NAHEMS GUIDELINES:
PERSONAL PROTECTIVE EQUIPMENT (PPE)

FAD PReP
Foreign Animal Disease
Preparedness & Response Plan

NAHEMS
National Animal Health
Emergency Management System

USDA

APHIS

the Center for Food Security & Public Health
Iowa State University®

United States Department of Agriculture • Animal and Plant Health Inspection Service • Veterinary Services

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The Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Management System (NAHEMS) Guidelines provide a framework for use in dealing with an animal health emergency in the United States.

This FAD PReP/NAHEMS Guidelines was produced by the Center for Food Security and Public Health, Iowa State University of Science and Technology, College of Veterinary Medicine, in collaboration with the U.S. Department of Agriculture Animal and Plant Health Inspection Service through a cooperative agreement.

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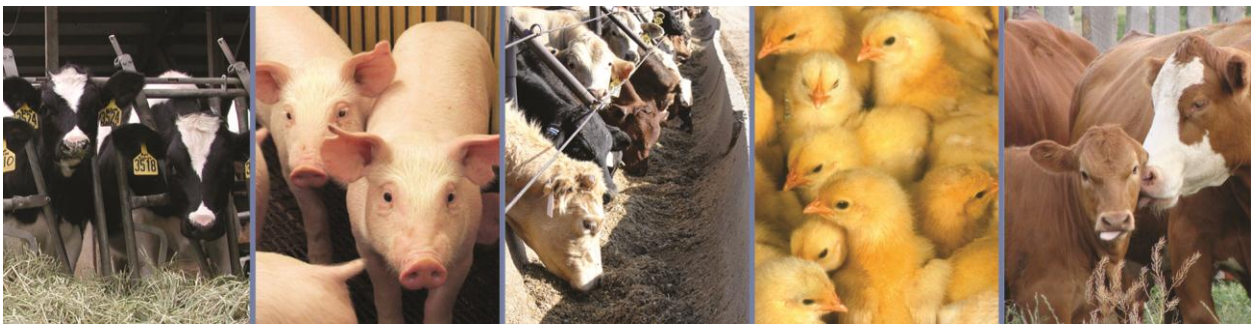
THE IMPERATIVE FOR FOREIGN ANIMAL DISEASE PREPAREDNESS AND RESPONSE

Why Foreign Animal Diseases Matter

Preparing for and responding to foreign animal diseases (FADs), like highly pathogenic avian influenza (HPAI) and foot-and-mouth disease (FMD), are critical measures to safeguard our nation's animal health, public health, and food supply.

There are significant potential consequences of an FAD outbreak in the United States. For example, the 2001 FMD outbreak in the United Kingdom cost an estimated £8 billion ($13 billion) and reduced the British gross domestic product by 0.2 percent. Studies have projected a likely cost of between $6 billion and $14 billion for a U.S. outbreak contained to California. In addition to the economic impact, the social and psychological impact on both producers and consumers would be severe.



Challenges of Responding to an FAD Event

An FAD outbreak will be challenging to all stakeholders. For example, there will be disruptions to interstate commerce and international trade. Response activities are complex, and significant planning and preparation must be conducted before an outbreak. Outbreaks can become large and widespread. Large, geographically dispersed and diverse teams will need to be assembled rapidly and must react quickly. The response effort must have the capability to be rapidly scaled up, involving many times more resources, personnel, and countermeasures. As such, responding to an FAD—large or small—may be a very complex and difficult effort.

Lessons Learned from Past FAD Outbreaks

Past outbreaks both in the United States and other countries have allowed us to learn important lessons that can be applied to preparedness and response efforts. To achieve successful outcomes in future FAD outbreaks, it is vital to identify, understand, and apply these lessons learned:

- Provide a unified State-Federal-Tribal-industry planning process that respects local knowledge
- Ensure the unified command sets clearly defined and obtainable goals
- Have a unified command that acts with speed and certainty to achieve united goals
- Employ science-based and risk-management approaches that protect public health and animal health, stabilize animal agriculture, the food supply, and the economy
- Ensure guidelines, strategies, and procedures are communicated and understood by responders and stakeholders

- Acknowledge that high expectations for timely and successful outcomes require the:
  – Rapid scale-up of resources and trained personnel for veterinary activities and countermeasures
  – Capability to quickly address competing interests before or during an outbreak
- Execute FAD tracing, which is essential for the efficient and timely control of FAD outbreaks

FAD PReP Mission and Goals

The significant threat and potential consequences of FADs and the challenges and lessons-learned of effective and rapid FAD response have led to the development of the Foreign Animal Disease Preparedness and Response Plan, also known as "FAD PReP." The mission of FAD PReP is to raise awareness, expectations, and develop capabilities surrounding FAD preparedness and response. The goal of FAD PReP is to integrate, synchronize, and de-conflict preparedness and response capabilities as much as possible before an outbreak, by providing goals, guidelines, strategies, and procedures that are clear, comprehensive, easily readable, easily updated, and that comply with the National Incident Management System.

In the event of an FAD outbreak, the three key response goals are to: *(1) detect, control, and contain the FAD in animals as quickly as possible; (2) eradicate the FAD using strategies that seek to stabilize animal agriculture, the food supply, the economy, and protect public health; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.*

FAD PReP Documents and Materials

FAD PReP is not just one, standalone FAD plan. Instead, it is a comprehensive U.S. preparedness and response strategy for FAD threats. This strategy is provided and explained in a series of different types of integrated documents, as illustrated and described below.

FAD PReP Suite of Documents and Materials

Note: APHIS=Animal and Plant Health Inspection Service, NAHEMS = National Animal Health Emergency Management System, SOP = standard operating procedures.

- Strategic Plans—Concept of Operations
  - *APHIS Framework for Foreign Animal Disease Preparedness and Response:* This document provides an overall concept of operations for FAD preparedness and response for APHIS, explaining the framework of existing approaches, systems, and relationships.
  - *National Center for Animal Health Emergency Management (NCAHEM) Stakeholder Coordination and Collaboration Plan*: This plan describes NCAHEM strategy for enhancing stakeholder collaboration and identifies key stakeholders.
  - *NCAHEM Incident Coordination Group Plan:* This document explains how APHIS headquarters will organize in the event of an animal health emergency.
- NAHEMS Guidelines
  - These documents describe many of the critical preparedness and response activities, and can be considered as a competent veterinary authority for responders, planners, and policy-makers.
- Industry Manuals
  - These manuals describe the complexity of industry to emergency planners and responders and provide industry a window into emergency response.
- Disease Response Plans
  - Response plans are intended to provide disease-specific information about response strategies. These documents offer guidance to all stakeholders on capabilities and critical activities that would be required to respond to an FAD outbreak.
- Critical Activity Standard Operating Procedures (SOPs)
  - For planners and responders, these SOPs provide details for conducting 23 critical activities such as disposal, depopulation, cleaning and disinfection, and biosecurity that are essential to effective preparedness and response to an FAD outbreak. These SOPs provide operational details that are not discussed in depth in strategic documents or disease-specific response plans.
- Continuity of Business Plans (Developed by public-private-academic partnerships)
  - *Secure Egg Supply (SES) Plan:* The SES Plan uses proactive risk assessments, surveillance, biosecurity, and other requirements to facilitate the market continuity and movement of eggs and egg products during an HPAI outbreak.
  - *Secure Milk Supply (SMS) Plan:* Currently under development, the SMS plan will help facilitate market continuity for milk and milk products during an FMD outbreak.
- Outbreak Response Tools
  - Case definitions, appraisal and compensation guidelines and formulas, and specific surveillance guidance are examples of important outbreak response tools.
- State/Tribal Planning
  - State and Tribal planning is essential for an effective FAD response. These plans are tailored to the particular requirements and environments of the State or Tribal area, taking into account animal populations, industry, and population needs.
- Industry, Academic, and Extension Planning
  - Industry, academia, and extension stakeholder planning is critical and essential: emergency management is not just a Federal or State activity.
- APHIS Emergency Management
  - APHIS directives and Veterinary Services Memorandums provide critical emergency management policy. APHIS Emergency Management documents provide guidance on topics ranging from emergency mobilization, to the steps in investigating a potential FAD, to protecting personnel from highly pathogenic avian influenza.

These documents are available on the FAD PReP collaboration website: https://fadprep.lmi.org. For those who have access to the APHIS intranet, these documents are available on the internal APHIS FAD PReP website: http://inside.aphis.usda.gov/vs/em/fadprep.shtml.

PREFACE

The Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Response System (NAHEMS) Guidelines provide the foundation for a coordinated national, regional, state and local response in an emergency. As such, they are meant to complement non-Federal preparedness activities. These guidelines may be integrated into the preparedness plans of other Federal agencies, State and local agencies, Tribal Nations, and additional groups involved in animal health emergency management activities.

The Personal Protective Equipment (PPE) Guidelines are a component of APHIS' FAD PReP/NAHEMS Guideline Series, and are designed for use by APHIS Veterinary Services (VS), and other official response personnel in the event of an animal health emergency, such as the natural occurrence or intentional introduction of a highly contagious foreign animal disease in the United States.

The PPE Guidelines provide guidance for USDA employees, including National Animal Health Emergency Response Corps (NAHERC) members, on PPE principles for animal health emergency deployments. This Guideline provides information for the Safety Officer and other personnel associated with PPE activities. The general principles discussed in this document are intended to serve as a basis for making sound decisions regarding PPE. As always, it is important to evaluate each situation and adjust procedures to the risks present in the situation.

The FAD PReP/NAHEMS Guidelines are designed for use as a preparedness resource rather than as a comprehensive response document. For more detailed response information, consult the FAD PReP Standard Operating Procedures (SOP): 8. Health and Safety/PPE and plans developed specifically for the incident. Additional PPE resources are included in the Appendix and in the references at the end of this document.

NOTE: This "FAD PReP/NAHEMS Guidelines: Personal Protective Equipment 2011" is the result of a content update to the NAHEMS Operational Guidelines: Personal Protective Equipment 2005.

APHIS DOCUMENTS

This "FAD PReP/NAHEMS Guidelines: Personal Protective Equipment (PPE)" has corresponding disease-specific FAD PReP Standard Operating Procedures (SOP): 8. Health and Safety/Personal Protective Equipment (PPE).

Several key APHIS documents complement this "FAD PReP/NAHEMS Guidelines: Personal Protective Equipment" and provide further details when necessary. This document references the following APHIS documents:

- APHIS Safety and Health Manual
- APHIS Form 270-R

- FAD PReP/NAHEMS Guidelines:
    - Biosecurity (2011)
    - Cleaning and Disinfection (2011)
    - Disposal (2011)
    - Surveillance, Epidemiology, and Tracing (2011)
    - Health and Safety (2011)
    - Mass Depopulation and Euthanasia (2011)
    - Quarantine and Movement Control (2011)

- FAD PReP Standard Operating Procedures (SOP):
    - 8. Health and Safety/PPE
    - 9. Biosecurity

- Veterinary Services Memorandum No. 580.4

Many of these documents are available on the FAD PReP collaboration website at: https://fadprep.lmi.org Username and password can be requested.

