



# **Uniform Program Standards for the Mississippi Voluntary BVD Control Program**

**January 2009**

*Available on-line at: [www.mbah.state.ms.us/disease\\_programs/bvd/](http://www.mbah.state.ms.us/disease_programs/bvd/)*

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## Introduction

The objective of the Mississippi Voluntary BVD Control Program is to provide a cost effective program for controlling BVD in Mississippi cattle operations. The program consists of four basic elements:

- (1) Education, to inform veterinarians and producers about the health impacts and economic cost of BVD in cattle;
- (2) Management, to work with veterinarians and producers to implement and validate good management practices on Mississippi cattle operations to prevent, control, and eliminate BVD;
- (3) Herd Testing, to facilitate removal of persistently infected animals from participating herds; and
- (4) Herd Enrollment in the MS Voluntary BVD Certification Program or the Participation Program.

The program supports the BVDV position statements of the Academy of Veterinary Consultants and the National Cattlemen's Beef Association (Appendix I).

This document describes the cooperative Mississippi Voluntary BVD Control Program to be administered by the Mississippi Board of Animal Health. The program was developed in cooperation with the Mississippi Beef Cattle Improvement Association, Mississippi Cattlemen's Association, Mississippi Cooperative Extension System, Mississippi Department of Agriculture and Commerce, Mississippi Veterinary Medical Association, Mississippi State University College of Veterinary Medicine, Mississippi Veterinary Research and Diagnostic Laboratory, National Animal Disease Center, and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services. This publication is intended as a working document that will change as the program develops.

## Part I. Definitions and Abbreviations

Accredited veterinarian	A veterinarian approved by the Animal and Plant Health Inspection Service (APHIS) administrator in accordance with the provisions of Title 9 Code of Federal Regulations (CFR) Part 161 to perform functions required by State-Federal-Industry cooperative programs.
ACE	Antigen capture ELISA
APHIS	Animal and Plant Health Inspection Service, an agency of the U.S. Department of Agriculture
Approved animal identification	Unique animal identification in the form of a tattoo, hot brand, freeze brand, metal USDA ear tag, or Official USDA “840” tag
AVIC	Area Veterinarian-in-Charge: the veterinary official of Veterinary Services (VS), APHIS, USDA, assigned by the APHIS Administrator to supervise and perform the official animal health work of APHIS in the State or States concerned.
BQA	Beef Quality Assurance, a producer certification program
BVD	Bovine viral diarrhea
BVDV	Bovine viral diarrhea virus
ELISA	Enzyme-linked immunosorbent assay
Herd	A group of animals that has been managed as a separate and discrete unit. This may include two or more geographically separated groups of animals under common ownership or supervision but which have an interchange or movement of animals without regard to health status.
Official BVDV test	An organism-detection test approved by the Mississippi Voluntary BVD Control Program Committee and conducted in a laboratory approved by the State Veterinarian.
PCR	Polymerase chain reaction
PI	An animal persistently infected with BVDV

Premises identification number	A unique number assigned by the State animal health official to a livestock production unit that is, in the judgment of the State animal health official and AVIC, epidemiologically distinct from other livestock production units.
Program	The Mississippi Voluntary BVD Control Program
State	Any of the 50 States, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the District of Columbia, and any territories and possessions of the United States.
State Animal Health Official	The State official who is responsible for the livestock and poultry disease control and eradication programs in a State.
USDA	U.S. Department of Agriculture
VS	Veterinary Services: the division of APHIS in charge of animal health activities within the United States.

## **Part II. Administration of the Program**

### **I. Mississippi Board of Animal Health**

- a. Administers the Education, Management, and Herd Enrollment components of the program.
- b. Answers questions related to diagnostic test results.
- c. Answers questions related to the Mississippi Voluntary BVD Control Program.
- d. Provides follow-up service for producers and local veterinarians regarding positive diagnostic test results. Discuss ethical disposition of PI cattle with local veterinarians and producers.
- e. Collaborates on the research generated by the Mississippi Voluntary BVD Control Program.
- f. Updates the Uniform Program Standards for the Mississippi Voluntary BVD Control Program as needed.
- g. Assist with BVD surveillance.
- h. Mail out Test Kits and ear notchers.
- i. Provide "840" EID-Ear tags at \$1.00 each.
- j. Provide financial support, as available, to the program.

### **II. Mississippi Veterinary Research and Diagnostic Laboratory System**

- a. Administer the Herd Testing component of the program by performing all diagnostic tests.
- b. Report diagnostic test results to producers and local veterinarians.
- c. Charge producers directly for diagnostic tests and ear notchers.
- d. Collaborate on the research generated by the Mississippi Voluntary BVD Control Program.
- e. Direct questions related to the Mississippi Voluntary BVD Control Program to the State Veterinarian or BVD Program Coordinator.
- f. Assist with BVD surveillance and education.

