State Veterinarian in collaboration with the USDA AVIC and will be based on the epidemiology of the disease agent. Guidance on the movement of cattle and beef products during a disease outbreak is described in Sections 9.2 and 9.3.

9.1 Cow - Calf Movement

Cow-calf operations are a year round business where calves are produced and raised for beef production. Such enterprises involve large tracks of range land where breeding herds, replacement heifers and bulls are maintained. The typical beef production cycle on a Colorado cow-calf operation entails breeding cows in the spring with calving occurring in February or March. Calving may occur earlier depending on the location of the ranch in the state. Steer calves and most heifer calves are weaned and sold to feedlots in the fall. Optimally, calves weigh between 500 to 700 pounds when they are sold to feedlots for finishing.

During the summer months, cattle are often moved from the cow-calf premise to grazing allotments on federal or private property so that ranchers may raise hay on their pastures lands. Hay is grown, baled and stored over the summer months to provide feed to cattle in the winter and spring.

9.2 Controlled Animal Movement

During a disease outbreak, the State Veterinarian may issue an official permit for movement of cattle and beef products and other livestock that would allow their movement from a premises or geographic area within a quarantine order. Permits to move cattle or other affected animals from premises to premises within a control area can be issued if the follow criteria are met. Types of permits that maybe authorized are listed below.

- No cattle or other livestock on that premises have shown clinical signs of the disease agent for a determined amount of days and disease free status has been verified within 24 hours prior to movement.
- No susceptible species were added to the premises of origin for an appropriate amount of time as determined by the State Veterinarian.
- The premises of origin is not an infected premises, contact premises, or suspect premises and there is no detectable evidence of the disease agent.
- Transport conveyances for cattle and livestock product meet acceptable biosecurity standards.

9.2.1 Movement to Slaughter within a Control Area

Permits to move to slaughter (for human food use) or processing can be issued if (a) the cattle or livestock products meet the requirements of USDA's Food Safety and Inspection Service for food use; and (b) the livestock or products are eligible for a permit for movement from premises to premises or for movement directly to slaughter.

9.2.2 Movement Out of an Infected Zone

No susceptible livestock species or products posing a risk of disease transmission may leave the infected zone unless they are going directly to slaughter at an approved slaughter facility established in the buffer surveillance zone or meet the criteria described on a permit. No materials posing risk of disease transmission may leave the infected zone except by permit.

9.2.3 Movement within an Infected Zone

During the initial phase of an incident, cattle or beef products should not be allowed to move within an infected zone except at the discretion of the State Veterinarian.

9.2.4 Movement within the Buffer Surveillance Zone

Susceptible animal species or products posing a risk, may be moved within the buffer surveillance zone under permit if they are known not to be infected with or exposed to the disease agent and animals show no signs of other communicable diseases.

9.2.5 Movement Out of the Buffer Surveillance Zone

Susceptible animal species or products may be allowed to leave the control area if a risk assessment deems such movement to be appropriate. Movement will require a permit as prescribed by the State Veterinarian. Decontamination of such animals may be required.

9.2.6 Movement of Non-Susceptible Livestock

Movement of non-susceptible livestock out of the control area requires a permit as prescribed by the State Veterinarian. Decontamination of such animals may be required.

9.3 Bio-secure Transportation Corridors

As mentioned, allowing unaffected animals and animal food products to move during an animal disease outbreak is essential to maintaining industry business continuity. Thus, movement of cattle and other livestock that are deemed disease-free will take place along bio-secure corridors. Bio-secure corridors are transportation routes located outside of the quarantine area that will allow livestock and animal food products to travel safely without risk of exposure to an animal disease. Identifying bio-secure corridors will be the responsibility of the CDA with assistance from the Colorado State Patrol and local law enforcement agencies.

9.4 Risk Reduction and Contingency Planning

Contingency planning for cow-calf enterprises is necessary for emergency diseases but also has additional benefits in respect to natural disasters. Advance planning for natural disasters can help producers minimize the loss of animal lives and the health problems associated with disasters. It is important to note, though aid may be available from many sources following a disaster, producers themselves are ultimately responsible for the welfare of their animals and should prepare accordingly. Appendix M provides information and templates to assist producers in preparing their operation for a disaster.

10.0 Recovery -- Returning Affected Premises to Normal Business Operations

The actions taken during the recovery period are focused on restoring the situation to normal or near normal as quickly as possible. Issues to consider are repopulation of production facilities, financial considerations, re-establishing public trust and consumer confidence, and review of risk reduction measures. It is important to note that the recovery phase of an incident may last an extended period of time.

10.1 Surveillance and Monitoring

Once the mandatory down time requirements are met, serologically negative sentinel cattle may be introduced to determine if pathogens are still present and viable on the premises. Sentinel cattle may be retained for at least two specific pathogen incubation periods (to be determined by the State Veterinarian) and monitored for clinical signs of the disease. In the event that a sentinel becomes infected or tests serologically positive for the disease, the sentinel will be depopulated and the cleaning and disinfection process will be repeated.

10.2 Restocking

Once all premises affected by the outbreak are cleaned and disinfected and there are no new reports of the disease agent, restocking will be permitted by the State Veterinarian. A moratorium on restocking will be in place for a minimum of 30 days or other appropriate time period determined by the State Veterinarian after depopulation and after the completion of an approved cleaning and disinfection process of the entire premises. OIE recommendations for restocking by disease agent are listed in Appendix C.

Purchasing restock cattle from herds of known health status is strongly recommended, Additional recommendations include isolating stock for a minimum of 30 days before introduction as a herd addition, holding veterinarian-to-veterinarian pre-conferences and testing animals before purchase, on arrival and before exiting isolation.

11.0 Roles and Responsibilities

Sections 11.1 and 11.2 outline the roles and responsibilities of agencies and producers when responding to an animal disease outbreak.

11.1 Agencies Roles and Responsibilities

Responding to an outbreak of a highly contagious animal disease outbreak will require the coordination of multiple agencies. A list of local, state, and federal agencies and their possible role in an outbreak response is listed in Appendix K.

11.2 Industry's Role in a Disease Outbreak

Industry will play an important role both in preventing a disease outbreak and in response and recovery efforts of such an event. Appendix L offers recommendations and actions to improve Continuity of Operations plans for the beef industry.

Appendices

A List of Acronyms **A-1**

B Agencies Involved in Animal Emergency Response **B-1**

C Animal Diseases Significant to Cattle **C-1**

D Incident Command System Organization Structure Chart **D-1**

E Incident Complexity Analysis Worksheet **E-1**

F PPE Guidance for Zoonotic and Non-Zoonotic **F-1**

G Regulatory Communication Network **G-1**

H Colorado VMO Territories **H-1**

I FADI Collection Data Form Sample **I-1**

J EPA Approved Disinfectants for Highly Pathogenic Diseases **J-1**

K Local, State, and Federal Agencies Roles and Responsibilities **K-1**

L Industry's Role in Emergency Response **L-1**

- Foreign Animal Disease Investigation Action Steps
- Flow Chart of a Foreign Animal Disease Investigation
- Developing a Site Plan
- Livestock Trailer Cleaning & Disinfecting Recommendations
- Biosecurity Measures for Cow-Calf Producers
- List of FADs Significant to Cattle

M Livestock Emergency Response Planning Templates & Information **M-1**

- Vulnerability Assessment
- Disaster Kit
- Emergency / Essential Functions Contact List
- Draft Guidelines for Emergency Composting of Cattle Mortalities

Appendix A List of Acronyms

AVIC	Area Veterinary In Charge
AVMA	American Veterinary Medical Association
APHIS	Animal and Plant Health Inspection Service
BSE	Bovine Spongiform Encephalopathy
CBPP	Contagious bovine pleuro- pneumonia
CCA	Colorado Cattle Association
CCR	Code of Colorado Regulations
CDA	Colorado Department of Agriculture
CDC	Center for Disease and Prevention
CDEM	Colorado Department of Emergency Management
CDPHE	Colorado Department of Public Health and Environment
CDOT	Colorado Department of Transportation
CFA	Colorado Farmers Association
CFR	Code of Federal Regulations
CIAC	Colorado Information Analysis Center
CLA	Colorado Livestock Association
CLSS	Colorado Livestock Security System
CO_2	Carbon Dioxide
CO AERO	Colorado Animal Emergency Response Organization
CRS	Colorado Revised Statutes
CSP	Colorado Safety Patrol
CSU	Colorado State University
CVMBS	College of Veterinary Medicine and Biomedical Sciences
DOW	Division of Wildlife
ECIMT	Eastern Colorado Incident Management Team
EMAC	Emergency Management Assistance Compact
EOC	Emergency Operation Center
EPA	Environmental Protection Agency
ESF	Emergency Support Function
FMD	Foot and Mouth Disease
FAD	Foreign Animal Disease
FADD	Foreign Animal Disease Diagnostician
FADDL	Foreign Animal Disease Diagnostic Lab
FADI	Foreign Animal Disease Investigation
FBI	Federal Bureau of Investigation
FDA	Food and Drug Agency
FEMA	Federal Emergency Management
FSIS	Food Safety Inspection Service
GPS	Global Positioning System
HSPD	Homeland Security Presidential Directive
IA	Interagency Agreement
IAP	Incident Action Plan
IC	Incident Commander
ICS	Incident Command System
IMT	Incident Management Team
JTTF	Joint Terrorism Task Force (within FBI)
NIMS	National Incident Management System
NVSL	National Veterinary Services Laboratories
NVS	National Veterinary Stockpile
OSHA	Occupational Safety and Health Association
OIE	Office of Internationale des Epizooties
PPE	Personal Protective Equipment
PIN	Premises Identification Number
PIO	Public Information Officer
SEOC	State Emergency Operations Center
SOP	Standard Operating Procedures
USDA	United States Department of Agriculture
VMO	Veterinarian Medical Officer
VS	Veterinary Service

Appendix B Agencies Involved in Animal Emergency Response

The following table provides an overview of agencies and organizations who may be involved in an animal emergency response. Emergency support functions were developed by the Federal Emergency Management Agency (FEMA) in the late 1980's to better coordinate response activities that are common to most or all disasters. Each ESF is comprised of one or more Primary agency (ies) serving as the lead and several other agencies and organizations providing support. Lead agencies for local, state and federal response are listed below for ESF's often associated with an animal emergency.

Agencies Involved in Animal Emergency Response			
Emergency Support Function	**Local Agencies / Organizations**	**State Agencies / Organizations**	**Federal Agencies / Organizations**
Animal Health	Accredited Veterinarians	Colorado Department of Agriculture / State Veterinarian	US Department of Agriculture, APHIS- VS / Area Vet-in Charge
Emergency Management	Local Emergency Management Resources / County Emergency Manager	Colorado Division of Emergency, Governor's Office of Homeland Security	Federal Emergency Management Agency
Public Health	Local / County / Regional Health Department	Colorado Department of Public Health and Environment	US Department of Health & Human Services / Centers for Disease Control and Prevention
Law Enforcement	County Sheriff Office / Local Law Enforcement	Colorado Department of Public Safety	Federal Bureau of Investigation
Environmental Issues	State /County/Local Health Department	Colorado Department of Public Health and Environment	US Environmental Protection Agency
Incidents/Issues			
Wildland Fire	Fire Districts	Colorado Department of Public Safety — Division of Fire Safety	USFS National Wildfire Coordination Group
Wildlife	CO Division of Wildlife Officials	CO Division of Wildlife	Dept of Interior, US Fish and Wildlife Service; USDA, APHIS, Wildlife Services
Transportation	Local Municipalities, County Public Works Department	Colorado Department of Public Safety Colorado Department of Transportation	US Department of Transportation
Food	Salvation Army Faith-Based Groups Local Red Cross Chapters	CDEM Coordination with Non-Governmental Organizations (NGOs)	Federal Emergency Management Agency
Utilities	Local Utility Companies	Colorado Public Utilities Commission	Federal Energy Regulation Commission