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National Animal Health Emergency Management System

Guidelines: Personal Protective Equipment (PPE)

1. INTRODUCTION

Veterinary responders are needed in emergency situations that threaten animal health, such as the natural occurrence or intentional introduction of a highly contagious foreign animal disease. Initially, the risk to human health and/or the difficulty of preventing the spread of disease to other animals or people is unknown. Responders must take the appropriate precautions to protect themselves from exposure to harmful agents (hazards), and they must ensure that they do not spread the hazard to other people or animals. The phrase "personal protective equipment" (PPE) refers to special clothing and equipment that places a barrier between an individual and a hazard. Personal protective equipment serves two purposes in an animal health emergency: 1) the protection of the responder against potentially harmful hazards, e.g., highly pathogenic avian influenza, and 2) with appropriate use and decontamination/disposal, the prevention of the spread of hazards, e.g., foot-and-mouth disease, between animals or locations. Selection of the PPE must take into consideration both of these purposes. Additional factors must also be considered when selecting PPE to ensure a safe and effective response.

This document discusses

- The responsibilities of personnel for PPE;
- General considerations in use of PPE;
- Types of PPE available and levels of PPE protection; and
- Selection of PPE in various settings.

The Incident Commander, the Safety Officer, and the responder's supervisor have responsibility for recommending and selecting the PPE. It is the responsibility of the veterinary responder to understand the required PPE and use it correctly. Everyone involved in response activities must be trained on the proper use of PPE. Protocol developed based on risk assessment and detailed in the incident-specific Health and Safety Plan (HASP) must be strictly followed and enforced. Additional information can be found in *FAD PReP Standard Operating Procedures (SOP): Health and Safety and Personal Protective Equipment (PPE). FAD PReP/NAHEMS Guidelines: Cleaning and Disinfection (2011)* provides information on the proper handling of PPE to prevent the spread of biologic hazards. For additional PPE resources see Section 8 of this document.

1.1 Responsibilities of Personnel for PPE

The successful use of PPE in an animal health emergency is extremely important to the health and well-being of responders and to their effectiveness as emergency responders in containing and eradicating the disease. As an integral part of the overall animal health Incident Command System (ICS), personnel responsible for health and safety of the responders must work closely with other personnel throughout the system to ensure a smoothly functioning and safe operation. All personnel involved in an animal health emergency should study the procedures discussed in these guidelines and in other

information sources such as those listed in Section 8 of this document. They should also participate in educational sessions and emergency response exercises designed to help them expand their knowledge of and expertise in the use of PPE. At the time of an event, it is imperative to follow incident-specific procedures.

1.1.1 Incident Commander

In emergency situations, the Incident Commander (IC) at the Incident Command Post has responsibility of

- Determining if and what PPE is required;
- Ensuring that all the required PPE is available;
- Ensuring all users have been medically cleared, fit tested, and trained for the type of PPE required. (In the case of respirators, ensure compliance with APHIS Respiratory Protection Program Policy, Appendix B. The Occupational Safety and Health Administration (OSHA) addresses the Respiratory Protection Standard in 29 CFR 1910.134, along with other notable safety standards, such as hearing protection in Title 29 of the Code of Federal Regulations.); and
- Naming a Safety Officer, if required, to provide the necessary information and recommendations to make safety and health decisions.

1.1.2 Safety Officer

The Safety Officer (SO) is a member of the Command Staff and reports directly to the IC, as illustrated in Figure 1. The SO must know and understand the safety and health requirements and policies of veterinary responders' employing institutions (e.g., APHIS, State governments, or the military) concerning the use of PPE. It is advisable that all safety personnel are identified and trained well before an animal emergency occurs. The SO has the authority to issue an immediate stop-work order to halt any unsafe activities which are an immediate threat to life and health.

The SO's responsibilities to the IC include

- Issuing communications regarding health and safety matters;
- Consulting with the IC to assess the risk of a situation and recommend the use of appropriate PPE;
- Reporting to and briefing the IC on the health and safety issues related to the deployment; and
- Preparing a health and safety plan specific to the incident.

The SO's responsibilities to the responders include

- Providing and documenting all PPE-oriented training provided to personnel, including hazard communication and training in the selection, use, decontamination, disposal, and maintenance of PPE;
- Ensuring all veterinary responders are briefed about the nature of the hazard they will be dealing with and all safety and hygiene requirements specific to a premises are explained before personnel enter;
- Verifying that all personnel required to use the selected PPE are trained, medically cleared, and fit tested as stated for IC above; and
- Verifying the appropriate and adequate supplies are provided for the responders.

The SO's responsibilities to other components of ICS include

- Participating with the Finance Section in the issuance of contracts and leases pertaining to equipment or personnel needed for PPE-related activities;
- Working closely with the Operations Section to establish and ensure safe work procedures; and
- Inspecting work sites and ensuring safe working procedures are followed; and
- Advising on decontamination and/or disposal of PPE.

In addition to the biological threat posed by the introduction of a highly contagious foreign animal disease, responders will face other hazards—possibly environmental, physical or chemical. A more thorough discussion of potential hazards and safety issues can be found in *FAD PReP/NAHEMS Guidelines: Health and Safety (2011)*.

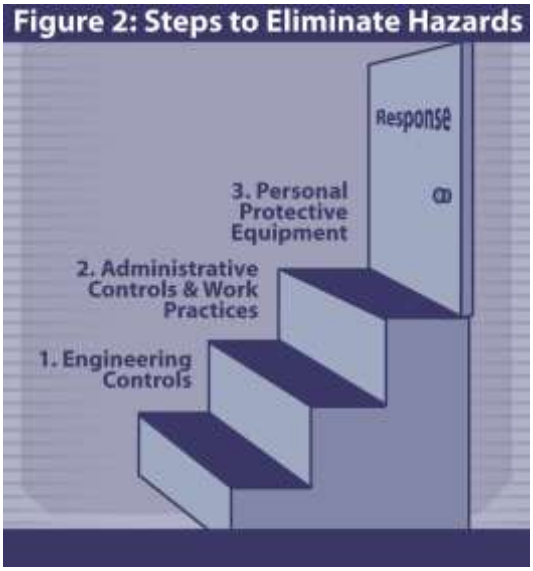
1.1.3 Veterinary Responders

Veterinary responders who use PPE must

- Understand why they need PPE (i.e., appreciate the importance of PPE in preventing occupational injuries and diseases);
- Understand that the use of PPE is required because feasible engineering and administrative controls have not reduced the hazard exposure to acceptable levels;
- Understand the consequences of unprotected exposure and thus the rationale for compliance with proper procedures for the use of PPE;
- Be knowledgeable about the limitations of PPE, particularly in emergency situations;
- Understand that PPE can impose limitations on movement, dexterity, senses (e.g. hearing, sight) and otherwise cause restrictions on normal movements and activities;
- Understand that PPE poses a physiological burden on the wearer that may not be anticipated;
- Be medically cleared, fit tested, and trained for the required PPE;
- Learn to recognize when equipment is not functioning properly so that it can be repaired or replaced as needed;
- Be able to inspect, fit check, don, doff, decontaminate, maintain, dispose, and replace PPE, as necessary; and
- Utilize the buddy system for safe and effective PPE use.

2. GENERAL CONSIDERATIONS

Personal protective equipment is often essential for protecting a responder from a hazard. However, there are many things to consider and understand before PPE is selected and used. OSHA requires the use of PPE to reduce employee exposure to hazards when engineering and administrative controls and work practices are not feasible or effective in reducing these exposures to acceptable levels. This is illustrated in Figure 2.



This section discusses things that must be considered/evaluated before selecting PPE. These things are

- Hazard assessment;
- Engineering controls;
- Administrative controls;
- Hazard reduction training;
- Cost-benefit analysis;
- PPE education and training;
- Management of disease risk with PPE; and
- Other factors that affect PPE decisions.

2.1 Hazard Assessment

The risk of exposure to hazards must be assessed before the appropriate safety measures and PPE can be implemented. The hazard assessment (sometimes referred to as a risk assessment or hazard analysis) is used to evaluate the nature of the health risk and its relationship to the work environment and what type of protection is needed.

APHIS has developed an emergency deployment Health and Safety Plan (HASP) Template to help personnel who are responsible for the safety and health of responders in an animal health emergency response quickly develop a specific plan. This HASP is a template to be modified with incident-specific information before being utilized. The full template can be accessed at http://www.aphis.usda.gov/emergency_response/tools/how-to/htdocs/emtools/tools/tools0050.html. Also see the *FAD PReP Standard Operating Procedures (SOP): Health*

and Safety/Personal Protective Equipment (PPE) for steps to follow and forms to use for preparing a job-hazard analysis.

While the need for a hazard assessment may seem obvious, it is important to carefully assess all potential hazards in order to choose appropriate PPE to protect responders. Consider the biological threats of the animal disease, potential chemical exposures, and risks posed by the tasks and the working environment. In an animal disease emergency detailed consideration is also given to the proper selection and management of PPE to contain the disease.

The deleterious consequences of providing PPE unsuited to the hazards of a given work environment may include

- Enhanced risk of spreading the disease;
- Impaired job performance; and
- Risk of responder injury, illness, or death.

Thus, it is important to make a proper match between the type and degree of risk and the selection of a given protective measure. The first step in making this match is to conduct a thorough risk assessment. An effective risk assessment establishes

- The composition and magnitude (concentration) of the potential biological, chemical, environmental, and/or physical hazard;
- The length of time the equipment or device will be expected to perform at a known level of protection; and
- The exertion level and extent of the physical work to be performed while using the equipment.

Based on the information provided by the risk assessment, the IC and/or SO can make educated decisions and take the appropriate actions to ensure responder safety during a response. A cascade of protection starts with engineering controls and administrative controls to minimize worker exposure to the hazard. PPE is used when these engineering and administrative controls are not effective in reducing exposure to acceptable levels.

2.2 Engineering Controls

Engineering controls are measures that contain or remove a hazard through isolation, enclosure, ventilation, substitution, or other process changes. Theses controls isolate or decrease the hazard in the environment and prevent or reduce the responder's exposure. An example of an engineering control is a system such as local exhaust ventilation. An exhaust ventilation system controls responder exposure to a hazardous substance at the source and operates effectively without direct responder involvement.

2.3 Administrative Controls

Administrative controls refer to administratively initiated policies, directives, or other measures that regulate responders' exposure to a hazard. An example of an administrative control is a supervisor's limitation of employees' time at risk for hazard exposure to less than a work shift or the reduction in the number of responders in a hazardous area.