### **III. Mississippi Cattlemen's Association**

- a. Assists with educational programs related to BVD control.
- b. Promotes the Mississippi Voluntary BVD Control Program.
- c. Directs questions related to the Mississippi Voluntary BVD Control Program to the State Veterinarian or BVD Program Coordinator.

### **IV. Mississippi Beef Cattle Improvement Association**

- a. Assists with educational programs related to BVD control.
- b. Promotes the Mississippi Voluntary BVD Control Program.
- c. Directs questions related to the Mississippi Voluntary BVD Control Program to the State Veterinarian or BVD Program Coordinator.

V. Mississippi State University College of Veterinary Medicine Faculty

- a. Assist with program administration
- b. Provide laboratory support
- c. Investigate issues arising with BVD surveillance.
- d. Assist with educational programs related to BVD control.
- e. Collaborate on the research generated by the Mississippi Voluntary BVD Control Program.
- f. Mississippi State University Extension Veterinarian will coordinate the MSU CVM administrative role in the MS Voluntary BVD Program.
  - i. Administers the Education, Management, and Herd Enrollment components of the program.
  - ii. Answers questions related to diagnostic test results.
  - iii. Answers questions related to the Mississippi Voluntary BVD Control Program.
  - iv. Provides follow-up service for producers and local veterinarians regarding positive diagnostic test results. Discuss ethical disposition of PI cattle with local veterinarians and producers.

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### **Part III. Laboratory Procedures**

#### Official Diagnostic Test:

The current official diagnostic test is the IDEXX HerdChek<sup>®</sup> BVD Antigen Capture ELISA (ACE) performed on an individual skin biopsy. Diagnostic tests will be completed within ten business days or less from the time the sample arrives in the laboratory.

The ACE will also be used to retest and confirm any positive test results (see Part IV). This will also assist in determining whether the BVD infection is transient (acute) or persistent in the animal.

In addition to the individual ACE, the MVRDL may also perform a pooled PCR assay as a quality control measure. Producers and local veterinarians will not be charged for the pooled PCR, nor will they be notified of the pooled PCR results unless there is a discrepancy between the PCR and the individual ACE. Performing the pooled PCR will also allow the opportunity to investigate the possibility of validating a pooled PCR for routine diagnostic testing.

#### Diagnostic testing site(s):

All BVD diagnostic testing performed under the MS Voluntary BVD Control Program must be performed at a diagnostic laboratory approved by the State Veterinarian. Currently, the Mississippi Veterinary Research and Diagnostic Laboratory in Pearl, Mississippi conducts all BVDV diagnostics associated with the Mississippi Voluntary BVD Control Program.

#### Reporting test results:

All test results will be reported to the submitting veterinarian (or herd owner if a local veterinarian is not involved).

Test results will be reported as indicated on the submission form. Choices for test result reporting include either mail or fax. Appropriate contact information must be included on the submission form.

#### Cost for diagnostic tests:

Diagnostic tests will cost participants in the program \$3.50 per sample.

#### Access to diagnostic test results:

Access to diagnostic test results will be allowed for research and epidemiological investigation approved by the State Veterinarian as long as producer confidentiality is maintained.

## Part IV. Program Elements and Procedures

### BVD test kit:

Veterinarians and/or producers interested in testing for BVD can contact the MVRDL, the State Veterinarian's office, or the Mississippi State University CVM Extension Veterinarian to request a BVD test kit which will contain the following items:

1. Instructions for ear notch sample collection, storage, and submission (Appendix VIII)
2. BVD Virus Ear Notch Testing Submission Forms (Appendix IX)
3. MS Voluntary BVD Control Program enrollment form (Appendix X or XI)
4. Waterproof envelope
5. Sample tubes filled with 2 ml of liquid preservative and placed in a Styrofoam block.
6. Mailing instructions
7. Ice pack
8. Ear notchers- medium sized, ¼ - ½" (if requested)

The test kit will come in an insulated box which can be used to return the samples to the MVRDL.

### Herd Enrollment in the Mississippi Voluntary BVD Control Program:

There are two levels of the BVD Voluntary Control Program that a farm can enroll in to accommodate the goals of the farm/ranch, the CERTIFICATION LEVEL and the PARTICIPATION LEVEL. The requirements for both levels are outlined in Appendix VI.