. **Appendix C Animal Diseases Significant to Cattle**

Animal Diseases Significant to Cattle Table I			
Animal Disease / Classification[1,2]	**Mode of Transmission[1,5]**	**Recommended Quarantine and Movement Controls[1,3,4]**	**Treatment Options and Vaccine Availability[5]**
Contagious Bovine Pleuropneumonia (CBPP) 6 months incubation period	**Aerosol** - Cough from infected cow **Direct Contact** - Cattle-to-Cattle (saliva, urine or (reproductive tissues or fluids)	- Infected zone should extend (3 km) from Infected premise - Suspected premises should be placed in quarantine for six months - Stop movement for all suspected animals except official approval to slaughter	- Vaccine is available (only in countries with endemic CBPP) - No effective treatment available - Depopulation of all infected and in-contact cattle - Regular serological testing of at-risk cattle, slaughter cattle that test positive
Foot and Mouth Disease	**Aerosol** **Direct Contact** - Cattle-to-Cattle (saliva, milk, urine, reproductive tissues or fluids, tears, blood and feces) **Oral** - Ingesting infected product Fomites	- Strict quarantine controls - Infected zone should extend a minimum of 6.2 miles (10km) beyond the presumptive or confirmed infected premise.	- Depopulation of all infected and in contact Animals - Vaccine is available, must be repeated in intervals - Barrier or ring vaccination is recommended with stamping out infected and at risk cattle
Rift Valley Fever (RVF) 30 days infective period	**Vector** - Mosquito	- RVF virus has been found in raw milk and semen - Infection zone should extend a minimum of 10 km from infected premises. Other factors determining infection zone include livestock concentrations, the weather and prevailing winds - Suspected cattle should be quarantine until trace backs are completed	- Vaccine is available (only in countries with endemic CBPP) - No effective treatment available - Destruction of all susceptible animals on an IP is likely only on the index farm.
Rinderpest 21 days incubation period	**Direct Contact** - Cattle-to-Cattle (saliva, milk, urine, reproductive tissues or fluids, tears, blood and feces) **Fomites** (Limited) - i.e. Feed troughs and watering tanks	- A control area CA will form a buffer zone of at least 6.2 miles (10 km) between the infected and free areas, and movement into and out of the area will be controlled	- No effective treatment available - Depopulation of all infected and in contact Animals - Vaccine is available, must be repeated in intervals - Barrier or ring vaccination is recommended with stamping out infected and at risk cattle

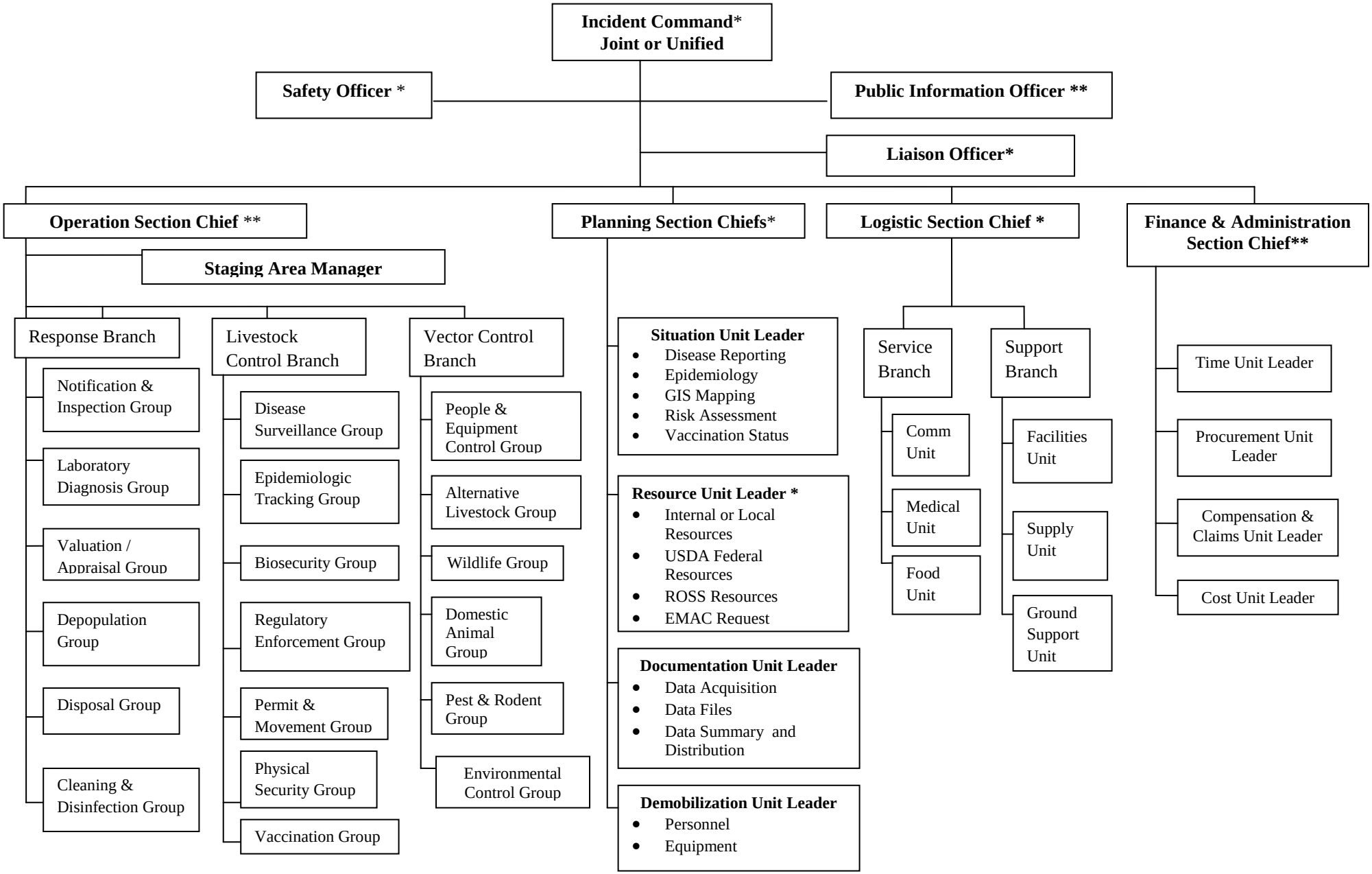
[1] Center for Food Security and Public Health, Iowa State University, *Animal Disease Index*, 2008.
[2] The World Organization for Animal Health, *Terrestrial Animal Health Code*, 20098. http://www.oie.int/eng/normes/Mcode/en_sommaire.htm
[3] AUSVETPLAN Australian Veterinary Emergency Plan, Disease Strategies, http://www.animalhealthaustralia.com.au/aahc/programs/eadp/ausvetplan/disease-strategies.cfm.
[4] United States Animal Health Association, Committee on Foreign and Emerging Diseases. *Foreign Animal Diseases*, 2008.
[5] USDA, APHIS *Publications* http://www.aphis.usda.gov/publications/animal_health/index_ah_c.shtml.

. **Appendix C Animal Diseases Significant to Cattle**

Animal Diseases Significant to Cattle Table II				
Animal Disease [2]	**Tracing Recommendations**[1]	**Decontamination Recommendations**[1,2] **(See Appendix J for Approved Disinfectants)**	**Restocking / Surveillance Recommendations**	**Wildlife / Vector Control**
Contagious Bovine Pleuropneumonia (CBPP) 6 months incubation period	- Trace backs should extend back 6 months from first signs of disease - All suspected cattle one year or older should be individually identified	- Building used to house livestock, dairies, yards should be decontaminated. - Household bleach is an effective disinfectant CBPP. - All surfaces should be cleaned. - Remove manure, bedding and feed.	- Suspected species serological tested on two occasions at 2 and 8 weeks - Slaughter cattle that test positive	N/A
Foot and Mouth Disease 14 days incubation period	- Trace-backs minimum of 14 days from first appearance of clinical signs - Trace-forward 21 days before first case to time of quarantine.	- Premises equipment, materials & buildings should be cleaned and disinfected. - Road surfaces and yards adjacent and within the infected premises should be sprayed - If decontamination can't occur quickly and effectively, then equipment, materials should be destroyed. - Steps should be taken to prevent generation and dispersal of infective dusts and aerosols.	- Sentinel cattle restocked 30 days after decontamination, contact with all parts of premises and objects. Inspected by Vet every 3 days. - Sentinel cattle maintained on Premises for 60 days	Rodent Controls Feral Pigs
Rift Valley Fever (RVF) 30 days infective period	- Trace backs should extend back 30 days - Tracing should include: cattle products- milk, semen, blood and embryos, and people.	- Building used to house livestock, dairies, yards should be decontaminated - Fumigation of enclosed premises with paraformaldehyde. - Particular care should be taken to decontaminate blood-contaminated areas.	- Use of sentinel animals is dependent on Transovarial transmission of vector- in absence of this, 6 weeks after decontamination should be sufficient. - Once restocking occurs, serological Monitoring at monthly intervals for 1 year and quarterly for the next 2 years.	Vector Control
Rinderpest 21 days incubation period	- Trace-back of animals, people and equipment should extend back 21 days before detection of first clinical case on the IP. - Trace-forward 21 days before first case to time of quarantine.	- Premises, equipment and clothing be cleaned on infected premise. - Decontaminated follows using sodium or calcium hypochlorite, or sodium hydroxide or sodium carbonate. - Feces and effluents should be treated with sodium carbonate, before they are burned or or buried.	- Restocking of cattle 150 days after decontamination and cleaning of IP. - Random sampling of IP 1 month after restocked and then 2 months later.	If found in feral animals, a policy of search and depopulation will be recommended.

[1] Center for Food Security and Public Health, Iowa State University, *Animal Disease Index*, 2008.
[2] The World Organization for Animal Health, *Terrestrial Animal Health Code*, 2008. http://www.oie.int/eng/normes/Mcode/en_sommaire.htm
[3] AUSVETPLAN Australian Veterinary Emergency Plan, Disease Strategies, http://www.animalhealthaustralia.com.au/aahc/programs/eadp/ausvetplan/disease-strategies.cfm
[4] United States Animal Health Association, Committee on Foreign and Emerging Diseases. *Foreign Animal Diseases*, 2008.
[5] USDA, APHIS *Publications* http://www.aphis.usda.gov/publications/animal_health/index_ah_c.shtml

Appendix D ICS Incident Organization Chart for Animal Disease Response



*** Denotes positions to be filed by ECIMT members when the incident's complexity exceeds CDA's capability to manage the incident effectively. Additional positions may be filled by ECIMT as the complexity of an incident increases.**

Appendix E Incident Complexity Worksheet

All-Hazard Incident Complexity Analysis

Incident Name:	**Date:**
Incident Number:	**Time:**

This Complexity Analysis is weighed based on the relevance to Life Safety, Incident Stabilization, and Property Conservation.

Complexity Factors	Check if Pertinent
Impacts to Life, Property, and the Economy	
Urban interface; structures, developments, recreational facilities, or potential for evacuation.	☐
Community and Responder Safety	
Performance of public safety resources affected by cumulative fatigue	☐
Overhead overextended mentally and/or physically	☐
Communication ineffective with tactical resources or dispatch	☐
Incident action plans, briefings, etc. missing or poorly prepared	☐
Resources unfamiliar with local conditions and tactics	☐
Potential Hazardous Materials	
Potential of Hazardous Materials	☐
Weather and other Environmental Influences	
Unique natural resources, special-designation areas, critical municipal watershed, protected species habitat, cultural value sites	☐
Likelihood of Cascading Events	
Variety of specialized operations, support personnel or equipment	☐
Potential Crime Scene (including Terrorism)	
Potential crime scene	☐
Potential of terrorism	☐
Political Sensitivity, External Influences, and Media Relations	
Sensitive political concerns, media involvement, or controversial policy issues	☐
Organizational Performance Values and Product Development	
Non-IAP Products not being developed or deficient.	☐
Area Involved, Jurisdictional Boundaries	
Incident threatening more than one jurisdiction and potential for unified command with different conflicting management objectives.	☐
Availability of Resources	
Operations are at the limit of span of control.	☐
Unable to property staff air operations.	☐
Limited local resources available for initial attack/response	☐
Heavy commitment of local resources to logistical support.	☐
Existing forces worked 12 hours without success.	☐
Percentage Score	**%**
If 10% or lower look at going to or staying at Type 4 Team.	
If 10 % to 20% maintain or go to Type 3 Team	
If greater than 20% increase to Type 2 Team or additional overhead	

Prepared By	**Date:**	**Time:**

Source: Todd Manns, Planning Chief, Eastern Colorado Incident Management Team

Appendix F PPE Guidance for Zoonotic and Non-Zoonotic Diseases

Personal Protective Equipment Guidelines for Colorado Department of Agriculture Employees																
Environment	Zoonotic Disease not Diagnosed in the U.S.		Zoonotic Disease Diagnosed in the United States													
			Suspect Disease Outbreak Investigation			Confirmed Zoonotic Disease Diagnosis – Emergency Response Activities										
						General Operations Areas Surveillance		Near or Contact Premises Surveillance		Biological Control Area Surveillance		Biological Control Area Activity				
Equipment	Routine Surveillance	Suspect Disease Outbreak Investiga-tion	Routine Surveillance	Outdoor Environ-ment	Indoor Environ-nment	Outdoor Environ-ment	Indoor Environ-ment	Indoor Environ-ment	Outdoor Environ-ment	Indoor Environ-ment	Indoor depopulation	Re-Entry CO2 & CO2 Level Testing	Indoor Depopulation Preparation	Indoor Environ-ment	Outdoor Environ-ment	Any Cleaning and/or Disinfection Activity
Coveralls, Work Uniforms, etc.	X															
Tyvek Coveralls		X	X			X		X		X		X	X			
Tychem Coveralls														X	X	X
Exam gloves (heavy Disposable)	X	X	X	X	X	X	X	X	X	X plus	X plus	X plus	X plus	X plus	X plus	X plus
Rubber Glovers (heavy duty)										X	X	X	X	X	X	X
N-95 or N-100 Filtering Face piece*		X	X	X	X plus	X	X	X plus	X plus	X plus					X plus	
Goggles (indirect vented)**				+/-	X or		+/-	X or	X or	X or					X or	
Full-face APR with N-100 Canister					X			X	X	X	X	X		X	X	X
Self-contained breathing apparatus SCBA													X			
Boot Covers (Disposable)	+/- OR	+/- OR	+/- OR			+/- OR	+/- OR									
Rubber Boots	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

* Examples of zoonotic disease with higher transmission risk would include influenza in swine or other non-avian species, anthrax, plague and tularemia, among others.