2.4 Hazard Exposure Reduction Training

Providing responders with training to reduce hazard exposure is part of a responder safety program. The assignment of personnel to respond in an animal health emergency is situation specific. The IC will determine when animal health responders are required to enter a hazardous situation. Animal health personnel are necessary in a highly contagious foreign animal disease response. In a chemically or radiologically hazardous situation, for example, personnel from the Federal Emergency Management Agency and/or the appropriate State Emergency Management Agencies—rather than agricultural personnel—typically would provide emergency response leadership. Although agricultural personnel might serve as valuable resources, especially if the

situation involved animal care or other aspects of agriculture, their role would be advisory and their exposure to the chemical or radiological hazard may be minimal or nonexistent.

In addition, safety training includes information concerning the event and the responder's role. Awareness and exposure-reduction strategies related to hazards in the environment, the tasks to be performed, and risks associated with the use of PPE are covered.

2.5 Cost-Benefit Analysis

The selection of hazard control measures should be made on the need for hazard reduction and the feasibility and efficacy of the control. Once the minimum level of protection is established by the hazard analysis, a cost-benefit analysis can help the IC and SO determine which types of PPE and devices are sound investments as a means of hazard control. The benefits of effectively protecting human health and preventing the spread of disease should weigh heavily in the analysis. It is also important to recognize that the initial cost of PPE program start-up represents only a fraction of the total maintenance expense of continuing a PPE program operation over time.

An example of such expense is seen in the fixed costs of equipment maintenance, repair, and replacement. These expenditures, often significant, are essential to maintaining the effectiveness of the operation. In most cases, however, the time, effort, and expense involved in administering an effective and comprehensive PPE program are amply justified. If the IC deems PPE too costly, then responders should not be allowed to enter or perform work in the hazardous area.

2.6 PPE Education and Training

Thorough training of administrators and responders in the use of PPE will help reduce responder hazard exposure. Training programs should seek to orient learners to the correct use of PPE via an optimal mix of cognitive (information-based), affective (attitudinal), and applied (laboratory practice) approaches.

A comprehensive training program is critical in ensuring responders understand how to wear PPE appropriately thus providing optimal protection when working. Responders must be sufficiently knowledgeable and confident in the use of PPE so that even in stressful situations (e.g., involving compromised PPE) their training will help keep them safe. On the other hand, some PPE is of simple design, and its use is easy to learn. The apparent design simplicity of some PPE, however, may result in an attitude of complacency regarding training and its use. ***Personal protective equipment is effective only when it is actually taken out of the box or storage container and worn or used properly!***

To be successful, a PPE safety training program must have the full participation and commitment of all supervisors and the personnel it is designed to protect. A comprehensive PPE safety training program should include coverage of the following topics:

- The role of PPE as one among several hazard-control methods (e.g., in addition to engineering and administrative methods of control)
- The benefits of PPE use in a hazardous situation and the consequences of unprotected exposure to a hazard
- The precautions and limitations of PPE, particularly in emergency situation, and possible ways to overcome these limitations (e.g., donning multiple sets of gloves in case an outer pair is breached)
- Recognition of the signs of overheating or cold stress and how to respond
- Selection of appropriate PPE for various hazardous situations, with clear explanations of how the PPE protects against these hazards
- The importance of properly fitting PPE and the basic criteria for a proper fit
- Techniques for donning, respirator seal-checking, wearing, doffing, and cleaning, disinfection or disposing of PPE properly
- The consequences of poor performance or failure of PPE and ways to deal with situations in which this occurs

- Use of the buddy system in cooperative completion of tasks (e.g., donning and doffing PPE, conducting an on-premises animal health investigation, and dealing swiftly and effectively with emergency situations involving compromised PPE)
- Criteria for recognizing damaged PPE and the importance of retreating to a clean area to remove and replace damaged PPE
- Ways to detect improperly functioning or damaged PPE as well as methods of minimizing adverse consequences of PPE failure (e.g., keeping backup PPE available or temporarily patching tears quickly with extra tape appropriate to the hazard)
- Identification of local health facilities with the personnel and equipment required to effectively evaluate exposure to and illness from zoonotic diseases
- Stress-management techniques that will help responders remain calm, focused, and analytical under high-risk and/or emergency conditions
- Techniques for safely decontaminating, storing, maintaining, disposing, and repairing PPE

Education programs must aim for relevance and interest in order to keep responders focused on the training tasks and to promote learning.

2.7 Management of Disease Exposure and Spread with PPE

In an animal health emergency such as the response to a highly contagious foreign animal disease, PPE serves two purposes: 1) the protection of the responder against potentially harmful hazards, particularly the disease agent, and 2) the prevention of the spread of the disease agent between animals or locations. The complex process of PPE selection for management of disease exposure and spread must include consideration of the zoonotic and biosecurity risks of the agent in the absence of PPE. Diseases that are transmissible between animals and humans are referred to as zoonotic. The action taken to prevent the spread of disease to other animals or locations is referred to as biosecurity. The zoonotic and biosecurity risks can be divided into low, moderate, and high risks.

2.7.1 Zoonotic Risk

The safety of all responders is of the highest priority in an emergency response. Some pathogens that cause disease in animals can also cause disease in humans. When responding to a zoonotic disease, the hazard to human health must be recognized. The route or routes of transmission of zoonotic diseases to humans must be considered when choosing PPE. For example, some diseases present a zoonotic risk through exposure to the pathogen in aerosols or during sample collection or necropsy.

The **zoonotic risk** is

- **Low** when a disease agent represents little or no danger to human health.
- **Moderate** when a disease agent represents non–life-threatening danger to human health.
- **High** when a disease agent is life-threatening and represents significant danger to human health.

For more detailed information on zoonotic diseases, see the Centers for Disease Control and Prevention web site, http://www.cdc.gov/nczved/.

See Table 1 below for the zoonotic risk of some foreign animal diseases.

2.7.2 Biosecurity Risk

The goal of the emergency response is to contain and eradicate the animal disease. Methods to contain and eradicate the disease depend on the routes of transmission. The proper choice and use of PPE is one of the biosecurity actions taken to prevent the spread of disease to other animals or locations.

The biosecurity risk is based on the survivability of the agent outside the live host. The better adapted the agent is to survive outside the host and infect other animals, the more easily the disease can be spread. Well adapted

agents can be carried to new animals and locations by fomites, which are inanimate objects such as outwear. Diseases that are easily transmitted horizontally from one animal to another are described in this document as contagious diseases. The proper selection and the thorough decontamination or appropriate disposal of PPE prevents the responder's outerwear from spreading disease.

The **biosecurity risk** is

- **Low** when a disease agent is non-contagious or vector-borne (spread by the bite of an insect or arachnid)
- **Moderate** when a disease agent is contagious but does not survive outside the host.
- **High** when a disease agent is highly contagious and survives outside the host.

Based on the descriptions above, Table 1 illustrates the zoonotic risk and the biosecurity risk of some examples of foreign animal diseases. Be aware that the major source of disease transmission between animals may be by vector, creating a low biosecurity risk. However, if zoonotic, responders may risk exposure to the disease agent in tissues through diagnostic sampling or necropsy. Disease information for Table 1 was gathered from technical facts on animal diseases from the Iowa State University Center for Food Security and Public Health web site, http://www.cfsph.iastate.edu/DiseaseInfo/factsheets.php.

Table 1. Zoonotic Risk and Biosecurity Risk of Some Foreign Animal Diseases

Zoonotic Risk	Biosecurity Risk	Disease Example
Low, non-zoonotic	Low, vector-borne	Heartwater
Low, non-zoonotic	Moderate	Dourine
Moderate, zoonotic	Low	Screwworm
High, zoonotic	Low, vector-borne	Japanese encephalitis
High, zoonotic	High	Glanders
High, zoonotic	Low, vector-borne	Rift Valley Fever
Low, non-zoonotic	High	Foot-and-mouth disease
High, zoonotic	High	High pathogenicity avian influenza
High, zoonotic	High	Nipah

The Incident Commander and Safety Officer need to consider both types of risks in the hazard assessment. A risk category can be determined based on a combination of zoonotic (transmission to humans) and biosecurity (transmission to other animals) risk. Where the zoonotic risk of a disease is greater than its biosecurity risk, **zoonotic risk takes precedence**. The appropriate PPE and protective measures are based on the category of risk as well as specific factors about the disease. This is especially true with the degree of respiratory protection needed. See Table 2 for an illustration of risk category based on the zoonotic risk as well as the biosecurity risk of example diseases.

Table 2. Combined Risk of Some Foreign Animal Diseases

Zoonotic Risk	Biosecurity Risk	Combined Zoonotic/ Biosecurity Risk	Disease Example
Low, non-zoonotic	Low, vector-borne	**Low**	Heartwater
Low, non-zoonotic	Moderate	**Moderate**	Dourine
Moderate, zoonotic	Low	**Moderate**	Screwworm
High, zoonotic	Low, vector-borne	**High**	Japanese encephalitis
High, zoonotic	High	**High**	Glanders
High, zoonotic	Low, vector-borne	**High**	Rift Valley Fever
Low, non-zoonotic	High	**High**	Foot-and-mouth disease
High, zoonotic	High	**High**	High pathogenicity avian influenza
High, zoonotic	High	**High**	Nipah

It is beyond the scope of this guide to assign a risk category to every high-consequence animal disease of concern to the United States or listed by the World Organization for Animal Health (OIE). For more information, consult http://www.oie.int/international-standard-setting/terrestrial-code/access-online/. Veterinary responders should consult the latest version of Veterinary Services Memorandum No. 580.4 for more information. Incident Commander and Safety Officers should consult the USDA-APHIS HASP found on the APHIS website: http://www.aphis.usda.gov/emergency_response/hasp/employee_health.shtml.

2.8 Other Factors that Affect PPE Decisions

In addition to the zoonotic and biosecurity risks, other factors influence the selection of PPE veterinary responders should wear. These include

- Tasks that individuals must perform such as surveillance, depopulation, disposal, and cleaning and disinfection;
- Exertion levels and the extent of physical work at a premises;
- Ambient temperature, relative humidity, and other conditions independent of the event;
- Length of time PPE must provide a specific level of protection; and
- Classification of the premises. For detailed information on control zones and premises classifications see *FAD PReP/NAHEMS Guidelines: Surveillance, Epidemiology, and Tracing (2011)*. Recommendations for PPE may vary based on the premises classification due to the differences in risk of exposure to a hazardous agent. For example, PPE may be different when working at an Infected Premises (IP) than when working on surveillance at a premises in a free area.

In summary, there are many things to consider when trying to minimize risks and provide a safe and successful work environment for veterinary responders. Preparation and training are essential to a safe and successful response.

3. TYPES OF PPE

This section describes various types of PPE including respiratory protection, eye/face protection, hand protection, body protection, foot protection, and head/hearing protection. PPE is intended to protect an individual from inhalation, dermal or physical exposures that may cause injury based on the hazard assessment. A thorough understanding of the types of PPE available is essential in order to select the appropriate PPE for the situation, hazard, task, etc.

For additional information on hazards and responder protection, see *FAD PReP/NAHEMS Guidelines: Health and Safety (2011)* and *FAD PReP Standard Operating Procedures (SOP): Health and Safety/Personal Protective Equipment (PPE)*. Also see OSHA Hearing Protection Standard (29 CFR 1910.95).

The National Veterinary Stockpile (NVS), maintained by the National Center for Animal Health Emergency Management (NCAHEM) through USDA-APHIS, is the nation's repository of veterinary countermeasures, including supplies, equipment, field tests, vaccines, and commercial support services. PPE is included in the inventory to be deployed in an emergency animal disease outbreak. For more information on the NVS visit http://nvs.aphis.usda.gov.

3.1 Respiratory Protection

A respirator is a personal protective device that is worn on the face, covers at least the nose and mouth, and is used to reduce the wearer's risk of inhaling hazardous airborne particles (including dust particles and infectious agents), gases, or vapors. Respirators protect the user by either purifying the air or supplying air, as described below.

Medical clearance, involving a medical evaluation by a qualified health professional, is required before a respirator can be used. Fit testing is required for those respirators that form a tight seal against the face. OSHA requires employers with employees who must use respirators to have a written respiratory protection program. The respiratory protection program must include policies for medical clearance and fit testing, as well as care and maintenance of the equipment. The respiratory protection program sets forth employer responsibilities for ensuring that the program is correctly implemented. See Appendix B for the APHIS Respiratory Protection Program Policy. The information in the following section was taken in large part from the National Institute for Occupational Safety and Health (NIOSH) respirator web sites http://www.cdc.gov/niosh/topics/respirators and http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/RespSource.html.

3.1.1 Air Purifying Respirators (APR)

An APR removes contaminants from ambient air prior to inhalation using filters or cartridges. Respirators of this type include particulate respirators which filter out harmful airborne particles such as viruses and bacteria and also include "gas masks" which remove harmful chemicals, gases, and vapors. Responders requiring respiratory protection in a highly contagious foreign animal disease outbreak will most likely be provided with APRs to remove particles; therefore these will be the focus in this document.

The classification of particulate respirators that purify air can be further subdivided into three categories:

1. **Particulate filtering facepiece respirators** – Sometimes referred to as disposable respirators because the entire respirator is discarded when it becomes unsuitable for further use due to considerations of hygiene, excessive resistance, or physical damage. A common type is referred to as an "N95" which will be described more fully below.
2. **Elastomeric respirators** – Sometimes referred to as reusable respirators because the facepiece is cleaned and reused but the filter cartridges are discarded and replaced when they become unsuitable for further use.
3. **Powered air-purifying respirators (PAPRs)** – A battery-powered blower moves the air flow through the filters.

The two most common configurations for particle filtering respirators are filtering facepieces and elastomerics. Particulate filtering APRs come in three primary filtering efficiencies. The 95, 99 or 100 respirators filter out at least 95%, 99%, and 99.97% of penetrating airborne particles, respectively. These respirators are also rated for their protection against oils

- **N**- Not resistant to oil;
- **R**- Somewhat resistant to oil; and
- **P**- Strongly resistant or oil proof.

At this time, there are ten classes of filters for NIOSH-approved particulate filtering respirators, through a combination of filter efficiencies and oil resistance. Nine exist for non-powered particulate filtering respirators, three for each filter efficiency. For example, there are three different types of 95: N95, R95, and P95. N95 respirators adequately protect against most exposures that might be encountered in a veterinary response. A tenth type, HE described as a high-efficiency filter, is for PAPRs only. The HE filter is also the only type of filter that can be used with a PAPR.

Please visit the NIOSH website for more information and a complete listing of NIOSH-certified respirators: http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/.

3.1.1.1 Particulate Filtering Facepiece Respirator

This is disposable, and the simplest, least expensive, and least protective of the particulate filtering facepiece respirator types. This is the most common type of respirator being stockpiled by State and Federal agencies to issue to animal health responders if a surge of emergency personnel is required for a livestock or poultry disease. These respirators protect against particles only (including viruses and bacteria). They do not protect against chemicals, gases, or vapors and are intended only for low hazard levels. They cover the mouth and nose, require a tight seal to the face, and do not protect the eyes from exposure; thus, eye protection would also need to be worn. The entire respirator facepiece is comprised of filter material. Some disposable APRs have an exhalation valve which can reduce breathing resistance, reduce moisture buildup inside the respirator, and increase work tolerance and comfort for respirator users. Worker comfort increases compliance to properly position and wear the respirator. The respirator in its proper position covers the nose and mouth.

Advantages of disposable APRs include

- Relatively low cost, and
- Disposability.

Disadvantages of disposable APRs respirators include

- Limited protection,
- Lack of adjustability in some types,
- Must be user seal checked,
- Cannot be cleaned and re-worn,
- Number needed,

- Breathing resistance and moisture buildup (exhalation valves do help minimize this), and
- Difficulty in verbal communications with others.

3.1.1.2 Elastomeric Respirator

This is sometimes referred to as a reusable respirator. The molded facepiece is cleaned, decontaminated, and reused. The filter cartridges are discarded and replaced as needed. The facepiece can be a half-face (middle-top photo), which covers the mouth and nose and needs to be used in conjunction with goggles to protect the eyes from exposure. The full-face respirator (middle-bottom photo) purifies air like the half-face respirator, but offers a higher level of protection than the half-face respirator as it can provide a more effective (better) seal to the face as it covers the entire face. It also provides a level of ocular protection as it covers the eyes as well.

Advantages of reusable half and full-face APRs include

- Relatively low cost,
- Reusable,
- Can be fit tested and worn by multiple individuals,
- Generally provided with adjustable straps to provide better fit,
- Adjustable protection based on filter used,
- Can be equipped with a speaking diaphragm to ease communication, and
- Full-face protects eyes also.

Disadvantages of reusable APRs include

- Must be user seal checked,
- Breathing resistance,
- Moisture buildup is sometimes a problem,
- Can be uncomfortable in warmer situations,
- Difficulty in verbal communications with others, and
- Requires a maintenance program for cleaning and reuse.

3.1.1.3 Powered Air-Purifying Respirator (PAPR)

This is generally the appropriate type of respiratory protection for high zoonotic risk levels of infectious agents. A PAPR utilizes a battery-powered blower to pull air through filters that trap particulates that may be present and then moves the filtered air to the wearer's facepiece. For respiratory protection against airborne particulates, such as viruses and bacteria, the PAPR must be equipped with a HE (high-efficiency particulate air) filter. A fully charged battery is required for the PAPR to work properly. Before entry into the hazardous environment, PAPR blower units should be checked before each use to ensure that they are providing the air flow rate identified in the NIOSH approval for the configuration being used. PAPRs can be configured with a half facepiece, full facepiece or a hooded covering. PAPRs incorporate several hood configurations and styles. Different configurations provide different levels of filtering efficiency.

Advantages of PAPRs include

- Comfortable, easy to breathe in while wearing;
- Can be used by more than one person;
- Can provide limited body cooling effect during hot and/or humid weather; and
- Wearability of loose-fitting PAPRs by individuals with beards or other facial conditions that preclude them from using a face-sealing respirator.

Disadvantages of PAPRs include

- Significantly higher initial cost of purchase;
- The need for maintenance (e.g., battery recharging, filter replacement, cleaning and disinfection for re-use);
- Potential difficulty in disinfecting the blower units completely;
- Weight of the batteries and pump; and
- Difficulty in verbal communications with others.

3.1.2 Self-Contained Breathing Apparatus (SCBA)

Where the respirators discussed above purify ambient air, this type of respirator supplies clean, non-contaminated air through its own air supply for use in high-risk environments. It protects a responder when concentrations of respiratory hazard are unknown or above the specified concentration for effective use of other respirators or there is an environment that is immediately dangerous to life and health (e.g., chlorine spill, low ambient oxygen). Most foreign animal disease responses will not require this higher level of protection.

Advantages of SCBAs include

- Offers the greatest respiratory protection from the outside environment compared to other respirators; and
- Reusable.

Disadvantages of SCBAs include

- Highest initial cost of purchase;
- Special training required for use and maintenance of this most complicated and complex respirator type;
- The need for maintenance (e.g., respirator components and air cylinders that supply the air);
- Limited work time, which is limited by the amount of air in the cylinder carried by the wearer;
- Uncomfortable, heavy equipment that may tire the user more quickly;
- Difficulty in verbal communications with others; and
- Potential difficulty in completely disinfecting all the components.

3.2 Eye/Face Protection

Many field tasks in an animal health event will expose responders to contaminated or caustic material via aerosolization, splash, or direct contact with contaminated hands. In those cases, to prevent materials such as livestock manure, dust, mud and contaminated biological tissue from entering the eyes, nose, and mouth, eye/face protection should be worn based on the risk assessment. As an example, eye protection consisting of safety glasses, goggles, or a face shield should be used when conducting field necropsies or collecting tissue

samples. Goggles will protect a responder's eyes from cleaning and disinfection fluids splashed during C&D activities. A face shield should be used if C&D fluids are caustic or irritating to the skin.

Selection of appropriate PPE should be based on a risk assessment. A higher level of eye/face protection may be required for zoonotic diseases depending on transmission. Selection will be detailed in the incident-specific Health and Safety Plan.

3.3 Hand Protection

Gloves: Standard disposable latex gloves are recommended for clinical use in the field. Gloves made from other materials (such as nitrile, butyl, PVC, and neoprene) may be substituted for latex gloves under certain conditions if appropriate. A suitable type of glove will need to be substituted for those with an allergy to latex.

Cut-resistant gloves made of materials such as steel mesh, Kevlar®, and Surgipath® are essential PPE for personnel who are conducting necropsies and collecting and cutting tissue specimens in the field. These gloves should be worn as essential PPE on both hands over the latex or other waterproof gloves. Using different colored gloves gives users an indication if they have had a break in their outer glove.

3.4 Body Protection

Minimizing dermal (skin) exposure is one of the most important reasons for using PPE. At a minimum, long sleeves and long pants should be worn in the field. Additional body protection can be provided by wearing coveralls or an apron. Proper protective outwear will serve to protect the responder as well as prevent the spread of disease. As one of the biosecurity steps, this outerwear is appropriately cleaned and disinfected, or properly disposed of before leaving the contaminated area.

Coveralls: A protective outer layer of clothing should be worn over appropriate undergarments as an initial form of body protection. In many cases, it is appropriate to use a clean, washable, reusable long-sleeved one-piece cloth coverall suit. Higher risk situations require a clean, disposable, long-sleeved one-piece Tyvek® coverall suit. Either white or colored Tyvek® suits are acceptable.

Apron: A full-length, waterproof, cut-resistant apron should be available as needed for field necropsies or for collecting and cutting tissues which may be contaminated with a disease agent of high zoonotic risk.

Other: Some situations may require more specific body protection. Brightly colored high-visibility vests should be worn when working around vehicles and traffic, such as a quarantine checkpoint. If the weather is warm, a cooling vest may be used under the coveralls. Cold weather operations may require additional insulated underclothing. See more on heat and cold stress in Section 6.2 Safety in PPE.