** A separate table has been developed for avian influenza. See HPAI PPE Guidelines.

Appendix F PPE Guidance for Zoonotic and Non-Zoonotic Diseases

Personal Protective Equipment Guidelines for Colorado Department of Agriculture Employees Non- Zoonotic Animal Disease Incident										
Environment	Suspect Disease not Diagnosed in the U.S.		Suspect Disease Diagnosed in the United States							
			Suspect Disease Outbreak Investigation	Confirmed Diagnosis of Suspect Disease – Emergency Response Activities						
				General Operations Areas Surveillance	Near or Contact Premises Surveillance	Biological Control Area Surveillance	Biological Control Area Activity			
Equipment	**Routine Surveillance**	**Suspect Disease Outbreak Investigation**	Routine Surveillance	Routine Surveillance Operations	Routine Surveillance Operations	Routine Surveillance Operations	Indoor Depopulation Preparation	Indoor Depopulation Re-Entry CO2 & CO2 Level Testing	Routine Surveillance Operations	Any Cleaning and/or Disinfection Activity
Coveralls, Work Uniforms, etc.	**X**									
Tyvek Coveralls		**X**	X	X	X	X	X	X		
Tychem Coveralls									X	X
Exam gloves (heavy Disposable)	**X**	**X**	X	X	X	X plus	X plus	X plus	X plus	X plus
Rubber Glovers (heavy duty)						X	X	X	X	X
N-95 or N-100 Filtering Face piece*		**X**	X	X	X	X	X		X	X plus
Goggles (indirect vented)**										X or
Full-face APR with N-100 Canister										X
Self-contained breathing apparatus SCBA ***								X		+/-
Boot Covers (Disposable)	+/- OR	+/- OR	+/- OR	+/- OR						
Rubber Boots	**X**	**X**	X	X	X	X	X	X	X	X

***** Filtering face pieces are recommended to avoid transmission of a disease agent to other physical locations via the responders respiratory system as can occur with agents such as the Foot and Mouth virus.
**Goggles /full race piece maybe considered for dust control in any location /activity and should routinely be used in cleaning and disinfection activities.
*** SCBA should be used in altered environments such as gas euthanasia or high risk confined space such as manure pits.

Appendix G Regulatory Communication Network

County Emergency Managers of Colorado Current as of January 2011				
Colorado County	**Emergency Manager**	**Phone Number (24-Hour)**	**Fax Number**	**Email**
Adams	Heather McDermott	720-322-1400	720-322-1404	hmcdermott@co.adams.co.us
Alamosa	Pet Magee	719-589-5807	719-587-0264	pete_magee@qwestoffice.net
Arapahoe	Lt. Greg Palmer	303-795-4711	720-874-4158	GPalmer@co.arapahoe.co.us
Archuleta	Drew Petersen	970-263-2131	970-731-4800	dpetersen@archuletacounty.org
Baca	Riley Frazee	719-523-4511	719-523-6584	riley.frazee@seregion.com
Bent	Randy Freed	719-456-1363	719-456-0476	randyf@bentcounty.net
Boulder	Mike Chard	303-441-4444	303-441-3884	mchard@bouldercounty.org
Broomfield	Kent Davies	303-438-6400	720-887-2001	kdavies@ci.broomfield.co.us
Chaffee	Lisa Ortega	719-539-2596	719-539-7442	lortega@chaffeecounty.org
Cheyenne	Darcy Janssen	719-767-5633	719-346-8542	janssen@wildblue.net
Clear Creek	Kathleen Krebs	303-679-2393	303-679-2440	kkrebs@co.clear-creek.co.us
Conejos	Rodney King	719-589-5804	719-376-5661	rodneykk@hotmail.com
Costilla	Matthew Valdez	719-672-3302	719-672-3003	Mathew.Valdez@costillacounty.net
Crowley	Larry Reeves	719-267-5555 x1	719-267-3114	lreeves@crowleycounty.net
Custer	Christe Feldmann	719-783-2270	719-783-9085	ccoem@centurytel.com
Delta	Rob Fiedler	303-640-9999	970-874-2014	fiedler@deltacounty.com
Denver	Daniel Alexander	303-640-9999	720-865-7691	daniel.alexander@denvergov.org
Dolores	Todd Parisi	970-677-2500	970-677-2880	dcoem@yahoo.com
Douglas	Fran Santagata	303-660-7500	303-814-8790	fsantagata@dcsheriff.net
Eagle	Barry Smith	970-479-2201	970-328-8694	barry.smith@eaglecounty.us
Elbert	LaRiea Thompson	303-805-6131	303-805-6159	LaRiea.Thompson@elbertcounty-co.gov
El Paso	Jim Reid	719-390-5555	719-575-8591	
Fremont	Steve Morrisey	719-276-5555	719-276-7304	steve.morrisey@fremontco.com

Colorado Department of Emergency Management. http://www.dola.state.co.us/dem/localem.htm. Jan 2011.

County Emergency Managers of Colorado (Cont.)
Current as of January 2011

Colorado County	Emergency Manager	Phone Number (24-Hour)	Fax Number	Email
Garfield	Chris Bornholdt	970-625-8095	970-945-6430	cbornholdt@garfield-county.com
Gilpin	George Weidler	303-582-5500		gweidler@co.gilpin.co.us
Grand	Trevor W. Denney	970-887-2732		tdenney@co.grand.co.us
Gunnison	Scott Morrill	970-641-8000	970-641-7693	smorrill@gunnisoncounty.org
Hinsdale	Jerry Gray	970-641-8000	970-944-2630	grayj@lakecity.net
Huerfano	Diego A. Bobian	719-989-8220		dbobian@huerfano.us
Jackson	Kent Crowder	970-723-4242	970-723-4706	
Jefferson	James (Tim) McSherry	303-277-0211	303-271-4905	jmcsherr@jeffco.co.us
Kiowa	Chris Sorensen	719-438-5411	719-438-5503	chris@kiowaoem.com
Kit Carson	Darcy Janssen	719-346-8538	719-349-8542	janssen@wildblue.net
Lake	Mike McHargue	719-486-1249	719-486-0139	mikemchargue@hotmail.com
La Plata	Butch Knowlton	970-385-2900	970-382-6272	knowltonbk@co.laplata.co.us
Larimer	Erik Nilsson	970-416-1985	970-498-9203	nilssoed@co.larimer.co.us.
Las Animas	Bill Cordova	719-846-2211	719-845-2598	bcordova@amigo.net
Lincoln	Kenneth Morrison	719-743-2426	719-743-2280	lcadmin@lincolncountyco.us
Logan	Bob Owens	970-522-3512	(970) 521-0632	Owens@sterlingcolo.com
Mesa	Andrew Martsolf	970-250-1279		andrew.martsolf@mesacounty.us
Mineral	William Fairchild	719-658-2600	719-658-2764	mincosheriff@centurytel.net
Moffat	Tom Soos	970-824-6501	970-826-2423	tom.soos@thmcraig.org
Montezuma	Doug Parker	970-565-8441	970-565-3991	dparker@so.montezuma.co.us
Montrose	Ike Holland	970-252-4010	970-249-7761	iholland@montrosecounty.net
Morgan	Steve Enfante	970-867-8531	970-867-7344	senfante@co.morgan.co.us
Otero	Chris Johnson	719-384-5941	719-384-2272	cjohnson@oterogov.org

Colorado Department of Emergency Management. http://www.dola.state.co.us/dem/localem.htm. Jan 2011.

County Emergency Managers of Colorado (Cont.) Current as of January 2011				
Colorado County	**Emergency Manager**	**Phone Number (24-Hour)**	**Fax Number**	**Email**
Ouray	Alan Staehle	970-252-4020		awsouray@aol.com
Park	Brain Foltz	719-836-4121	719-836-4156	bfoltz@parkco.us
Phillips	Randy Schafer	970-854-3144	970-854-3811	rschafer@pctc.net
Pitkin	Ellen Anderson	970-920-5300	970-920-5307	ellena@co.pitkin.co.us
Prowers	Staffon Warn	719-336-3977	719-336-4883	staffon.warn@prowerscounty.net
Pueblo	Karen Ashcraft	719-583-6250	719-583-6218	ashcraft@co.pueblo.co.us
Rio Blanco	John Hutchins	970-878-9620	970-878-3127	rbcem@co.rio-blanco.co.us
Rio Grande	Vic Webb	719-657-4000		rgcoem@riograndecounty.org
Routt	Bob Struble	970-846-1552		bstruble@co.route.co.us
Saguache	Jim Felmlee	719-655-2525		jfelmlee@amigo.net
San Juan	Kristina Maxfield	970-387-5531	970-387-0251	sanjcoem@yahoo.com
San Miguel	Jennifer Dinsmore	970-728-1911	970-728-9206	jenniferd@sanmiguelcounty.org
Sedgwick	Mark Turner	970-474-3355	970-474-2607	ptsports57@yahoo.com
Southern Ute Indian Tribe	Kathie Gurule	970-563-4401	970-563-0215	kgurule@southern-ute.nsn.us
Summit	Joel Cochran	970-453-2232 ext 336	970-453-7329	jcochran@co.summit.co.us
Teller	Steve Steed	719-687-9652	719-687-1202	steeds@co.teller.co.us
Ute Mountain Ute Indian Tribe	John Trocheck	970-565-3706	970-564-5443	Jtrocheck@utemountain.org
Washington	Mike McCaleb	970-345-2244	970-345-2701	mmccaleb@co.washington.co.us
Weld	Roy Rudisill	970-304-4015 x2700	970-304-6543	rrudisill@co.weld.co.us
Yuma	Roger Brown	970-848-0464	970-848-0160	yumaoem@wycomm.org

Colorado Department of Emergency Management. http://www.dola.state.co.us/dem/localem.htm. Jan. 2011

County Sheriffs of Colorado (Cont.)

Current as of January 2011

Colorado County	Sherriff	Phone Number
Adams	Doug Darr	303-655-3216
Alamosa	David Stong	719-589-6608
Arapahoe	J. Grayson Robinson	720-874-4165
Archuleta	Peter Gonzales	970-264-2131
Baca	David Campbell	719-523-4511
Bent	David Encinias	719-456-0795
Boulder	Joseph Pelle	303-441-4605
Broomfield*	Chief Tom Deland	303-438-6400
Chaffee	William Palmer Jr.	719-539-2814
Cheyenne	Ken Putman	719-767-5633
Clear Creek	Don Krueger	303-569-3251 ext. 376
Conejos	Robert Gurule	719-376-2196
Costilla	Amos Medina	719-672-3302
Crowley	Miles Clark	719-267-5555
Custer	Fred Jobe	719-783-2270
Delta	Fred McKee	970-874-2000
Denver*	Chief William Lovingier	720-913-2000
Dolores	Jerry Martin	970-677-2257
Douglas	David Weaver	303-660-7541
Eagle	Joseph D. Hoy	970-328-6611
Elbert	Shayne Heap	303-621-2027
El Paso	Terry Maketa	719-520-7204
Fremont	Jim Beicker	719-276-5555
Garfield	Lou Vallario	970-945-0453

County Sheriffs of Colorado. **http://www.csoc.org/counties.asp**. **Jan 2011**

*Chief of Police for Bloomberg and Denver Counties.

County Sheriffs of Colorado (Cont.) Current as of January 2011		
Colorado County	**Sheriff**	**Phone Number**
Gilpin	Bruce Hartman	303-582-1060
Grand	Rodney Johnson	970-725-3344
Gunnison	Rickard Bescker	970-641-1113
Hinsdale	Ronald Bruce	970-944-2291
Huerfano	Bruce Newman	719-738-1600
Jackson	Scott Fischer	970-723-4242
Jefferson	Ted Mink	303-271-5305
Kiowa	Forrest Frazee	719-438-5306
Kit Carson	Tom Ridnour	719-346-8934
Lake	Ed Holte	719-486-1249
La Plata	Duke Schirard	970-247-1157
Larimer	Justin Smith	970-498-5100
Las Animas	James Casias	719-846-2211
Lincoln	Tom Nestor	719-743-2426
Logan	Brett Powell	970-522-2578
Mesa	Stan Hilkey	970-244-3500
Mineral	Ronald Bruce	719-658-2600
Moffat	Tim Jantz	970-824-4495
Montezuma	Dennis Spruell	970-565-8452 x303
Montrose	Rick Dunlap	970-249-6606
Morgan	James E. Crone	970-867-2461
Otero	James Casias	719-384-5941
Ouray	Dominic Mattivi	970-325-7272
Park	Fred Wegener	719-836-2494
Phillips	Charles Urbach	970-854-3644

County Sheriffs of Colorado. **http://www.csoc.org/counties.asp**. **Jan 2011**

County Sheriffs of Colorado (Cont.)