3.5 Foot Protection

Boots: For field use, high pull-on boots worn over stocking feet are preferable to overshoes or overboots. To permit thorough cleaning and decontamination, the boots should be made of rubber or waterproof plastic material with shallow treads. Safety boots with flexible steel toes and midsoles, which provide extra protection from puncture wounds and crushing, are especially recommended for use in the field. Boots must fit well and be comfortable, or the user will be less agile and more apt to trip or not comply with wearing them. It is expected that field responders will spend much of their working time on their feet.

3.6 Head/Hearing Protection

Under certain circumstances, a hard hat and hearing protection may be recommended. Working around heavy machinery or working with equipment or items overhead, such as in a supply area, may require hard hats.

In many events, responders will be exposed to loud noises. For emergency situations where hearing protection is required, as with routine situations, the employee should have had a baseline audiogram and should be enrolled in the Hearing Conservation program. Specially designed ear muffs and ear plugs, both disposable and reusable, are examples of PPE used to protect responders from noises above safe levels. The choice of hearing protection should consider the effectiveness and the cost, as well as biosecurity issues if intended to be reused.

4. LEVELS OF PPE PROTECTION FOR EMERGENCY RESPONSE ACTIVITIES

The Occupational Safety and Health Administration (OSHA) classifies PPE into four levels of protection. The levels range from D (lowest level of protection) to A (highest level).

Levels D through A are described below, and an example of the type of hazard for which that level of PPE would likely be recommended is given. Table 3 lists the levels and the equipment appropriate to provide that level of protection.

Level D: This is the lowest level of protection and consists of a basic work uniform to protect against nuisance contamination. For example, this would be sufficient for responding to a non-zoonotic, vector-borne animal disease in the absence of a respiratory hazard. Appendix 5 Personal Protective Equipment of the APHIS HASP also describes Level D Modified as the same as Level D for respiratory protection, but the skin protection is increased to that of Level C.

Level C: This level is used when the concentration and types of airborne substances are known and the criteria for using air purifying respirators are met. This level would be recommended when responding to a highly pathogenic avian influenza (HPAI) outbreak. General agreement exists that Level C PPE would be adequate protection for veterinary responders in most situations.

Level B: This level is used when the highest level of respiratory protection is necessary but a lesser level of skin protection is needed than in Level A. This may be the level required in a Nipah virus outbreak.

Level A: This is the level of protection selected when the greatest level of skin, respiratory, and eye protection is required. An example where this level would be required would be when responding to a large chlorine spill.

Emergency response activities in which veterinary responders are involved will almost never necessitate the use of Level B or A PPE. However, it is possible that veterinary responders may be needed to assist in emergency situations where these expanded levels of protection will be required. A basic familiarity with all levels of PPE protection will expedite onsite training in an actual animal health emergency.

Table 3. Equipment Based on PPE Level

To protect:	Level D	Level C	Level B	Level A
Skin (dermal)	**Inner barrier:** Street clothes **Outer barrier:** Coveralls, scrubs, or other protection	**Inner barrier:** Environmental temperature dependent street clothes/scrubs to insulated coveralls **Outer barrier:** Hooded chemical-resistant clothing		**Inner barrier:** Totally-encapsulating chemical-protective suit **Outer barrier:** Disposable protective suit, if warranted
Skin - specifically hands	**Disposable gloves** **Cut resistant gloves, if warranted**	**Disposable gloves, chemical-resistant outer & inner gloves** **Cut-resistant gloves, if warranted**		**Chemical-resistant outer gloves over encapsulating suit** **Cut-resistant gloves, if warranted**
Respiratory		**Air purifying respirator (APR)** • Full-mask for unknown hazards & zoonoses • Half-mask for non-zoonotic	**Self-contained breathing apparatus (SCBA)**	
Eyes		**Goggles, face shield**	**SCBA**	
Footwear	**Boots or shoes appropriate to perform duties**		**Chemical-resistant steel toe boots**	**Chemical-resistant steel toe boots over encapsulating suit**
	Known hazard No risk of skin contamination No risk of inhalation No risk of hazardous material contact			Unknown hazard Skin contamination imminent Respiratory exposure imminent Eye exposure imminent

5. SELECTING PPE

The selection of PPE should be based on risk assessment. This section of the guidelines discusses basic PPE suggestions in the following situations

- PPE for initial field investigations;
- PPE in non-zoonotic foreign animal disease events; and
- PPE in zoonotic foreign animal disease events.

5.1 PPE for Initial Field Investigations

At the initial field investigation of a suspected foreign animal disease, little information may be known. Whatever is reported on the species involved, clinical signs, number of animals affected, mortality, history of the herd/flock, and any specific circumstances is used to select appropriate PPE, keeping responder safety as high priority. Level C protection will be suitable in most cases. This will include protective hooded-coveralls, gloves (cut-resistant gloves and an apron if performing necropsies), goggles or a face shield, and waterproof boots that can be cleaned and disinfected, and respiratory protection. If necessary, head and hearing protection should be worn. A cooling vest or insulating undergarments are used as needed. All responders should have a National Institute for Occupational Safety and Health (NIOSH) approved

respirator for which they have been medically cleared, fit tested, and trained to use. A more thorough investigation and diagnosis will provide more details for an incident-specific HASP.

If upon investigation, it is determined that the disease is routine, endemic, and without zoonotic potential: and a risk assessment concludes the situation does not meet the criteria for eye or respiratory protection, the supervisor may authorize a "dress down" to a Level D protection. Disease-specific biosecurity protocols should still be followed which may require maintaining other Level C equipment aside from a respirator. APHIS describes this level as Level D Modified.

5.2 PPE in Non-Zoonotic Foreign Animal Disease Events

Most non-zoonotic FAD events will require Level C protection for biosecurity. Protection for the body, hand, foot, eye, face, head, hearing, and for the respiratory system should be chosen based on potential hazards. In most cases, protective hooded-coveralls, gloves, boots, goggles or a face shield, and waterproof boots that can be cleaned and disinfected will be required. Respiratory protection will be based on the nature of the disease and any environmental risks.

The requirement of other protective equipment is based on factors discussed in Section 2.8 of this document. Personnel involved in livestock handling and restraint will wear safety boots. Those performing necropsies will wear an apron and cut- resistant gloves. Those performing C&D will wear waterproof outerwear and face protection. Traffic controllers will wear high-visibility vests. Responders assigned to disposal, working around loud machinery, will wear hearing protection. Those serving in the supply area with stored items overhead may not need PPE for biosecurity, but may need hard hats to protect against falling items. All responders should follow the HASP recommendations for that site and for their assigned task.

5.3 PPE in Zoonotic Foreign Animal Disease Events

Exposure to zoonotic diseases constitutes a threat to human health. Level C protection is suitable for most zoonotic diseases if the appropriate respiratory protection is utilized based on the risk assessment. Double sets of gloves are essential PPE in situations in this risk category. Those performing necropsies will don triple sets including cut-resistant gloves.
In addition to the precautions described above, some diseases may require a respirator with a higher level of protection such as a full-facepiece elastomeric respirator or a full-facepiece elastomeric PAPR. The diseases with more significant zoonotic potential through respiratory exposure require a higher level of protection. If the level of respiratory protection requires a SCBA with its own air supply, only those responders cleared and appropriately trained should participate.

Table 4 adds to Table 2 the suggested minimum level of PPE an individual should wear; however, the decision is always based on the risk assessment of the specific circumstances. The route of transmission and potential method of exposure to a zoonotic disease as well as potential exposure to any respiratory hazard are especially important considerations. For most disease agents, Levels D and C are appropriate. If information about the outbreak suggests serious human threat, higher levels of protection must be considered.

For additional information on other aspects of response in these situations see *FAD PReP/NAHEMS Guidelines: Biosecurity (2011), Mass Depopulation and Euthanasia (2011), Cleaning and Disinfection (2011),* and *Disposal (2011).*

Table 4. PPE Level Based on Combined Risk

Zoonotic Risk	Biosecurity Risk	Combined Zoonotic/ Biosecurity Risk	PPE Level	Hazard Example
Low, non-zoonotic	Low, vector-borne	Low	D	Heartwater
Low, non-zoonotic	Moderate	Moderate	D	Dourine
Moderate, zoonotic	Low	Moderate	Level D Modified	Screwworm
High, zoonotic	Low, vector-borne	High	C	Japanese encephalitis
High, zoonotic	High	High	C	Glanders
High, zoonotic	Low, vector-borne	High	C	Rift Valley Fever
Low, non-zoonotic	High	High	C	Foot-and-mouth disease
High, zoonotic	High	High	C	High pathogenicity avian influenza
High, zoonotic	High	High	B	Nipah
High	N/A	N/A	A	Chlorine Spill

6. GUIDELINES FOR DONNING AND DOFFING PPE

The terms donning and doffing are often used with PPE. Donning is the procedure of assembling PPE on the user and doffing is the procedure for removal of PPE. Responders should only don PPE for which they have been thoroughly trained, medically cleared to use, and fit tested to wear. The responder must

- Inspect PPE to ensure all required safety features and devices have been incorporated or provided (e.g., ensure your APR respirator has a filter in place);
- Inspect PPE for damage before, during, and after each use (e.g., ensure your protective suit has not been torn); and
- Use doffing and decontamination procedures to prevent the spread of disease organisms from the work area to self, assistant, and/or other places and animals.

6.1 Donning

Upon arriving at the premises, veterinary responders should follow premises-specific protocols and biosecurity procedures. If work zones have been established, the responders must familiarize themselves with the layout and protocols and proceed appropriately. Prior to entry, responders will understand the requirements for biosecurity and decontamination, and any zoonotic disease protection. If first on the scene, responders will establish work zones (see below) and plan their exit before they enter.

Typically, three work zones and a corridor are established to help protect responders and prevent the accidental spread of the hazard. The three major work zones and corridor (Figure 3) according to the *FAD PReP/NAHEMS Guidelines: Biosecurity (2011)* are as follows:

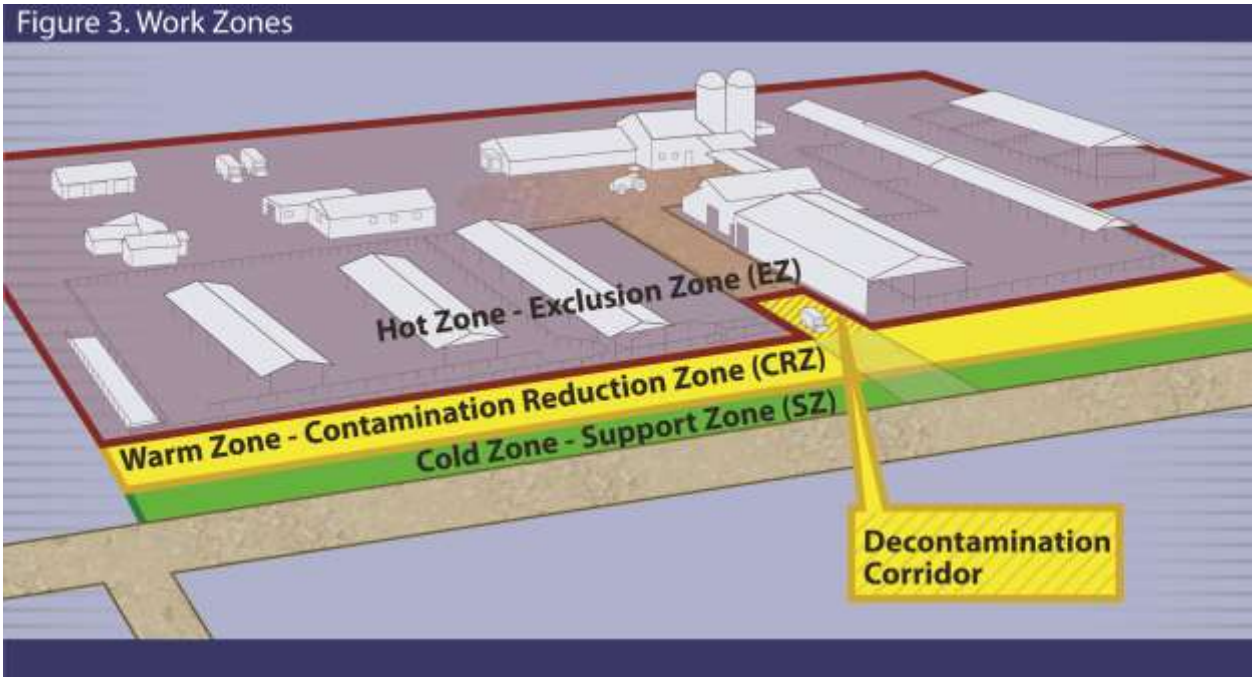
Hot Zone – Exclusion Zone (EZ): This high-risk area is where infected animals were housed and is potentially contaminated and considered unsafe. Examples include an area of a farm, local market, or roadside stand. PPE must be worn. Appraisal, depopulation, disposal, and facility cleaning and decontamination of the site and equipment occur in this area. Personnel and equipment enter and exit the Hot Zone through designated access points in the Warm Zone - Contamination Reduction Zone (CRZ).

Warm Zone – Contamination Reduction Zone (CRZ): This is a high-risk area due to the potential of exposure to pathogens and chemical disinfectants. All personnel are required to wear full PPE. Entry from the Warm Zone - Contamination Reduction Zone **(**CRZ) to either the Cold Zone - Support Zone (SZ) or Hot Zone - Exclusion Zone (EZ) occurs through designated access points. For workers exiting the Hot Zone - Exclusion Zone (EZ), final decontamination and disinfection of PPE and equipment as well as final doffing of PPE occur in the Decontamination Corridor of the Warm Zone - Contamination Reduction Zone (CRZ). Site-specific protocols for PPE, decontamination, and disinfection must be strictly followed.

Decon (Decontamination) Corridor: The area between the Hot Zone - Exclusion Zone (EZ) Control Line and the Warm Zone - Contamination Reduction Zone (CRZ) Control Line. Decontamination of personnel and equipment occurs along the corridor with stations for depositing tools, equipment, protective clothing and other items. The level of contamination should decrease along this corridor from the Hot Zone - Exclusion Zone (EZ) to the Cold Zone - Support Zone (SZ). Teams enter and exit the Hot Zone - Exclusion Zone **(**EZ) through the access control points at each end of the corridor.

Cold Zone – Support Zone (SZ): This is the "cleanest" work zone with the lowest relative risk of exposure to pathogens and other hazards such as decontamination chemicals. In this zone personnel are not required to wear PPE; however, facilities for donning PPE before entering other zones are provided. Administrative, clerical, and other support functions are based here. Medical support is provided to personnel in this zone. Facilities for personal needs such as eating, drinking, and bathroom use are provided. Air and surface monitoring is conducted as needed to ensure that the area is free from contamination. Contaminated articles and equipment are prohibited in this area. Decontamination activities are also prohibited.

Figure 3. Work Zones



For additional information on work zones, see *FAD PReP SOP: Biosecurity*.

For a step-by-step procedure for donning and doffing Level C and B PPE, see Appendix A, Steps for Donning and Doffing. Responders donning Level D Modified would follow the process for Level C outerwear (minus the respiratory protection).

6.2 Safety in PPE

Safe and effective donning, doffing, and wearing of Level C or greater PPE require assistance, and the buddy system should always be used. Wearing PPE can create responder hazards such as physical and psychological stress, and impaired vision, movement, and communication. Heat and cold stress can be a serious risk. In addition to appropriate clothing under PPE, the risk should also be addressed by administrative measures such as limited work shifts, rotations in and out of PPE, and rest periods. When involved in an incident response, a responder's time in PPE will be limited to maintain responder safety.

Responders must be aware of their physical abilities and overall health when engaged in activities requiring PPE. See also *FAD PReP/NAHEMS Guidelines: Health and Safety (2011)*.

6.3 Doffing

The responder should follow the PPE disposal and departure plan that was established prior to entering the premises. All departure plans should be consistent with the biosecurity principles outlined in the *FAD PReP/NAHEMS Guidelines: Biosecurity (2011)*, *Cleaning and Disinfection (2011)*, *Quarantine and Movement Control (2011)* and in Appendix C "Biosecurity: DOs and DON'Ts."

7. REFERENCES

APHIS Health and Safety Plan (HASP) Template, http://www.aphis.usda.gov/emergency_response/tools/how-to/htdocs/emtools/tools/tools0050.html

APHIS "Safety and Health Manual"— Chapter 11, "Personal Protection," and Section 1, "Personal Protective Equipment"

Code of Federal Regulations, Title 29, Part 1910, Subpart G, Occupational Health and Environmental Control (29 CFR 1910.95 Occupational noise exposure)

Code of Federal Regulations, Title 29, Part 1910, Subpart I, Personal Protective Equipment (29 CFR 1910 et seq.).

National Animal Health Emergency Management System, U.S. Department of Agriculture. FAD PReP/NAHEMS Guidelines: Personal Protective Equipment in Biologically Hazardous Environments (2005) (Draft September 2005)

National Animal Health Emergency Management System, U.S. Department of Agriculture. FAD PReP/NAHEMS Guidelines: Personal Protective Equipment in Biologically Hazardous Environments (2007) (Draft May 31, 2007)

National Animal Health Emergency Management System, U.S. Department of Agriculture. Suiting Up: A Guide for Selecting and Wearing Personal Protective Equipment in Biologically Hazardous Environments (2007) (Draft September 14, 2007)

National Institute for Occupational Safety and Health (NIOSH), Workplace Safety and Health Topics,

http://www.cdc.gov/niosh/topics/respirators

National Institute for Occupational Safety and Health (NIOSH), Respirator Trusted-Source Information Page,

http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/RespSource.html.

USDA-APHIS National Veterinary Accreditation Program web and print based module on *Personal Protective Equipment for Veterinarians,* 2007.

USDA-APHIS National Veterinary Stockpile (NVS). http://nvs.aphis.usda.gov

Veterinary Services Memorandum No. 580.4 Procedures for Investigating a Suspected Foreign Animal/Emerging Disease Incident (FAD/EDI). http://www.aphis.usda.gov/vs/nahss/swine/csf/CSF_pm_2007_AppendG_VSMEM_5084.pdf

Wenzel, J. Awareness-Level Information for Veterinarians on Control Zones, Personal Protective Equipment, and Decontamination. JAVMA 2007; 231: 48-51.

8. FOR MORE INFORMATION

Centers for Disease Control and Prevention

Interim Guidance for Protection of Persons Involved in U.S. Avian Influenza Outbreak Disease Control and Eradication Activities
http://www.cdc.gov/flu/avian/professional/protect-guid.htm

National Center for Zoonotic, Vector-Borne, and Enteric Diseases
http://www.cdc.gov/nczved/

National Institute for Occupational Safety and Health (NIOSH)
Certified Respirators
http://www2a.cdc.gov/drds/cel/cel_form_code.asp

NAHEMS Guidelines
Response Strategies: Highly Contagious Diseases, Draft 2009

Publications
http://www.cdc.gov/Publications/

National Association of State Public Health Veterinarians

Compendium of Veterinary Standard Precautions: Zoonotic Disease Prevention in Veterinary Personnel
http://www.nasphv.org/Documents/VeterinaryPrecautions.pdf

Occupational Safety and Health Administration

http://www.osha.gov

Health Standard 1910.120/Hazardous Waste Operations and Emergency Response
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9765

Hearing Protection Standard 1910.95/Occupational Noise Exposure
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9735

Personal Protective Equipment
http://www.osha.gov/SLTC/personalprotectiveequipment/index.html

U.S. Department of Agriculture, Animal and Plant Health Inspection Service

National Animal Health Emergency Response Corps
http://www.aphis.usda.gov/animal_health/emergency_management/naherc.shtml

U.S. Environmental Protection Agency

Search using “personal protective equipment” or “PPE” as keywords
www.epa.gov

9. ACKNOWLEDGEMENTS

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10. PHOTO AND ILLUSTRATION CREDITS

Page 1 ICS Command Structure. Graphic illustration by: Andrew Kingsbury, Iowa State University

Page 3 Steps to eliminate hazards. Graphic illustration by: Andrew Kingsbury, Iowa State University

Page 10 N-95 Respirator with an exhalation valve. Photo source: Tru Twedt, Iowa State University

Page 11 **(Top)** Half-face APR. Photo source: Tru Twedt, Iowa State University
(Middle) Full-face APR. Photo source: Tru Twedt, Iowa State University
(Bottom) Photo of a veterinarian in PAPR with the parts labeled. Photo source: John Wenzel New Mexico State University; labels by Andrew Kingsbury, Iowa State University

Page 12 **(Top)** Photo of a veterinarian in PAPR performing a necropsy on a horse. Photo source: John Wenzel, New Mexico State University
(Bottom) Photo of a person wearing a Self-Contained Breathing Apparatus (SCBA) decontaminating another person wearing a SCBA. Photo source: Federal Emergency Management Agency (FEMA)

Page 13 **(Top)** Goggles. Photo source: Travis Engelhaupt, Iowa State University
(Middle) Face shield. Photo source: Dani Ausen, Iowa State University
(Bottom-left) Nitrile gloves. Photo source: Center for Food Security and Public Health, Iowa State University
(Bottom-right) Cut-resistant gloves. Photo source: Rick Stammer, USDA

Page 14 **(Top-left)** Coveralls. Photo source: Danelle Bickett-Weddle, Iowa State University
(Top-middle) Photo of a responder donning a Tyvek® suit. Photo source: Center for Food Security and Public Health, Iowa State University
(Top-right) Photo of a responder wearing a Tyvek® suit with a waterproof, cut-resistant apron. Photo source: Tegwin Taylor, Iowa State University
(Bottom) High boots with steel toes and midsoles. Photo source: Danelle Bickett-Weddle, Iowa State University

Page 16 Veterinary Responder in Level C PPE. Photo source: Tegwin Taylor, Iowa State University

Page 19 Work zones shown over a farm with the various zones and decontamination corridor labeled. Graphic illustration by: Dani Ausen and Andrew Kingsbury, Iowa State University

Glossary

Administrative Controls
Administratively initiated policies, directives, or other measures that regulate responders' exposure to a hazard.