Current as of January 2011

Colorado County	Sheriff	Phone Number
Pitkin	Joe Disalvo	970-920-5300
Prowers	James Faull	719-336-8050
Pueblo	Kirk Taylor	719-583-6125
Rio Blanco	Si H. Woodruff	970-878-5023
Routt	Garrett Wiggins	970-879-1090
Saguache	Mike Norris	719-655-2544
San Juan	Sue Kurtz	970-728-4442
Sedgwick	Randy Peck	970-474-3355
Summit	Sheriff John Minor	970-453-2232
Teller	Mike Ensminger	719-687-9652
Washington	Larry Kuntz	970-345-2244
Weld	John Cooke	970-356-4015 x2801
Yuma	Chad Day	970-332-4805

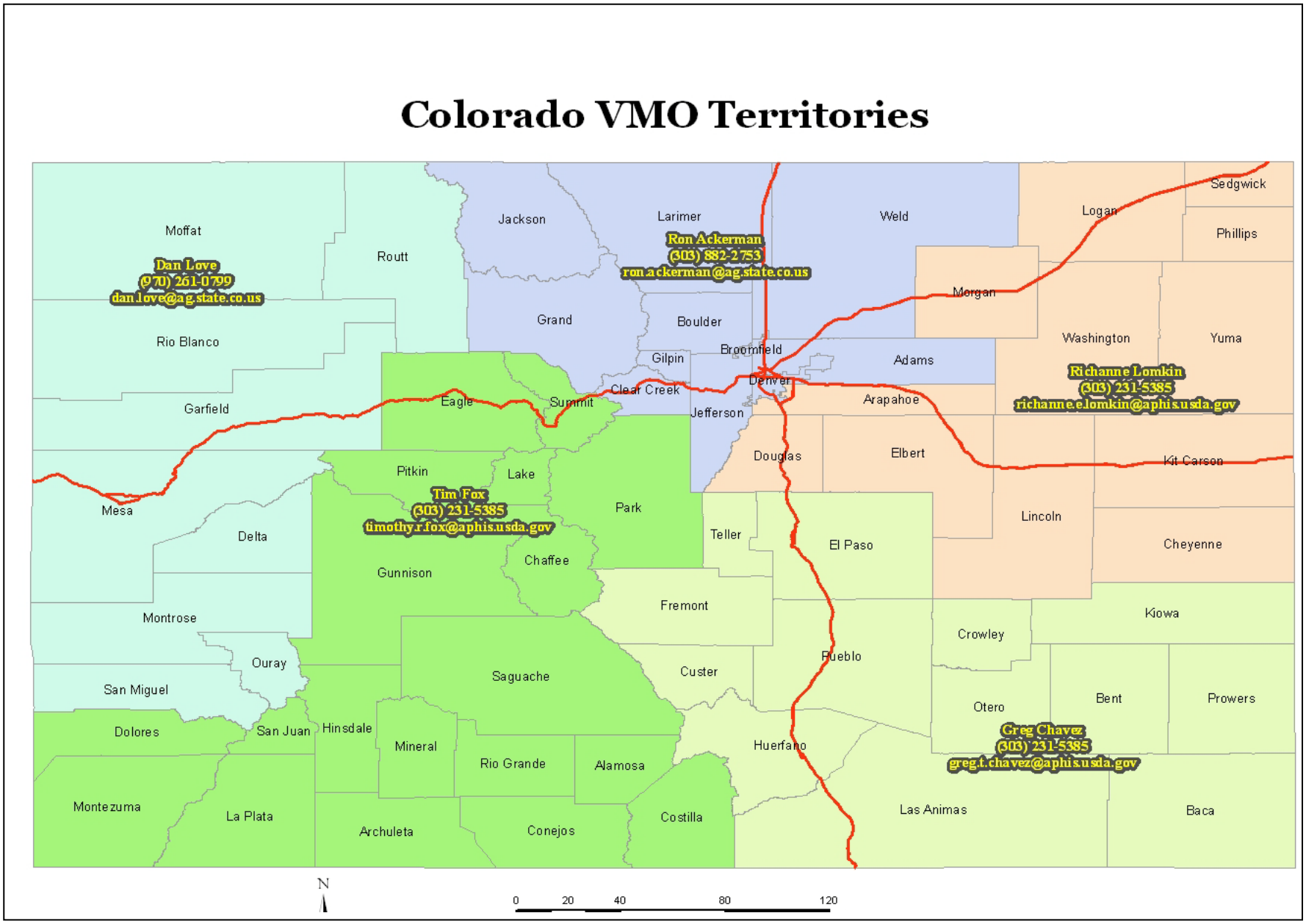
County Sheriffs of Colorado. **http://www.csoc.org/counties.asp**. **Jan 2011**

Colorado County Extension Offices Current as of October 2009		
Colorado County	**Phone Number**	**Address**
Adams	(303) 637-8100	9755 Henderson Road, Brighton, CO 80601
Alamosa	(719) 852-7381	1899 E. Hwy 160, Monte Vista, CO 81144
Arapahoe	(303) 730-1920	5804 South Datura, St. Littleton, CO 80120
Archuleta	(970) 264-5931	344 Highway 84, Pagosa Springs, CO 81147
Baca	(719) 523-6971	772 Colorado St., Springfield, CO 81073
Bent	(719) 456-0764	1499 Ambassador Thompson BLVD, Las Animas, CO 81054
Boulder	(303) 678-6238	9595 Nelson Road, Longmont, CO 80501
Broomfield	(720) 887-2286	6650 W. 120th Ave., Broomfield, CO 80020
Chaffee	(719) 539-6447	10165 County Road 120, Salida, CO 81201
Cheyenne	(719) 767-5716	425 South 7th W., Cheyenne Wells, CO 80810
Conejos	(719) 852-7381	1899 E. Hwy 160, Monte Vista, CO 81144
Costilla	(719) 852-7381	1899 E. Hwy 160, Monte Vista, CO 81144
Crowley	(719) 267-5243	601 North Main Street, Ordway, CO 81063
Custer	(719) 783-2514	205 South 6th, Westcliffe, CO 81252
Delta	(970) 874-2195	525 Dodge Street, Delta, CO 81416
Denver	(720) 913-5270	888 E. Iliff Avenue, Denver, CO 80210
Dolores	(970) 677-2283	409 North Main Street, Dove Creek, CO 81324
Douglas	(720) 733-6930	410 Fairgrounds Road, Castle Rock, CO 80104
Eagle	(970) 328-8630	441 Broadway, Eagle CO 81631
El Paso	(719) 520-7675	305 S. Union Blvd., Colorado Springs, CO 80910
Elbert	(719) 541-2361	325 Pueblo, Simla, CO 80835
Elbert Branch Office	(303) 621-3162	P.O. Box 189, Kiowa, CO 80117
Fremont	(719) 276-7390	615 Macon Avenue, Canon City, CO 81212
Garfield	(970) 625-3969	1001 Railroad Avenue, Rifle, CO 81650
Colorado State University Extension, http://www.ext.colostate.edu/cedirectory/countylist.cfm Oct. 2009		

Colorado County Extension Offices Current as of October 2009		
Colorado County	**Phone Number**	**Address**
Gilpin	(303) 582-9106	230 Norton Drive, Blackhawk, CO 80422
Grand	(970) 724-3436	210 11th Street, Extension Hall, Kremmling, CO 80459
Gunnison	(970) 641-1260	275 South Spruce, Gunnison, CO 81230
Huerfano	(719) 738-2170	928 Russell Ave, Walsenburg, CO 81089
Jackson	(970) 723-4298	312 5th Street, Walden, CO 80480
Jefferson	(303) 271-6620	15200 West Sixth Avenue, Golden, CO 80401
Kiowa	(719) 438-5321	County Courthouse - 1305 Goff, Eads, CO 81036
Kit Carson	(719) 346-5571	251 16th Street, Burlington, CO 80807
La Plata	(970) 247-4355	2500 Main Ave., Durango CO 81301
Larimer	(970) 498-6000	1525 Blue Spruce Drive, Fort Collins, CO 80524
Las Animas	(719) 846-6881	2200 North Linden Ave, Trinidad, CO 81082
Lincoln	(719) 743-2542	326 8th St., Hugo, CO 80821
Logan	(970) 522-3200	508 South 10th Ave, Sterling, CO 80751
Mesa	(970) 244-1834	2775 Highway 50, Grand Junction, CO 81502
Mineral	(719) 852-7381	1899 E. Hwy 160, Monte Vista, CO 81144
Moffat	(970) 824-9180	539 Barclay Street, Craig CO 81625
Montezuma	(970) 565-3123	109 West Main Street, Cortez, CO 81324
Montrose	(970) 249-3935	1001 North 2nd, St. Montrose, CO 81401
Morgan	(970) 542-35	914 E. Railroad, Ave, Fort Morgan, CO 80701
Otero	(719) 836-42	411 North 10th St. Rocky Ford, CO 81067
Park	(719) 836-4293	880 Bogue St. Fairplay, CO 80440
Phillips	(970) 854-3616	127 East Denver, Holyoke, CO 80734
Prowers	(719) 336-7734	1001 S. Main St., Pueblo, CO 81003
Pueblo	(719) 583-6566	212 W. 12th St. Pueblo, CO 81003
Colorado State University Extension, http://www.ext.colostate.edu/cedirectory/countylist.cfm Oct. 2009		

Colorado County Extension Offices Current as of October 2009		
Colorado County	**Phone Number**	**Address**
Rio Blanco	(970) 878-9490	779 Sulphur Creek Road, Meeker, CO 81641
Rio Blanco Branch Office	(970) 675-2417	17497 Highway 64, Rangely, CO 81648
Rio Grande-Saguache	(719) 852-7381	1899 E. Hwy 160, Monte Vista CO 81144
Routt	(970) 879-0825	136 6th St. Steamboat Springs, CO 80477
San Miguel	(970) 327-4393	1120 Summit, Norwood CO 81423
Sedgwick	(970) 474-3479	315 Cedar, Julesburg, CO 80737
SLV Area Office	(719) 852-7381	1899 E. Hwy 160 Monte Vista, CO 81144
Summit	(970) 668-3595	37 Peak One Dr., CR1005, Frisco, CO 80443
Teller	(719) 689-2552	112 North A St. Cripple Creek, CO 80813
Washington	(970) 345-2287	181 Birch Avenue Akron, CO 80720
Weld	(970) 304-6535	525 North 15th Ave., Greeley CO 80631
Yuma	(970) 332-4151	310 Ash Street, Wray, CO 80758
Colorado State University Extension, http://www.ext.colostate.edu/cedirectory/countylist.cfm Oct. 2009		

Appendix H Colorado VMO Territories



Source: Colorado Department of Agriculture, Animal Industry Division

Appendix I FADI Collection Data Form Sample

Foreign Animal Investigation Form

FADD Name and Phone: _____ Date: _____ FAD Control #: _____

Owner Information	Premises Information
Name: _____	Address: _____
Address: _____	City: _____
City, State, Zip: _____	State, Zip: _____
Type of Operation: _____	County: _____
Phone: _____	Latitude: _____
County: _____	Longitude: _____

Primary Species on Premises Initiating compliant: _____

Primary Species on Premises if different from above: _____

Number of animals showing lesions by species: (use separate page for additional animals or use comments lines)

Species:	# Animals:	# Sick	Description/ID:	Samples Submitted:
1. _____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____

Please describe any movements of affected animals from the premises over the past month _____

_____

Number & type of other susceptible species on premises: _____

Private Practitioner: _____ Clinic Name: _____

Phone: _____ Cell Phone: _____

Has practitioner collected samples? ___Yes_____No If yes, what type? _____

Has FADD collected Samples: ____Yes ____ No If yes, what type? _____

FedEx Tracking #: _____

What lab were samples sent to? ____ FADDL ____ NVSL Date Shipped: _____

Onset date: _____ Follow-up Date: _____

Quarantine date: _____ Quarantine number: _____

Count down date: _____ Quarantine release date: _____

Comments: _____

_____

_____

_____

_____

_____

Based on USDA VSV-09 Investigation Form

Appendix J EPA Approved Disinfectants for Highly Pathogenic Diseases

Environmental Protection Agency (EPA) Approved Disinfectants for Highly Pathogenic Diseases[1]				
Disease	**Product**	**EPA Regulatory No.**	**Manufacturer**	**Active Ingredient(s)**
Bovine spongiform encephalopathy -- No Products Registered				
Contagious Bovine Pleuropneumonia --- No Products Registered				
Foot and Mouth Disease				
	Low PH Phenolic 256	211-62	Central Solutions, Inc	2-Benzyl-4-chlorophenol o-Phenylphenol
	2-Benzyl-4-chlorophenol o-Phenylphenol	1677-129	Ecolab Inc.	Ethaneperoxoic acid Hydrogen peroxide
	Oxysept LDI	1677-203	Ecolab Inc.	Ethaneperoxoic acid Hydrogen peroxide
	Lonza DC 101	6836-86	Lonza, Inc.	Alkyl dimethyl benzyl ammonium chloride 1-Decanaminium, Ndecyl-N,N-dimethyl-,chloride 1-Decanaminium, N,Ndimethyl-N-octyl-,chloride 1-Octanaminium, N,Ndimethyl-N-octyl-,chloride
	Aseptrol S10-TAB	70060-19	BASF Catalysts, LLC	Sodium chlorite Sodium dichloroisocyanurate dehydrate
	Virkon S	71654-6	DuPont Chemical Solutions Enterprise	Sodium chloride Potassium peroxymonosulfate
Rift Valley Fever – No Products Registered				
Rinderpest – No Products Registered				

1 United States Animal Health Association, Committee on Foreign and Emerging Diseases. *Foreign Animal Diseases*, 2008.

Appendix K Local, State, and Federal Agencies Roles and Responsibilities

LEAD AGENCY

Colorado Department of Agriculture

The CDA, Animal Industry Division is the lead agency in any livestock health related emergency occurring in Colorado. CDA will respond by using the NIMS protocol. The specific components will be under the joint command of the State Veterinarian and the APHIS AVIC. Their overall responsibility will encompass command and management of the disease event, overseeing the management and dissemination of resources, establishing a communication and information management system and securing supporting technologies. The State Veterinarian and AVIC may use any or all of the following action steps to control and/or eradicate the disease encountered in the event.