Biosecurity
A series of management practices designed to prevent the introduction of disease agents onto an animal production facility.

Doffing
Taking off personal protective equipment.

Donning
Putting on personal protective equipment.

Engineering Controls
Measures that contain or remove a hazard through isolation, enclosure, ventilation, substitution, or other process changes.

Fit Test
The process of assuring the assigned respirator provides an adequate seal to the user's face.

Level A PPE
This level of protection is used when the greatest level of skin, respiratory, and eye protection is required. An example where this level would be required would be when responding to a large chlorine spill.

Level B PPE
This level is used when the highest level of respiratory protection is necessary but a lesser level of skin protection is needed than in Level A. This may be the level required in a Nipah virus outbreak.

Level C PPE
This level is used when the concentration and types of airborne substances is known and the criteria for using air purifying respirators are met. This level would be recommended when responding to a highly pathogenic avian influenza (HPAI) outbreak. General agreement exists that Level C PPE would be adequate protection for veterinary responders in most situations.

Level D PPE
This is the lowest level of protection and consists of a basic work uniform to protect against nuisance contamination. For example, this would be sufficient for dealing with a dermatophytosis (ringworm) outbreak at an animal shelter.

Medical Clearance
An evaluation by a qualified licensed health care provider to ensure the employee is physically suited to wear respiratory protection while working in an infected environment.

National Institute for Occupational Safety and Health (NIOSH)
The U.S. Federal agency responsible for conducting research and making recommendations for the prevention of work related injury and illness. NIOSH is part of the Centers for Disease Control and Prevention (CDC).

Personal Protective Equipment (PPE)
Equipment used as a barrier between an individual and a hazard that could result in an injury or occupational illness.

Powered Air-Purifying Respirator (PAPR)
A device equipped with a facepiece, hood, or helmet, breathing tube, canister, cartridge, filter, canister with filter, or cartridge with filter, and a blower.

Premises
Includes a tract of land, and all of its buildings, as well as a separate farm or facility that is maintained by a single set of services and personnel.

Risk
The probability of becoming infected given that exposure to an infectious agent has occurred.

Seal Check
An action conducted by the respirator user to determine if the respirator is properly seated to the face.

Self-Contained Breathing Apparatus (SCBA)
An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Vector
Insects or arachnids capable of transmitting pathogens from an infected animal to another animal, usually through a bite.

Zoonotic Disease
Disease that is transmissible from animals to humans under natural conditions.

Acronyms

APHIS
Animal and Plant Health Inspection Service. An agency of the U.S. Department of Agriculture

APR
Air-Purifying Respirator

CDC
Centers for Disease Control and Prevention

EDI
Emerging Disease Incident

EPA
Environmental Protection Agency

FAD
Foreign Animal Disease

HASP
Health and Safety Plan

HAZWOPER
Hazardous Waste Operations and Emergency Response

HE
High Efficiency Particulate Air (filter used on a PAPR)

HPAI
Highly Pathogenic Avian Influenza

IC
Incident Commander

ICS
Incident Command System

IP
Infected Premises

NAHEMS
National Animal Health Emergency Management System

NAHERC
National Animal Health Emergency Response Corps

NIOSH
National Institute for Occupational Safety and Health

OIE
Office International des Epizooties' also known as the World Organization for Animal Health

OSHA
Occupational Safety and Health Administration

PAPR
Powered Air-Purifying Respirator

PPE
Personal Protective Equipment

QLFT
Qualitative Fit Test

QNFT
Quantitative Fit Test

SCBA
Self-Contained Breathing Apparatus

SO
Safety Officer

SOP
Standard Operating Procedures

VS
Veterinary Services; a division of APHIS

APPENDIX A: DONNING AND DOFFING

Level C PPE Protection

Collect needed supplies:

- Four-inch width chemical-resistant tape
- A pair of blunt-nosed scissors
- Communication radios and headsets (if applicable)
- Two pairs of gloves, minimum. The disposable nitrile or latex inner pair should be in the wearer's size and the outer chemical pair should be ½-size larger. If performing necropsies or using cutting instruments, a third pair of cut-resistant gloves should also be worn.
- A two-piece scrub suit or other appropriate undergarment
- A pair of socks long enough to fit under the pant legs of the scrub suit
- Disposable underwear
- An optional disposable sweatband or surgical hat
- Tyvek® coveralls or similar protective suit with boot pouches and hood
- Steel-toed rubber boots
- A minimum of an N95 respirator or reusable Air Purifying Respirator (APR)
- Goggles, indirectly vented or non-vented
- Biohazard bags for disposal when doffing PPE, if not provided
- Supplies needed to perform tasks on the site, e.g., blood collection supplies, labeled tubes, necropsy supplies

In a changing room or other suitable place in the Cold Zone - Support Zone (SZ) lay out PPE and prepare to don Level C PPE by following the steps below.

Prepare to Don PPE

- Measure and cut a supply of chemical-resistant tape long enough to fit around ankles/top of boots, wrists, and over zipper and crotch.
- Cut several extra pieces in case one of the pieces accidentally bunches against itself and becomes unusable.
- Put tabs on chemical-resistant tape to assist with removal.
- Perform a communications check.
- Remove the Tyvek® coveralls or similar protective suit from the cellophane wrapping and inspect for tears, rips, or other imperfections then unzip it.

Don PPE

1. Remove all outerwear and underwear including socks. Don disposable underwear and socks then put on the two-piece scrub suit. Socks should be under the scrub pants.
2. Insert feet into the boot pouches of the Tyvek® or similar protective coveralls.
3. Pull the rest of the protective coveralls on and zip part way up. Do not put on the hood yet.
4. Step into steel-toed rubber boots.

5. Using the buddy system, wrap chemical-resistant tape around top of boot at the junction of the protective coveralls to ensure no fluid could enter the boot from the outside. One to three turns should be sufficient. One turn is sufficient with wide tape (3-4 in or 7.6-10 cm in width), whereas two or even three turns are required with narrow tape (1-2 inch or 2.5-5 cm in width). Leave a tab on the tape end to help with doffing. If protective coveralls without boot pouches are used, pull the leg of the coverall over the top of the boot and secure in place with chemical-resistant tape. When taping, leave enough give in the legs and arms of the protective coveralls to allow easy movement and to prevent ripping.
6. Put on first pair of gloves. These may be nitrile or latex disposable gloves.
7. Put on the assigned APR respirator (prior medical clearance and fit testing required) and perform the required seal check. The following describes *user seal checking* for an APR:
    - Position the APR appropriately on the face and slide straps over head.
    - Place hand over the opening on the exhalation valve on the facepiece.
    - Exhale strongly one time; the facepiece should pressurize slightly, then air should escape from the contact area between the sides of the face, forehead, and the facepiece.
    - Inhale with hands over the filter cartridges and hold for five seconds (when fitting properly, facepiece should collapse on face and remain collapsed for the duration of this step).

    If a proper fit cannot be achieved, do not enter the area where protection is required. Contact your supervisor for a new respirator and then don and perform seal check again.
8. Put on goggles if eye protection is not provided by the APR. Take care not to disrupt the respirator seal.
9. Pull the hood over your head.
10. Zip up the protective coveralls completely and seal the length of its zipper with chemical-resistant tape. Leave a tab on the tape end to help with doffing.
11. If a full facepiece respirator is used, place tape around the facepiece, completely sealing the hood of the coveralls to the respirator. Be sure to cover the area under the chin as well.
12. Put on the outer pair of chemical-resistant gloves. Pull the cuffs of the protective coveralls over the cuffs of the gloves. Using the buddy system, wrap chemical-resistant tape around each wrist at the junction of the glove and coverall cuff. Stretch out arms and then apply tape. Leave enough give so arms can move freely without ripping of the protective coveralls. Leave a tab on the tape end to help with doffing.
13. Enter work area and perform duties.

Doff PPE

1. Begin doffing in the Hot Zone - Exclusion Zone (EZ) by dry brushing off exterior of PPE.
2. Enter the Decontamination Corridor and continue the decontamination procedure to allow for safe doffing. Appropriate decontamination is performed on a responder's PPE as well as equipment before returning to the Cold Zone – Support Zone (SZ).
3. Remove all chemical-resistant tape from the coveralls, including gloves, boots, and zipper (and facepiece, if applied). Dispose of tape in provided containers.
4. Unzip the protective coveralls.
5. Remove the outer gloves.
6. Reach inside the hood and roll it back, touching only the inside of the coveralls. This step is easiest with the assistance of a team member.
7. Pull the protective coveralls off the shoulders (turning the suit inside out) to ensure any residual contamination is kept away from the body.

8. Sitting on a stool or other support, remove boots and place them in a designated container.
9. Peel the protective coveralls down from head to toe and step out of the coveralls.
10. Dispose of coveralls in a provided container.
11. Remove scrub suit, disposable underwear, and socks and place in a designated container.
12. Remove the APR and inner gloves. Place the APR in a designated container. Dispose of gloves in a provided container.
13. Take a complete shower, including a shampoo, and change to freshly laundered clothing. Personnel should clean under their fingernails and clear their respiratory passages by blowing their noses, clearing their throats, and expectorating into a sink with running water. If there is not a shower facility provided at the premises, this should be done at a shower in a location without animals. This should be done immediately after leaving the infected or exposed area and before visiting public places such as restaurants or theaters.

Level B PPE Protection

PPE Level B protection is required when the highest level of respiratory protection is necessary but a lesser level of skin protection is needed than in Level A. Where Level C requires an Air Purifying Respirator (APR), Level B requires a Self-Contained Breathing Apparatus (SCBA).

Collect needed supplies and prepare to don PPE:

- Four-inch width chemical-resistant tape
- A pair of blunt-nosed scissors
- Strips of chemical-resistant tape that have been measured and cut long enough to fit around ankles, wrists, and over zipper and crotch; 4-5 four-inch pieces of tape to be used around the facepiece of the respirator; and several extra pieces in case one of the pieces accidentally bunches against itself and becomes unusable. Put tabs on all chemical-resistant tape to assist with removal.
- Communication radios and headsets (if applicable). Perform a communications check before use
- A pair of socks long enough to fit under the pant legs of the scrub suit
- Disposable underwear
- A two-piece scrub suit or other appropriate undergarment
- An optional disposable sweatband or surgical hat
- Disposable gloves
- Two pairs of chemical-resistant gloves. The inner pair should be in the wearer's size and the outer pair should be at least ½-size larger so that they can be worn over the protective suit.
- Self-Contained Breathing Apparatus (SCBA)
- A chemical-resistant disposable protective suit
- Chemical-resistant steel-toed boots

Don PPE

1. Remove <u>all</u> outerwear and underwear including socks. Don a dedicated pair of socks, disposable underwear, and scrubs.
2. Put on a disposable protective suit.
3. Put on a pair of disposable gloves.