- Establish and name incident command.
- In consultation with the APHIS AVIC, determine the scope and level of initial response and deploy a task force.
- Frequently conduct a complexity analysis to assure appropriate command is in place.
- In consultation with the APHIS AVIC, determine the location and size of hold / quarantine areas.
- Establish quarantine area(s) and issue quarantine orders as needed.
- In consultation with the APHIS AVIC and other agency personnel, strategically assign duties and areas of responsibility to state, deputy-state and federal veterinarians, members of the Colorado veterinary response team, livestock inspectors and animal health technicians.
- Determine appropriate movement restrictions for animals, people, equipment, feed, commodities, and conveyances.
- In collaboration with the CDA, USDA – APHIS, VS, and/or the Incident Management Team and the Public Information Officer, prepare information for dissemination to the public, producers, processors and other concerned groups through the Joint Information System or Center.
- CDA will notify Colorado Division of Emergency Management (CDEM) when a livestock disease sample is being sent to the Foreign Animal Disease Diagnostic Lab (FADDL, Plum Island, NY) for analysis and is likely to be a highly contagious or infectious disease or agent of concern.
- CDA will coordinate with CDEM, USDA, Colorado Department of Transportation (CDOT), Colorado State Patrol (CSP), local jurisdiction emergency managers, law enforcement, and other agencies as needed in enforcing stop movement orders.
- Conduct livestock disease assessments at the site of the event to determine needs and priorities.
- Coordinate state-level livestock disease emergency response and recovery activities.
- Prioritize activities and areas of greatest urgency for state response and recovery personnel in the field.
- CDA will coordinate with USDA, APHIS, VS, Emergency Programs Staff and provide liaison between other federal, state and local organizations when required.
- CDA will develop protocols for worker protection related to incident-specific health and site safety plans, risk (hazard/exposure) assessments and PPE.

- Direct disease investigations, epidemiological investigations and trace outs to determine source of disease and scope of disease outbreak.
- Identify contaminated feed and agricultural products that must be destroyed and disposed of or decontaminated.
- Identify and approve, in collaboration with CDPHE, animal carcass disposal sites.
- Identify and approve, in collaboration with CDPHE, sites for disposal of, contaminated feed, or other items that are contaminated.
- Identify and approve, in collaboration with CDPHE, temporary waste disposal sites for effluent from cleaning and disinfecting stations.
- Coordinate with appropriate organizations for the deployment of inspectors and veterinarians for agricultural response and recovery.
- Establish and/or coordinate appropriate regulatory controls.
- In collaboration with the IC PIO provide advisories and related public information.
- CDA will coordinate with CSP, county and local law enforcement for site security, traffic control and related issues.
- Maintain ongoing animal agriculture surveillance of affected communities in order to rapidly identify and address disease-related problems.
- Notify DOW of any wildlife disease threat or involvement.
- Work in close collaboration with the Colorado Brand Board and livestock industry groups as well as major beef producers

SUPPORT AGENCIES

Local Government

Since all emergency response begins at the local level, local emergency management officials will be actively involved in the response and will be a key provider of resources for operational missions. Each county has a comprehensive emergency management plan which provides the framework for the jurisdiction's response to emergencies and disasters. Counties, through their assets of County Commissioners, County Extension Offices, county agencies, and other county networks, will utilize their resources and provide an additional line of communication with local ranchers and farmers, industry groups and the community. Additionally, as part of a coordinated response, local law enforcement officers with assistance from Brand Inspectors and Bureau of Animal Protection Agents may:

- Assist in identifying clean transportations corridors' for moving unaffected livestock and animal food products safely during an animal health incident.
- Provide security in implementing a hold or quarantine for the infected area.
- Assist in the conduct of a criminal investigation
- Provide Site security and conflict resolution as needed to ensure the safety of veterinarians, inspectors, and all other responders should any conflicts arise.

State Agencies

Colorado Division of Emergency Management may:

- Activate the State Emergency Management Plan and SEOC to support CDA.
- Support CDA by providing statewide coordination among any and all agencies impacted by the event. Assist unit leaders within incident command in acquiring needed resources to include carrying out ROSS and EMAC requests and in general stand in support to the IMT as needed.

Colorado State Patrol (CSP) may:

- Provide law enforcement support and coordination to conduct traffic checkpoints and roadblocks, enforce stop movement orders and secure quarantined areas and related sites during livestock disease emergencies.
- Coordinate with local law enforcement agencies to support response and recovery with all available resources.

Colorado Department of Public Health and Environment may:

- Coordinate with CDA if a zoonotic condition exists.
- Support public information efforts.
- Consult with CDA and USDA regarding bio-security issues related to zoonotic diseases.
- Provide veterinary and epizootiologic support to an CDA emergency.
- Assist and collaborate with CDA on subjects such as carcass disposal, cleaning and disinfection and other issues that may influence soil, water, and air quality.
- Liaison with Environmental Protection Agency to address issues that may arise.
- Provide laboratory emergency response and/or surge support.
- Colorado Human Services Department may provide or coordinate mental health staff to assist in crisis counseling efforts.

Colorado Division of Wildlife may:

- Provide disease surveillance and management in free-ranging wildlife and wildlife in zoos, parks, and other natural areas.
- Survey for and/or dispose of contaminated items and wild animals.
- Conduct wild animal inventories in the area of a disease event to identify susceptible species.
- In collaboration with the State Veterinarian, collect wildlife specimens and samples for disease testing to determine presence or absence of disease or transmission of the disease agent or impact of disease on wildlife.

Colorado Department of Transportation may:

- Assist in the movement of state resources during livestock disease emergencies.
- Provide traffic control and routing assistance, barricades, and road monitoring.
- Provide equipment and operators to assist with animal disposal.

Colorado State University (CSU) may:

The College of Veterinary Medicine and Biomedical Sciences (CVMBS) may provide veterinary support and expertise throughout the emergency as requested by CDA. Colorado State University Veterinary Diagnostic Laboratory may provide appropriate diagnostic support services as requested by CDA. Colorado State University Extension may provide communication and liaison between Incident Command, affected industry groups and local communities during emergencies. Extension Disaster Emergency Network (EDEN) will also be an important resource to enhance CSU Extension's involvement in the response and recovery phase of the incident.

Federal Agencies

Untied States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) may:

- Assist in disease eradication activities including quarantine, evaluation, indemnification, slaughter, disposal, cleaning and disinfecting, epidemiology, trace-back, vector control and transportation permitting arrangements and /or in acquiring appropriate contractors to conduct such activities.
- Consult with state and local authorities regarding eradication proceedings.
- Collect, analyze, and disseminate technical and logistical information.
- Define training requirements for temporary employees or support agencies involved in eradication operations.
- Issue a declaration of extraordinary emergency.
- Coordinate with state and local agencies to define quarantine and buffer zones.
- Prepare information for dissemination to the public, producers, processors and other concerned groups through the Joint Information Center.
- Allocate funding for indemnifying to the owner(s) of depopulated animals or related property loss.
- Define restrictions on interstate commerce.

USDA, Food Safety Inspection Service (FSIS)

The FSIS is charged with protecting the Nation's food supply by providing inspectors and veterinarians in meat, poultry, and egg product plants and at ports-of-entry to prevent, detect, and act in response to food safety emergencies. FSIS has developed the infrastructure needed to confront new biosecurity challenges. FSIS may assist state and local authorities in disease eradication activities and/or food-borne illness emergency investigations.

Appendix K Local, State, and Federal Agencies Roles and Responsibilities

Food and Drug Administration (FDA)

One of FDA's mandates is to protect the public health by assuring the safety of our nation's food supply. FDA also has an important role in prevention and control of contaminated animal feed. FDA may assist state and local authorities in disease eradication activities and/or food-borne illness emergency investigations.

Federal Bureau of Investigation (FBI)

The FBI is the agency responsible for investigating cases of bio-terrorism or agro-terrorism as a part of the mission of a Joint Terrorism Task Force (JTTF). When food animals are the target of a terrorists attack and evidence suggests a foreign animal disease may have been intentionally introduced or threatened, CDA will notify the CIAC who in turn will coordinate activities with the JIFF within the Denver Office of the FBI.

Environmental Protection Agency (EPA)

The federal agency that may collaborate with CDPHE & CDA on decisions of carcass disposal, cleaning and disinfection and their effect on soil, air and water or the environment in general.

Local Livestock Industry Groups

Serve as liaison on matters relating to livestock industries affected by an animal disease outbreak.

- Identify individuals who may be qualified to assist in disease control efforts.
- Develop a list of qualified appraisers.
- Provide assistance to families affected by an animal disease outbreak.
- Provide support for disease control and eradication activities.
- Provide appropriate information for dissemination to industries and public (through close coordination with CDA or the IMT public information officer).
- Support response and recovery with all available resources.

Appendix L Industry's Role in Emergency Response

Industry will play an important role both in preventing a disease outbreak and in response and recovery efforts of such an event. The following Appendix offers recommendations and actions to improve Continuity of Operations plans for the cow-calf industry. In addition, information presented in this Appendix provides producers supplementary information on steps taken in a Foreign Animal Disease Investigation (FADI), information that will be collected during an FADI and clinical signs of FADs significant to cattle. Specific material provided in this section includes the following.

Foreign Animal Disease Investigation Action Steps / Check list of FAD Information	L-2
Flow Chart of a Foreign Animal Disease Investigation	L-3
Developing a Site Plan	L-4
Livestock Trailer Cleaning and Disinfecting Recommendations	L-5
Biosecurity Measures for Cow-Calf Producers	L-6
List of FADs Diseases Significant to Cattle	L-7

FOREIGN ANIMAL DISEASE INVESTIGATION ACTION STEPS

1. Contact the State Veterinarian's Office or the USDA Area Veterinarian in Charge

Colorado State Veterinarian:	**Keith Roehr, *DVM* (303) 239 - 4161**
Area Veterinarian – in– Charge:	**Roger Perkins, *DVM* (303) 231 – 5385**

2. The Colorado State Veterinarian or AVIC will dispatch a Foreign Animal Disease Diagnostician (FADD) to initiate an investigation within 24 hours of the initial notification.

3. The FADD will set up an appointment to visit the premises, assess the disease situation, collect and submit laboratory samples, execute disease control actions if necessary, and file a report with the State Veterinarian and AVIC. See section 4.1 Foreign Animal Disease Investigation for specific FAD protocols.

4. The State Veterinarian and AVIC will assign a priority level to the laboratory submissions which will govern the response of the federal lab(s).