4. Put on the inner pair of chemical-resistant gloves.
5. Test the SCBA respirator using standard operational procedures found in the Safety and Health manual, Chapter 11, supplemental section B.
6. Attach the facepiece to the respirator.
7. Turn on the SCBA respirator unit and put it on. **This must be done with a buddy.**
8. Using the buddy system, pull on the hood of the protective suit and seal the edge of the SCBA respirator to the hood with chemical resistant tape.
9. Step into a pair of rubber boots, pull the legs of the suit over the boot tops, and seal the suit legs securely with chemical-resistant tape around the ankle area.
10. Put on the outer pair of chemical-resistant gloves. Pull the cuffs of the protective suit over the gloves and tape the sleeves to the gloves by placing the chemical resistant tape equal distance over the suit cuff and glove. Wrap the tape up to three additional turns around wrists to ensure a tight seal between the cuffs of the garment and the cuffs of the gloves. Although one turn is sufficient with chemical-resistant tape that is 3-4 in (7.6-10 cm) wide, two or even three turns are required with narrow tape that is 1-2 inch (2.5-5 cm) wide.

Doff PPE

Doffing occurs after team members have completed their current task and decontamination procedures. The following describes the process for doffing:

1. Remove all chemical-resistant tape from the suit, including gloves, boots, facepiece, and zipper. Dispose of tape in provided containers.
2. Remove the inner and outer layer of chemical-resistant gloves.
3. Follow standard operational procedures to shut down and remove the air pack.
4. Sitting on a stool or other support, remove boots and place in a designated container.
5. Unzip the outer disposable protective suit.
6. Reach inside the hood and roll it back, touching only the inside of the suit. This step is easiest with the assistance of a team member.
7. Pull the suit off the shoulders (turning it inside out) to ensure any residual contamination is kept away from the body.
8. Peel the protective suit down from head to toe and step out of the suit.
9. Place the suit in a designated container.
10. Remove inner gloves and dispose in a designated container.
11. Remove the SCBA and place in designated container.
12. Remove and dispose of dedicated outerwear and underwear before departing the premises.

Level A PPE Protection

Level A protection is selected when the greatest level of skin, respiratory, and eye protection is required. Level A requires a totally-encapsulating chemical-protective suit for skin protection and a Self-Contained Breathing Apparatus (SCBA) for respiratory and eye protection. Emergency response activities in which veterinary responders are involved will almost never necessitate the use of Level B or Level A PPE. Special training is required for handling hazards that require these levels of PPE protection.

APPENDIX B: APHIS RESPIRATORY PROTECTION PROGRAM POLICY

Animal and Plant Health Inspection Service

Respiratory Protection Program Policy

June 14, 2006

Policy: No APHIS employee can be assigned a function that requires them to use or wear respiratory protection without first complying with the following policy and procedures.

USDA APHIS requires the use of the TSI PortaCount Respirator Fit Testing Unit and the N95 Companion to perform quantitative respirator fit testing no matter what respiratory protection that the APHIS employee is wearing/using. Qualitative respirator fit·testing is not an acceptable method for determination of proper fit for APHIS. APHIS requires that all employees required to use or wear respiratory protection be medically cleared to wear the assigned or designated respiratory protection before they can be respirator fit tested. Final medical clearance must come from FOH.

Definitions:

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

NOTE: APHIS personnel can only be fit tested if they have first been medically cleared to wear a respirator.

Procedures:

All APHIS employees required to wear or use respirators will be fit tested based on the following procedures:

For APHIS employees required to wear/use N95 or P95 filtering face piece respirators:

The selections of N-95 or P95 respirators which are required by APHIS are listed below:

3M 8210

3M 8511

3M 8271

Moldex 2700

To qualify to use the respirators listed above the employee must meet the following APHIS criteria:

APHIS requires a TSI PortaCount Fit Factor equal to or greater than 100 for the employee to be authorized to use an N95 or P95.

If this fit factor cannot be achieved then the employee can not wear an N95 or P95 respirator and must be fit tested with the next higher protection providing respirator, i.e., an N100 or P100 respirator.

NOTE: It may occur, for example, that an employee cannot get an acceptable fit test with any of the N95 or P95 respirators that APHIS uses so they would then need to be fit tested with the next higher level of protection and so on until an acceptable fit can be achieved with a respirator that provides them with an acceptable level of protection for the function they are to perform.

For APHIS employees required to wear/use N100 or P100 filtering face piece respirators:

The selection of N100 and P100 respirators which are required by APHIS are listed below:

3M 8233

3M 8293

Moldex 2360

To qualify to use the respirators listed above the employee must meet the following APHIS criteria:

APHIS requires a TSI PortaCount Fit Factor equal to or greater than 500 for the employee to be authorized to use a N100 or P100.

If this fit factor cannot be achieved then the employee can not wear N100 or P100 respirators and must be fit tested with the next higher level of respirator protection, i.e. the 1/2 face Air Purifying Respirator (APR).

For APHIS employees required to wear/use 1/2 face APR respirators:

The selection of 1/2 face APR respirators which are required by APHIS are listed below:

North 7700

MSA Advantage 420

MSA Advantage 200

To qualify to use the respirators listed above the employee must meet the following APHIS criteria:

APHIS requires a TSI PortaCount Fit Factor equal or greater than 1000 for the employee to be authorized to use a 1/2 face APR.

If this fit factor cannot be achieved then the employee can not wear a 1/2 face APR must be fit tested with the next higher level of respiratory protection, i.e. the Full Face Air Purifying Respirator (APR).

For APHIS employees required to wear/use full face APR respirators:

The selection of Full Face APR respirators which are required by APHIS are listed below:

MSA Advantage 1000

Survivair 4100

MSA Advantage 3000

MSA Advantage 4000

To qualify to use the respirators listed above the employee must meet the following APHIS criteria:

APHIS requires a TSI PortaCount Fit Factor equal to or greater than 5000 for the employee to be authorized to use a full face APR.

NOTE: PPQ personnel required to wear SCBA must be fit tested using the TSI

PortaCount and obtain a fit factor equal to or greater than 5000.

The SCBA which is required by APHIS, PPQ is the MSA Air Hawk MMR Air Mask assembly.

If this fit factor cannot be achieved then the employee can not wear a full face APR and must be provided with the equivalent level of respiratory protection, i.e., the Powered Air Purifying Respirator (PAPR). The PAPR is not allowed as a replacement for the SCBA full face. Therefore. if a PPQ employee, who is required to use SCBA, cannot achieve the required fit factor they then are not authorized to wear/use an SCBA.

The APHIS PAPR is listed below:

3M Breathe Easy 10 PAPR

NOTE: The TSI PortaCount Fit Factor is determined as follows:

The TSI PortaCount performs seven separate exercises during the respirator fit testing operation.

The test occurs as follows:

Ambient air is sampled by the TSl PortaCount close to the employee breathing zone

Air inside the specific respirator being tested is sampled while the employee performs the designated exercise (normal breathing, deep breathing, turning head side to side, moving head up and down, talking, grimacing, bending over, and normal breathing)

Ambient air is sampled by the TSJ PortaCount close to the employee breathing zone

The TSI PortaCount then uses the following formula to determine the fit factor:

[Ambient I (particles/per cubic centimeter) + Ambient 2 (particles/cubic centimeter)] / Reading in the Respirator (particles/cubic centimeter)

The overall fit factor for all of the individual exercises is then calculated as follows:

$$\frac{7}{1/E1FF + 1/E2FF + 1/E3FF + 1/E4FF + 1/E5FF + 1/E6FF + 1/E7FF}$$

The resultant fit factor is what is used to indicate whether the employee can or cannot wear the specific respirator being fit tested.

The comparison of Fit Factors:

OSHA	APHIS	Respirator
10	100	N95 & P95
100	500	N100 & P100
100	1000	1/2 Face APR
500	5000	Full Face APR
500	1000	SCBA Face Piece

APPENDIX C: BIOSECURITY DOS AND DON'TS*

Before ENTERING a Premises:

DO

Park your vehicle away from site production facilities and/or ensure that your vehicle's tires, wheel wells, and undercarriage have been cleaned with soapy water so they are free of dirt and debris and/or that your vehicle has been taken through a pressure car wash.

Designate separate "clean" and "dirty" areas in your vehicle. The "clean" area is usually the passenger compartment. The "dirty" area is usually the trunk or cargo area.

Put on clean coveralls, boots, hat, gloves, and other required apparel. Use only clean equipment and supplies.

Wash your hands with soap and water.

Consult with the owner to establish an arbitrary line on the site to demarcate the "clean" side of the premises from the "dirty" side. This will usually be somewhere along the driveway on in the parking area.

DON'T

Enter a "clean" area on either a premises or vehicle unless you have disposed of or cleaned and disinfected all clothes, footwear, hats, gloves, equipment, supplies and other sources of pathogen transmission.

Attempt to disinfect a surface unless it first had been thoroughly cleaned (i.e. it is free of all visible organic material).

Drive your vehicle onto premises any more than necessary. Use an on-site vehicle for on-site transportation whenever possible.

***Additional biosecurity and cleaning and disinfection procedures are required to address the risks posed by suspected and confirmed foreign animal diseases and serious zoonotic diseases. This includes the creation of work zones for proper entry and exit from a contaminated area.**

Before LEAVING a Premises:

DO

Upon returning to the vehicle area, use a brush and an approved disinfectant to thoroughly clean and disinfect all reusable clothing and equipment, including personal items such as jewelry and eyewear. If these items may be harmed by the disinfectant, they may be washed thoroughly in soap and water or, if an acid-susceptible virus is present (e.g., foot-and-mouth disease virus) dipped in vinegar (acetic acid).

Clean vehicle exteriors and trailers, including tires, wheel wells and the undercarriage, with soapy water so they are free of dirt and debris and/or take them through a pressure car wash.

Place disposable protective coveralls (turned "inside out"), boots, and other used items in a plastic bag to leave with the owner on the premises or to transport in the "dirty" area of your vehicle.

Dispose of disinfectant solution according to label directions.

Dispose of all plastic garbage bags containing used or contaminated supplies in a manner that prevents exposure to other people or animals.

Wash your hands with soap and water.

Clean and/or launder all reusable equipment and clothing.

At the end of the day, take a shower. Personal hygiene should include shampooing your hair, cleaning under your fingernails, and clearing your respiratory passages by blowing your nose, clearing your throat, expectorating into a sink with running water, and washing your hands with soap and water.

DON'T

Bring "dirty" paperwork into the clean area of your vehicle.

Visit a second premises before complying with appropriate biosecurity protocol. Follow the incident-specific Biosecurity Plan for guidance on waiting periods between visits to susceptible sites. The waiting period may vary based on the disease, the premises designation, the task assignment, and the level of biosecurity practiced.