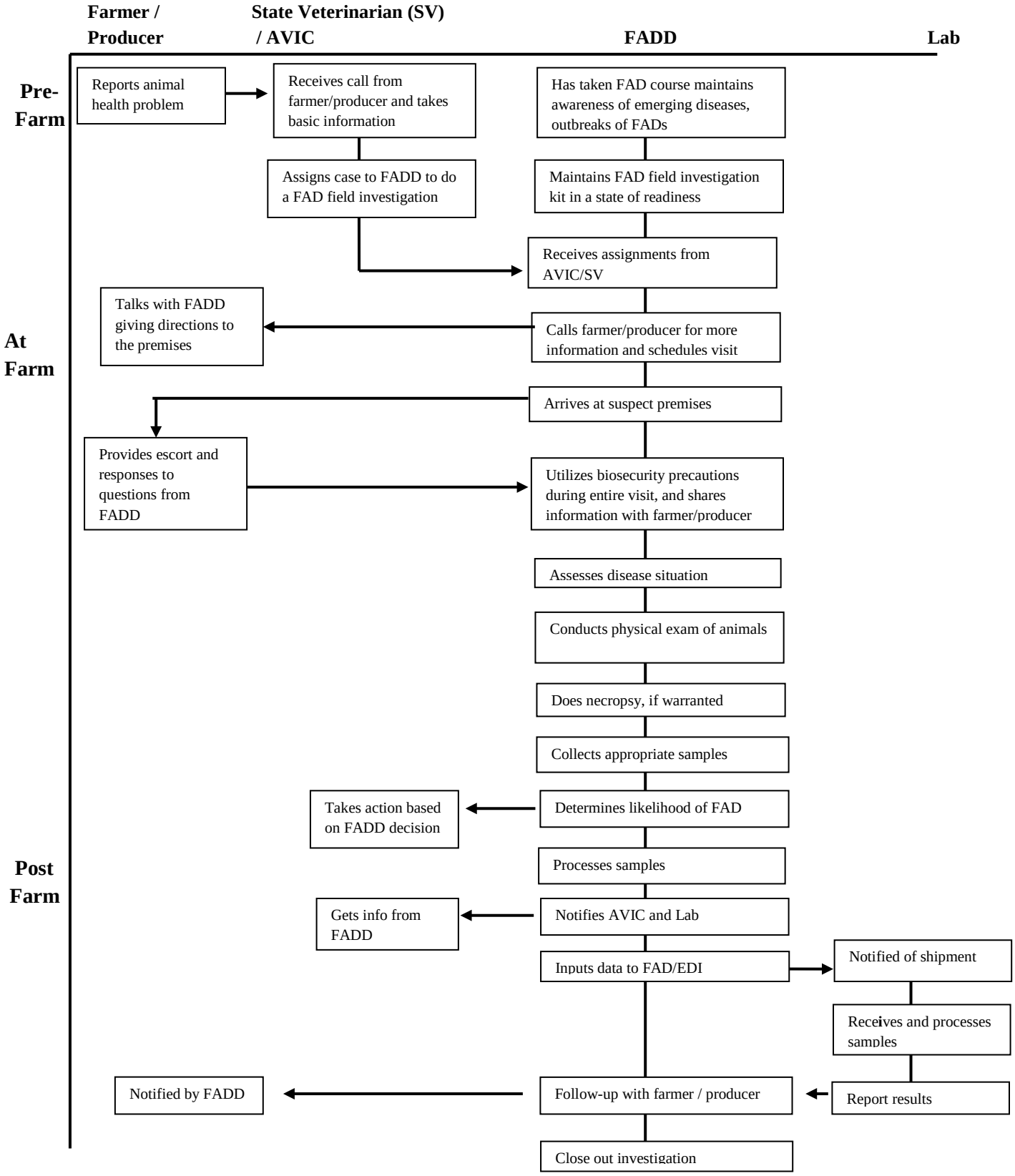
5. Further actions may be taken at the discretion of the State Veterinarian in collaboration with the AVIC and in consultation with the FADD.

6. Laboratory results will be reported to the State Veterinarian who will notify the AVIC and FADD. The FADD will then notify the practitioner and the owner.
   Source: American Association of Swine Veterinarians

Information collected during a Foreign Animal Disease Investigation

- ✓ Name and Address of Owner / Manager
- ✓ Type of operation being investigated
- ✓ Number and type of animals on premises
- ✓ Movement of animals on and off premises and date of movement
- ✓ Location of animals prior to arriving on premises
- ✓ Location of animals after leaving premises
- ✓ Number of sick and dead animals
- ✓ Physical examinations of the affected animals
- ✓ Results of postmortem examinations
- ✓ Number and types of samples taken
- ✓ Name of suspected disease

FLOW CHART OF FOREIGN ANIMAL DISEASE INVESTIGATION



Source: USDA National Animal Health Emergency Management System Guidelines

DEVELOPING A SITE PLAN

In the event of a disease outbreak, the State Veterinarian will recommend biosecurity measures to assist in containing the spread of the disease agent for all premises in or near the control area. Identifying the infrastructure on your premises prior to an outbreak will assist Colorado animal health officials in developing a biosecurity plan to protect the premises. Instructions for developing a site plan are listed below. The following guidance may also be used to update and reevaluate existing site plans.

A. Indicate geographic directionality (north, south east and west) on the Site Plan.
B. Sketch an outline of all structures on the premises.
C. Identify structure's purpose—(ie. Residential house, feed storage, calving barn).
D. For structures housing animals, identify type and number of animals.
E. Sketch and identify water sources for livestock and humans on premises.
F. Outline all yards and pastures that animals have access to.
G. Identify all premises' ingresses and egresses.
H. Identify all roads, streams or ponds on the premises.
I. Indicate the acreage of premises.
J. Attach aerial photos of property to sketched site plan. Area photos can be obtained for many locations at www.maps.google.com.

Site Plan Template

Livestock Trailer Cleaning and Disinfecting Recommendations

The following cleaning and disinfecting recommendations can be applied to any vehicle known to have carried livestock exposed to a FAD, the principles of vehicle and trailer decontamination are the same.

- √ Remove all solid debris, fecal matter and bedding.
- √ All water, feedstuff and litter carried in the vehicle must be disinfected and burned or buried.
- √ The vehicle should then be soaked in disinfectant using a detergent, and scrubbed down to bare metal or wood.
- √ All fixtures and fittings must be dismantled to ensure that infected material is removed.
- √ All surfaces must be cleaned down to metal and then disinfected. Wooden surfaces must be cleaned and disinfected, where appropriate, or valued before removal and destruction.
- √ The wheels, wheel wells, bodywork and undercarriage must be cleaned of small particles and disinfected.
- √ The driver's cab and sleeping compartment, if fitted, also need to be cleaned and disinfected.
- √ When the crate structure of a trailer has been decontaminated, the stock crate should be lifted free from the body if possible. The underside of the stock crate and the parts of the trailer on which it rests should be decontaminated.
- √ The vehicle must be closely inspected to determine if there is a double layer. If this is so, the top layer of metal tread plate or wood must be removed to reach areas where contaminated material could be trapped.
- √ Any metal flooring that appears solid must be weight tested to ensure that welds are not cracked and that there is no rubbish under the flooring. Some trailers may carry extra equipment under the body; if so, this must be treated.
- √ The outside dual wheels and spare wheels must be removed to ensure adequate decontamination of the wheel hubs and to allow inspection of the spare wheel hangers, which can be hollow and therefore could hold contaminated material.
- √ The driver should be asked to identify the clothing and boots they were wearing when in contact with suspect livestock; articles must be decontaminated, where applicable.

Source: Iowa State University, The Center for Food Security and Public Health

Biosecurity – Best Management Practices for Cow- Calf Operations

The following checklist is a compilation of biosecurity best management practices to help livestock producers minimize the exposure of their animals and facilities to diseases and enhance the general health and safety of their animals.

√	Biosecurity Recommendation
	Maintain accurate identification and health records of all animals. Especially check accuracy of identification of identification of purchased animals.
	Restrict access point to your facilities. Lock gates to prevent unauthorized entry. Investigate strange people or vehicles that enter or approach your property.
	Farm visitors should not enter any facilities on the farm unless they have a real need to do so.
	Visitors who have to enter animal facilities should wash their boots with a disinfectant or put on plastic boots before doing so.
	Insist that all employees, advisers, and visitors enter only with cleaning clothing and disinfected equipment. Maintain the highest standards of hygiene for all movements on and off your property.
	Provide boot brushes, disinfectant, and boot wash areas or disposable boots when moving between areas on the farm. Keep the disinfectant solution clean and renew it daily.
	Establish parking area for vehicles and equipment that are away from any animals and that provide adequate space to clean and disinfect vehicles, if necessary.
	Prevent movement of and contact with mud and feces introduced from other farms.
	Whenever possible, bring animals in from a source herd with a defined health history.
	Establish a segregation or isolation plan to prevent the introduction of disease agents. Quarantine incoming and returning animals for a minimum of 3 to 4 weeks, preferably in a holding facility downwind from resident animals. Use this time to monitor for disease.
	Minimize contact with non-resident animals including cattle, other livestock, pets, pests, and wildlife to prevent introduction of infections spread by saliva, respiratory secretions, blood, urine, and feces.
	Start work routines with young stock and move toward adults to prevent contamination of young stock. Handle sick animals last.
	Work with every person who routinely enters the barn to make sure they understand concerns for biosecurity. Train your staff and check to see they are following procedures.
	Identify a holding area for dead animals awaiting pickup by the rendering truck that is as far away from the corrals and other resident animals as possible.
	Clean and disinfect vehicles, trailers, and other equipment before returning to the farm.
	Equipment must be cleaned and disinfected between cows, groups, and farms.
	Equipment, such as hoof trimming tables, chutes, panels, etc., should be washed and disinfected thoroughly before it is brought into the facility.
	Use separate equipment for handling feed and manure, or clean and disinfect thoroughly before handling feed.
	Use clean equipment to mix and deliver feeds.
	Adopt rodent control programs. Keep pets and pests out of feedstuff.
	Keep animals away from surface water sources that may be a point of entry or export of disease.

Source: Dr. Sandra Amass, *Dairy Industry Facilities Manual Draft* (8/03) National Biosecurity Resource Center

Appendix L Industry's Role in Emergency Response

The following table presents information on FADs that are considered highly contagious and would cause high morbidity or mortality in cattle. Information presented in this table is intended to assist producers in recognizing a potential FAD agent in cattle populations.

Foreign Animal Disease Significant to Cattle			
Disease Agent[1]	**Clinical Signs[5]**	**Mode of Transmission**	**Zoonotic Disease**
Bovine spongiform encephalopathy[3,4]	- Nervousness - Persistent kicking when milked - Difficulty in coordination and rising - Hesitation at doors, gates and barriers - Loss of body weight despite continued appetite	**For Cattle:** Oral - Ingestion at a young age of BSE-contaminated feed **For Humans:** Oral - Ingestion of BSE-contaminated beef	**Yes**
Contagious bovine pleuropneumonia[2,4] (CBPP)	- Loss of milk production - Painful and difficult breathing - Initial dry cough that becomes moist - Loss of appetite - Fever - Moaning while exhaling - Elbows turned out, head lowered, back arched to ease breathing	Aerosol - Cough from infected cow Direct Contact - Cattle-to-Cattle (saliva, urine or (reproductive tissues or fluids)	**No**
Foot and Mouth Disease[2,3]	- Loss of milk production - Lameness - Blisters on top of foot, between Claws and on heels. - Lesions on snout - Oral lesions less commonly seen - Production of sticky, foamy, stringy saliva	Aerosol Direct Contact - Cattle-to-Cattle (saliva, milk, urine, reproductive tissues or fluids, tears, blood and feces) Oral - Ingesting infected product Fomites	**No**

[1] **Listed by USDA as a FAD, FADD must conduct an investigation.**
[2] **Ausvetplan Disease Strategy 2008**
[3] **United States Animal Health Association, Committee on Foreign and Emerging Diseases. *Foreign Animal Diseases*, 2008.**
[4] **Iowa State University, The Center for Food Security and Public Health, Animal Disease Information, http://www.cfsph.iastate.edu/DiseaseInfo/default.htm**
[5] **USDA, APHIS *Publications*** http://www.aphis.usda.gov/publications/animal_health/index_ah_c.shtml.

Foreign Animal Disease Significant to Cattle (Cont.)			
Disease Agent[1]	**Clinical Signs**	**Mode of Transmission**	**Zoonotic Disease**
Rift Valley Fever[2,3]	- Depression - Loss of appetite - Decrease in milk production - Abortion	**For Cattle:** Vector - Mosquito and possibly ticks and biting mites **For Humans:** Vector -- Mosquito Aerosol -- Infected animal tissue or fluids	**Yes**
Rinderpest[2,3]	**Peracute** - High fever - Congested mucous membranes - Death within 2–3 days **Acute** - Onset of a rapidly mounting fever - Depression - Loss of appetite and milk production - Watery discharges from the eyes and nose - Constipation - Mouth lesions **Subacute** - Mild form of disease, usually in endemic area	Aerosol (limited) Direct Contact - Cattle-to-Cattle (saliva, milk, urine, reproductive fluids, tears, blood and feces) Oral - Ingesting infected product Fomites (limited)	**No**

[1] **Listed by USDA as a FAD, FADD must conduct an investigation.**
[2] **Ausvetplan Disease Strategy 2006**
[3] **United States Animal Health Association, Committee on Foreign and Emerging Diseases. *Foreign Animal Diseases*, 2008.**
[4] **Iowa State University, The Center for Food Security and Public Health, Animal Disease Information, http://www.cfsph.iastate.edu/DiseaseInfo/default.htm**
[5] **USDA, APHIS *Publications*** http://www.aphis.usda.gov/publications/animal_health/index_ah_c.shtml

Appendix M Livestock Emergency Response Planning Templates & Information

Natural disasters may occur suddenly or be anticipated for several days. Preparing for emergencies such as tornados, wildland fires, severe winter weathers or floods is critical for producers to maintain business continuity. Information contained in this Appendix is intended to assist producers in planning for natural disasters. A list of information contained in this Appendix follows.

Vulnerability Assessment Checklist	M-2
Emergency Livestock Disposal Planning Considerations	M-6
Emergency / Essential Functions Contact List	M-8
Draft Guidelines for Emergency Composting of Cattle Mortalities	M-10

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Vulnerability Assessment Checklist

An effective Cow-Calf emergency response plan addresses vulnerabilities that exist on cow-calf ranching operation. The following list of questions is intended to assist beef producers in identifying vulnerable areas on their premise where emergency protocols should be considered.

Vulnerability Assessment Check List		
Monitor cattle for animal diseases and incorporate preventive measures against them in a biosecurity plan. **If the answer is no recommendations include:** **1)** Meeting with veterinarian to learn techniques on taking temperature, respiration, rate and recognizing general signs of disease- as appropriate for cattle. **2)** Contact local extension personnel or veterinarian for information about incorporating preventive measures into a comprehensive biosecurity plan.	**Yes**	**No**
Isolate sick animals until well and isolate new animals or animals returning from an off-farm event for 28 days. **If the answer is no recommendations include:** **1)** Design a location to isolate animals away from resident animal population, preferably in an area with no nose-to-nose contact. Have portable fencing or designated barn area available to be able to isolate animal that become sick. **2)** Provide separate clean feed containers and water supplies to isolated animals and do not share equipment between the isolated animals and other animals on the farm.	**Yes**	**No**
Limit access to animal areas by visitors and off-farm vehicles and have visible biosecurity signage. **If the answer is no recommendations include:** **1)** Develop a plan restricting visitor / vehicle access to animal housing areas. **2)** Establish biosecurity protocols for visitors who must have access to animal housing areas (e.g. veterinarians, Extension personnel, breeders, etc.)	**Yes**	**No**
Require visitors to wear clean or disposable shoes and outer clothing. **If the answer is no recommendations include:** **1)** Enforce biosecurity requirements and provide disposable boots and outer garments.	**Yes**	**No**
Regularly clean and disinfected vehicles, trailers, and other fomites that may harbor pathogens. **If the answer is no recommendations include:** **1)** Develop a schedule and written standard operating procedures for cleaning and disinfection of vehicles, trailers, equipment, and stall/barn areas based on the most likely infectious disease risks to the farm. Extension personnel and veterinarians can provide guidance.	**Yes**	**No**
Does your premise have an established carcass disposal site or method? **If the answer is No recommendations include:** **1)** Consult with your veterinarian, CDA and local health department on local and state laws for the best carcass disposal. **2)** Once the best carcass disposal method is identified for your premises, ensure adequate supplies are available (e.g. carbon-based material for composting).	**Yes**	**No**
Handle animals with a high health risk status first and those with a low health risk status last. **If the answer is No recommendations include:** 1) Group animals by age, use and risk factors if possible. Then determine the best traffic pattern to work with animals utilizing veterinary and Extension personnel.	**Yes**	**No**

Adapted from the Extension Disaster Education Network

Vulnerability Assessment Check List		
Implement rodent, insect, wildlife, and stray animal control programs. **If the answer is No recommendations include:** 1) Determine which problems currently exist on the farm or ranch. Consult with your Veterinarian or Extension personnel for guidance on control programs.	**Yes**	**No**
Does your veterinarian submit samples and/or carcasses to a diagnostic laboratory for testing for animals that die unexpectedly? **If the answer is No recommendations include:** 1) Determine the cause of death of all animals that die unexpectedly. 2) Consult a local veterinarian about how to handle carcasses prior to the veterinarian's arrive (e.g. using gloves, keeping carcass away from other animals, temperature issues etc).	**Yes**	**No**
Monitor feed and water intake of livestock and actively monitor behavior of animals. **If the answer is No recommendations include:** 1) Watch for behavioral and feed and water consumption changes as they are often the first signs of sickness in animals**.**	**Yes**	**No**
Provide designated paved or concrete parking areas for visitors. **If the answer is No recommendations include:** 1) Established a paved or concrete parking area away from animal housing to facilitate cleaning and disinfection of vehicles and to prevent introduction of pathogens into farm soil. 2) A cost-reduction option is to create a parking area using highway construction filter fabric, shot rock and limestone.	**Yes**	**No**
Do you enforce boot and hand-washing procedures before and after anyone enters animal areas? **If the answer is No recommendations include:** 1) Provide adequate supplies of soap, warm water, brushes, disposable paper tools, and a trash receptacle. 2) Post proper hand and boot washing guidelines.	**Yes**	**No**
Establish health status of origin herds before purchasing animals and inspect new animals. **If the answer is No recommendations include:** 1) Obtain a recent Certificate of Veterinary Inspection and results from all health tests that are required prior to crossing state lines.	**Yes**	**No**
Incorporate animal health programs that include vaccinations, proper nutrition, stress reduction, etc. **If the answer is No recommendations include:** 1) Establish a valid veterinarian-client-patient relationship and follow the veterinarian's advice concerning animal health needs.	**Yes**	**No**
Minimize fence-line contact between animals and contact between livestock of different age and production groups. **If the answer is No recommendations include:** 1) Establish buffer zone between neighboring livestock operations and the home herd; avoid shared fences, implement a wildlife exclusion plan, including special fencing if necessary (e.g. 45 ^{o} outward angle fencing). Control rodent, stray pet, etc. access to animal housing areas. 2) Separate animals by age and production groups to avoid exposure of more susceptible animals to disease pathogens.	**Yes**	**No**

Vulnerability Assessment Check List (Cont.)		
Have plans in place for evacuation of livestock or for them to shelter in place. **If the answer is No recommendations include:** 1) Identify animals that can be evacuated and map evacuation routes an destinations (primary and alternates). Keep trailers and vehicles well maintained, developed a written evacuation plan, and educate employees on evacuation plans. 2) Share evacuation plans in advance with someone outside the geographical area in case communication is not available during an emergency. 3) Arrange emergency supplies of feed and water and provide the safest locations for animals to shelter in place if they must be left behind.	**Yes**	**No**
Report vandalism or suspicious activity to law enforcement officials. **If the answer is No recommendations include:** 1) Identify local law enforcement telephone numbers for the farm (not all areas have 911 coverage). Ensure that all employees know that physical 911 or other emergency address and directions to the farm and can provide this information to emergency personnel. Post emergency contact information near every farm telephone.	**Yes**	**No**
Purchase drugs, farm chemicals, fuel, etc. only in amounts needed, store them properly and securely, and maintain updated inventories. **If the answer is No recommendations include:** 1) Invite the fire department for a safety inspection of the farm, including chemical storage. 2) Store fuel in approved containers, establish a dedicated pesticide storage building, and secure drugs with locks.	**Yes**	**No**
Manage locks and keys for security purposes (buildings, vehicles, equipment, storage, tanks, etc.) **If the answer is No recommendations include:** 1) Remove keys from the ignition switch of all unattended farm vehicles and equipment. 2) Provide access to keys only to screened employees who need them for their jobs. 3) Upgrade locks in sensitive areas (e.g. drug, vaccine or pesticide storage areas).	**Yes**	**No**
Clearly post our emergency / 911 address at the farm entrance. **If the answer is No recommendations include:** 1) Post the emergency / 911 road address on a mailbox, post, or sign at the farm entrance. Use large, reflective numbers that are visible under headlights at night.	**Yes**	**No**
Maintain adequate insurance coverage (crime, terrorism, pollution, earthquake, flood, business continuation, etc. **If the answer is No recommendations include:** 1) Consult reputable insurance agents and obtain several estimates for appropriate farm coverage. 2) Obtain coverage under government programs if private policies are not available (e.g. FEMA flood Or FSA crop insurance).	**Yes**	**No**
Invite emergency responders to tour the farm to familiarize them with potential hazards and obtain their input on appropriate prevention/mitigation measures. **If the answer is No recommendations include:** 1) Recognize that emergency responders many not be familiar with farm operations; farm employees and responders can learn from each other during farm tours. 2) Implement prevention/mitigation measures suggested by emergency responders as added insurance.	**Yes**	**No**

Vulnerability Assessment Check List (Cont.)		
Maintain a farm map indicting locations of building and their contents, hazardous materials, water supplies, utility shutoffs, fire extinguishers, etc. for emergency personnel. **If the answer is No recommendations include:** 1) Develop a farm map with information emergency responders need, and store in a safe, secure, weatherproof location. Include MSDS for farm chemicals. Laminate or waterproof documents so they will withstand adverse weather conditions. This information/location should be known and accessible to emergency personnel but not to the general public (may want to consider a lock box).	**Yes**	**No**
Investigate the backgrounds of all employees. **If the answer is No recommendations include:** 1) Consult your local sheriff and/or an attorney and establish proper, legal procedures for background checks. Inquire about drug testing for employees, workers compensation, and other employee legal issues.	**Yes**	**No**
Implement deterrence (e.g. lighting dark areas), detection, (e.g. sensors), and delay (e.g. fences, locks) measures in a physical security program. **If the answer is No recommendations include:** 1) Start a physical security program with cost-effective investments (watchdog, security lights provided by utility company). Build more components as resources allow, concentrating on area of greatest vulnerability.	**Yes**	**No**
Maintain visitor logs that outline expected biosecurity measures (wearing disposable boots, gloves, coverall, etc). Prevent or strictly limit access of people who have visited foreign countries within the last 10-30 days. **If the answer is No recommendations include:** 1) Maintain a visitor log and inquire about out-of-country travel within the past month. 2) Prohibit visitors from taking items into animal areas such as food, beverages, or unnecessary equipment. Provide a secure location for visitors to store personal items.	**Yes**	**No**

Emergency Livestock Disposal Planning Considerations

The following document is intended to provide beef producers' guidance on how to prepare for emergency disposal of livestock. Disposal options covered include on-farm burial, on-farm composting and rendering.

On-Farm Burial for Emergency Disposal Planning

1. Identify 2 or more earthmoving contractors with sufficient equipment and capacity to quickly response and excavate burial pit.

2. Record and file in your business records the following information.

- ✓ Proposed burial map
- ✓ Name of excavation contractors and contact persons (see Emergency Contact List).
- ✓ Regular and emergency phone numbers for an excavation company (see Emergency Contact List).

Note: Emergency burial of catastrophic mortalities requires prior approval by Colorado Department of Public Health and Environment.

On-Farm Composting For Emergency Disposal Planning

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1. Estimate total herd mortality weight.

2. Estimate required cover material:

Corn silage @ 3.2 tons / 1000 lb of Carcasses

Ground cornstalks@ 1.4 tons / 1000 lb of Carcasses

Ground straw @ 1 ton / 1,000 lbs of carcasses

3. Identify two or more emergency cover material suppliers if you do not plan to stockpile your own cover materials.

4. Identify two or more portable grinding service providers if you plan to use cornstalks, straw, or similar long and fibrous cover materials that require grinding prior to use.

5. Record and file in your business records the following information.

- ✓ Names and phone number of cover material suppliers (see Emergency Contact List).
- ✓ Names and phone numbers of grinding service providers (see Emergency Contact List.

Source: Dr. Tom Glanville and R. Jay Harmon, Department of Agricultural & Bio Engineering, Iowa State University

Rendering for Emergency Disposal Consideration

1. Contact nearest rendering service providers to determine:

Willingness and ability to accept your entire herd?

How will services be allocated if an emergency is regional in scope?

Will you need a contract to insure service? Disposal cost?

Will the rendering firm supply transportation, or will additional trucking capacity be needed?

2. Contact two or more local trucking firms (if needed)
Are they properly equipped to haul carcasses in accordance with Colorado Law or DOT regulations?

3. Record and file in your business records the following information.

✓ Name of rendering firm and contact person

✓ Name of trucking company and contact person business and emergency phone numbers

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Source: Dr. Tom Glanville and R. Jay Harmon, Department of Agricultural & Bio Engineering, Iowa State University

Emergency / Essential Functions Contact List

Cow-Calf Operation Contact Information		
Name of Ranch / Operations		
Address & City		
Directions		
GPS Coordinates	**Latitude**	**Longitude**
Emergency Response Phone Numbers		
Fire Department/Fire District		
Sheriff or Local Police		
Hospital Emergency Room		
Poison Control Center	**1-800-382-5544**	
Phone Numbers for Biosecurity Concerns		
Local Extension Office		
Local Veterinarian		
Veterinarian Medical Official (VMO)		
Other		
Other		
Phone Numbers of Pesticide, Fuel, and Chemical Spills		
Fire Department/Fire District		
Hospital Emergency Room		
Poison Control Center	**1-800-382-5544**	
Environmental Project Agency		
Phone Numbers for Utility Companies		
Type of Utility	**Emergency Number**	**Alternative Number**
Electric		
Gas		
Propone		
Water		
Telephone		

Neighboring Premise Information		
Name	**Address**	**Phone Number**

Emergency Disposal Contact Numbers		
Onsite Burial		
Excavator Company Name	**Phone Number**	**Location**
Excavator Company Name	**Emergency Number**	**Location**
On- Site Composting		
Cover Supply Company	**Phone Number**	**Location**
Grinding Service Provider	**Phone Number**	**Location**
Rendering		
Rendering Company Name	**Phone Number**	**Location**
Trucking Company Contact	**Phone Number**	**Location**

DRAFT GUIDELINES FOR EMERGENCY COMPOSTING of CATTLE MORTALITIES

Iowa Department of Natural Resources and Iowa State University

Disease vs Non-Disease Emergencies

Disposing of cattle that have a transmissible disease calls for extra precautions during composting. If infectious disease is the cause of death, the following composting procedures can help to reduce the risks of pathogen survival and disease transmission.

- To achieve high composting temperatures that are capable of killing pathogens as quickly as possible, cover carcasses with silage, or a 6-12 inch layer of moist manure capped with ground straw or ground cornstalks.
- To minimize the risk of releasing pathogens into the wind, do NOT turn the pile during carcass decomposition.
- Do NOT excavate and spread compost until approved by animal health officials. In emergencies involving highly contagious diseases, animal health officials may require burial or incineration of finished compost.

NOTE: Due to many unknown factors regarding the biodegradability of the prions that cause bovine spongiform encephalopathy (commonly called BSE or "mad cow" disease), composting should NOT be used for disposal of cattle suspected to have BSE.

For livestock deaths not caused by disease, less stringent composting procedures can be used.

- Ground cornstalks, ground hay, or similar dry porous materials that do not produce high heat quickly may be used to cover the carcasses.
- Turning of the compost pile is permissible (although not necessarily required) after a minimum of 60-90 days;
- Excavation and spreading of the compost on corn or soybean ground can be done as soon as soft tissues and internal organs are fully decayed and only skeletal remains are present (typically 8 - 12 months after composting is begun);

Site Selection

To protect property and water resources, and reduce disease risks, emergency composting systems should be sited:

- to avoid unnecessary transport of carcasses that may spread disease;
- at a location accessible by large trucks if cover materials will be transported to the site from off-farm sources;

- on well drained locations that are not subject to runoff or ponded water, and that are outside of 100 year floodplains or wetlands;
- at least 500 feet from homes, public roads, or other areas frequented by the public;
- at least 200 feet from public wells or visible bedrock outcrops, and 100 feet or more from private wells or streams;
- near agricultural land where compost can be spread and utilized by commodity crops that are not consumed directly by humans or grazing animals.

To minimize problems caused by rodents or burrowing predators, select a site in an open field located well away from timbered areas or buildings that provide cover.

Planning, Construction, & Maintenance

Planning Guidelines

Long and narrow (base width of 16-18 feet) composting "windrows," with a cross-section like that shown below, are preferable to use of broad-based piles. Windrows take more space, but are easier to construct and maintain with typical on-farm equipment.

Since emergency composting operations are turned infrequently (if at all), use of "naturally ventilated" windrows promotes rapid decay, increased heat production and evaporation of excess moisture, and less odor.

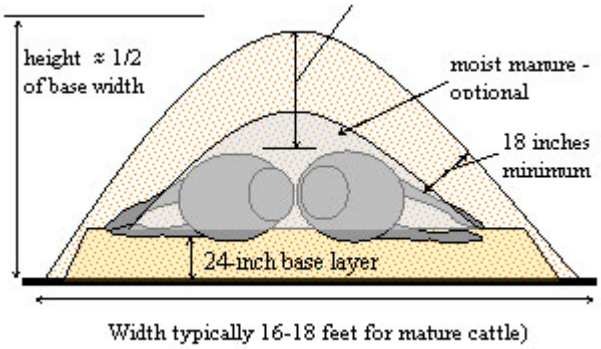

Figure 1. Recommended cross-section for composting full-sized cattle carcasses.

The following guidelines for windrow dimensions and proportions are suggested for full-sized dairy or beef cattle:

- To facilitate easy placement and covering of large carcasses <u>without compacting cover/base materials or soil beneath</u>, windrow base widths should be no more than 2X the loader reach;
- To avoid excessive pile widths that can lead to poor oxygen penetration, no more than two full-sized carcasses should be laid side-by-side (as shown above);
- To avoid release of excess liquids and odor, restrict loading to a single layer of carcasses;
- To minimize excessive pile settling and wind erosion, initial pile heights of approximately 1/2 X the base width are recommended. Completed piles are typically 16-18 feet wide at the base, and have initial heights of 7-8 feet ;

- For single carcasses (or a few small carcasses) a minimum pile width of 8 -10 feet is suggested to provide sufficient pile volume to retain heat during cold weather; and
- Approximately 8 feet of pile length will be needed for each pair of full-sized carcasses composted. If available space requires the operation to be broken into two or more parallel windrows, leave at least 2-3 loader lengths between adjacent windrows to facilitate pile maintenance. Figure 2 illustrates example site dimensions for composting 100 cattle carcasses in two parallel windrows. The total composting area (2 windrows+ space between) in this case is approximately 0.4 acre.

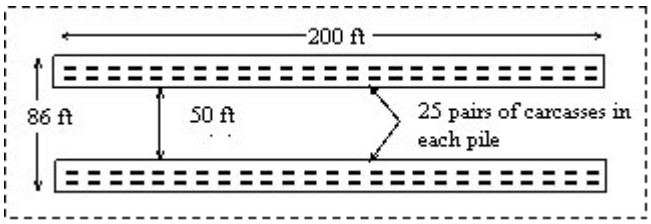

Figure 2. Example composting site dimensions for 100 cattle carcasses in two parallel windrows.

Cover Material Selection & Quantities

Three cover/base materials: corn silage; ground cornstalks; and feedlot manure capped with ground hay; have been field tested. Preliminary temperature and odor data, as well as visual decay observations, have shown that all three: produce complete decay of soft tissues and organs (not bones) within 8-12 months (depending on time of year); retain offensive odors and leachate; and are structurally stable when exposed to seasonal winds and precipitation.

- Corn silage is considered to be the best cover material for cattle carcasses that may be infected with disease. Due to its favorable moisture and readily degradable compounds produced by the ensiling process, silage typically rapidly produces pile temperatures of 130 °F or higher in the vicinity of the carcasses, and sustains these temperatures much longer than other cover materials that have been field tested.
- A thin (6-12 inch) layer of feedlot manure placed directly over the carcasses and capped with ground hay produces internal temperatures somewhat lower and less enduring than those produced by silage.
- Ground cornstalks typically have very low moisture and nitrogen content and so must rely on seepage of liquid and nutrients from the carcasses to become biologically active. As a result, they produce heat more slowly than the other cover materials.

Regardless of the type of cover selected, avoid using materials that are too wet. If a handful of material produces drops of liquid when squeezed, it is too moist and may produce slow decay and release excessive amounts of odorous gases and liquid seepage.

Composting requires large quantities of cover/base material. Using the windrow configuration shown in figure 1, about 12 cubic yards of cover/base material are needed for each 1,000 lb animal composted. At cover material densities typical in newly constructed piles, this is equivalent to 1 ton of ground hay or straw, 1.4 tons of ground cornstalks, or 3.2 tons of corn silage.

Beef or dairy operations considering composting for emergency disposal should stockpile plenty of cover materials as part of their emergency response plan. For the 100 animal composting operation illustrated in figure 2 then, approximately 100 tons of ground hay or straw (200 large round bales), 140 (280 large round bales) tons of ground cornstalks, or 320 tons of corn silage would be needed for cover/base material.

Construction Procedure

Construction of emergency composting windrows is begun by placing a 24-inch thick layer of cover material on the ground to absorb excess liquid released by the carcasses.

Following placement of the base layer, cattle carcasses are positioned on top of it as shown in the diagram. A loader equipped with pallet forks is recommended for positioning large carcasses on the pile without tearing up the base layer. Laying carcasses on their sides, back-to-back, with legs projecting out and downward as illustrated, reduces the amount of maintenance needed to keep carcasses covered as pile settling occurs. Field research experience indicates that carcasses need not be punctured or splayed to achieve decomposition.

As shown by the cross-section sketch in figure 1, cover depths of 3-4 feet are recommended at the centerline, where maximum settling occurs as carcasses rupture and decay. Along the sides of the piles, the outer extremities of the carcasses should be covered with at least of 18-inches of material to retain heat and odors.

Operation & Monitoring

Research experience has shown that 1,000 lb cattle carcasses are reduced to skeletal remains, without turning the compost piles, in 8-12 months depending on external air temperatures. As previously noted, piles should not be turned if carcasses are believed to be diseased.

In non-disease situations turning the pile may accelerate decay, but also can release odors and pathogens if done too early in the decay process. Turning of piles containing large carcasses should be delayed at least 60-90 days following construction to avoid release of objectionable odors. If odor becomes a problem following turning, cap the turned pile with at least 12 inches of fresh cover material. Turning during cold weather is not recommended as this will unnecessarily chill the pile and slow carcass decay.

Rapid pile settling, and rodent or scavenger activity, can cause occasional carcass exposure. Check the condition of the windrow each week, and repair exposures with additional cover material.

Appearance of liquid at the toe of the windrow can be caused by excess precipitation, use of cover materials that are too moist, overloading of the pile with too many carcasses (caused by stacking), or inadequate use of absorptive base and cover materials at the time of construction. Field research experience with cattle composting windrows loaded and constructed as described, have resulted in very little release of visible liquid. If liquid is noted, use a dry porous cover material, such as ground cornstalks or ground straw, to temporarily absorb the liquid until it can evaporate or infiltrate into the soil.

Compost Disposal

Preliminary results of field biosecurity tests using two common avian vaccine viruses suggest that composting windrows constructed with the recommended depths of cover material can retain and inactivate viruses within 3-4 weeks during cold weather, and in a matter of days during warm weather. Nevertheless, if cattle death was caused by a potentially contagious disease, skeletal remains and cover material should not be excavated until advised to do so by animal health officials. If the safety of the finished compost cannot be ascertained by sampling and testing, skeletal remains and cover materials can be incinerated, buried, or rendered to further reduce disease risks.

Skeletal remains and cover materials for non-diseased cattle can be spread on corn or soybean ground using a dry manure spreader. At the present time, spreading on grazing land, or on land used to produce human or animal food crops that will be consumed without further processing, is not recommended. Skeletal remains (bones) are normally clean and dry, but the bones of mature cattle can be quite thick and may not totally decompose for several years. Turning bones under the soil with a moldboard plow is advisable if the disposal area is located near to non-farm residences frequented by pets or children. Disking has not been a successful method for covering large bones.

The nutrient content of finished cattle mortality compost can be highly variable and is heavily dependent on the carcass loading rate and amount and type of cover material used. Limited sampling of cattle mortality compost has shown total N content in finished compost of roughly 0.6-0.7% (wet weight basis) where silage and ground cornstalks have been used as cover material. Total P_2O_5 content for the same composts were in the 0.4-0.5% range (wet weight basis).

FAQ's

Q. *What about carbon to nitrogen ratios? I read that C:N ratios need to be in the range of 20:1 - 30:1 for good composting.*

A. For large commercial/industrial composting operations where minimum composting time is the primary goal, and where the organic materials to be composted consist of small particles that are easily mixed, C:N ratios of 20:1-30:1 are the desired target. For on-farm mortality composting, however, the primary goals are immediate containment of carcasses to prevent release of disease and odor, and low cost of disposal. Carcass degradation DOES occur at non-optimal C:N ratios, it just takes longer. Since minimum carcass decay time is not a goal for most livestock producers, and achieving a uniform C:N ratio throughout the pile would require costly and time-consuming grinding of carcasses and mixing them with a carbon source, on-farm mortality disposal operations settle for longer decay times.

Q. *Would carcass decay times be decreased if the compost were turned more frequently?*

A. Yes they probably would, but as noted in the previous question, the critical issues in emergency livestock disposal are rapid containment of carcasses to prevent the spread of disease and to minimize air and water pollution. Turning the compost is time-consuming and costly, it can release odors and pathogens if done too soon during the decay process, and also can chill the pile and reduce decay rates if done during cold weather. In most cases, livestock producers are willing to forego rapid carcass decay in order to avoid these potential pitfalls.

Q. *If I don't have sufficient quantities of silage, cornstalks, hay, or straw for emergency disposal, are there alternative cover materials that I could use? How can I locate them in an emergency?*

A. Alternative materials that have good potential for mortality composting include, turkey or broiler litter, coarse sawdust or wood shavings, ground wood waste, leaf mulch, and coarse-textured municipal yard waste composts. Avoid materials that are fine textured (similar to soil) as these can result in extremely slow decay.

For assistance in locating suitable composted or recycled waste materials contact the Energy & Waste Management Bureau of the Iowa Department of Natural Resources
at: http://www.state.ia.us/dnr/organiza/wmad/index.html or by phone at 515-281-4367.