The CERTIFICATION LEVEL was created for farms/ranches to determine the infection status of their animals and work towards attaining and maintaining a BVD-free herd, while practicing overall best management health practices in their herd. For a herd to enroll in the Mississippi Voluntary BVD Control Program at the Certification Level and receive their enrollment certificate, the following requirements must be met:

1. A Veterinary-Client-Patient-Relationship (VCPR) must exist between the producer and an accredited veterinarian, and this veterinarian must be involved in the herd's BVD surveillance and risk management protocols. The development of a farm risk assessment and management plan for BVD is encouraged (Appendix V).
2. The producer and veterinarian must read the two documents provided as part of the Mississippi Voluntary BVD Control Program Herd Enrollment application packet titled *Understanding BVD* (Appendix III) and *Biological Risk Management* (Appendix IV).
3. The producer must agree to properly dispose of any BVD-PI animals by reading the document *Ethical Disposal of BVD-PI Animals* (Appendix II) included in the Mississippi Voluntary BVD Control Program Herd Enrollment application packet and signing the enrollment form. Recommendations regarding disposition of positive animals can be found below in this section.
4. The herd must have a comprehensive herd health management plan developed under the guidance of the herd veterinarian that involves, but is not limited to, nutrition, biological risk management, herd immunization, parasite control (internal and external), reproductive management, and Beef Quality Assurance (BQA).

5. The herd must regularly screen appropriate test-eligible animals for BVD-PI status by individual antigen capture ELISA at the MVRDL in Pearl, Mississippi. For a list of test-eligible animals please see below. The producer should consult with the herd veterinarian to identify the proper animals for BVD-PI surveillance.
6. All test-eligible animals must be associated with an official Mississippi Premises Identification Number (PIN). If the herd does not have a PIN number, one can be acquired by contacting the MBAH, their Extension Beef Specialist, or online at [www.mbah.state.ms.us/animal\\_id/index.html](http://www.mbah.state.ms.us/animal_id/index.html)
7. All test-eligible animals must have an appropriate form of unique, permanent animal identification. For a list of approved forms of identification please see below.
8. An application for enrollment in the Mississippi Voluntary BVD Control Program must be completed and signed by the herd's producer and accredited veterinarian (Appendix X).

Test-eligible animals for Certification program:

1. All adult cattle, including bulls (first year of enrollment only)
2. All calves
3. Any cow or heifer that did not have a calf tested for any reason. This includes replacement heifers that have not been tested for BVD-PI status at the MVRDL. Any cow or heifer that cannot be associated with a test-negative calf through proper records and unique, permanent animal identification
4. Any herd additions (additions would ideally be tested prior to introduction to the herd).
5. Any cow or heifer that gave birth to a PI calf.

Ideally, all test-eligible animals will be tested prior to the breeding season. Any animal that has tested negative once by an individual antigen capture ELISA (ACE) at the MVRDL in Pearl, Mississippi does not need to be retested and would therefore no longer have to be considered test-eligible for enrollment qualifications.

The PARTICIPATION LEVEL was created for farms/ranches who wish to begin a BVD control program and sell PI-negative calves by yearly testing of calves. A premise identification number and individual animal identifications are required. Veterinary participation is optional, but highly recommended. An application for enrollment in the Mississippi Voluntary BVD Control Program must be completed and signed by the herd's producer (Appendix XI).

Test-eligible animals for Participation program:

1. All calves
2. Recommended but not required: Any cow or heifer that did not have a calf tested for any reason. This includes replacement heifers that have not been tested for BVD-PI status at the MVRDL.
3. Recommended but not required: Any herd additions (herd additions would ideally be tested prior to introduction to the herd).
4. Recommended but not required: Any cow or heifer that gave birth to a PI calf.

Approved animal identification:

All test-eligible cattle must have an appropriate form of unique, approved identification. Approved forms of identification include:

1. Tattoo
2. Hot brand
3. Freeze brand
4. Official USDA Identification, including USDA metal tags. Use of “840” tags is encouraged.

Confirmation of positive results:

The official confirmatory test for the Program is the antigen-capture ELISA (ACE). Upon receiving a positive result on ACE, the positive animals should be isolated and retested in 2-4 weeks. The dams of any positive calves should also be tested. This will assist in determining whether the BVD infection is transient (acute) or persistent in the animal. If the second test is positive, then the animal is considered to be a PI and should be properly disposed of.

Disposition of PI cattle:

The Academy of Veterinary Consultants (AVC) and the American Association of Bovine Practitioners (AABP) adopted a joint position statement regarding the disclosure of BVD-PI animals in 2006 (Appendix II). The Mississippi Voluntary BVD Control Program must also strongly recommend responsible disposition of PI cattle such as:

1. Euthanasia
2. Custom slaughter
3. Research
4. State indemnity followed by disposal at one of the four Mississippi State Diagnostic Laboratories (if possible)
5. Sale with full disclosure (not a preferred method)

Mississippi Voluntary BVD Control Program Herd Enrollment Certificate:

Mississippi herds meeting the requirements for enrollment in the Mississippi Voluntary BVD Control Program Certification Level will be issued a Herd Enrollment Certificate (Appendix VII) issued by the Mississippi Board of Animal Health.

**Appendix I. BVDV Position Statements for the Academy of Veterinary Consultants  
and the National Cattlemen’s Beef Association**

Academy of Veterinary Consultants BVDV Position Statement:

*The beef and dairy industries suffer enormous losses due to effects of bovine viral diarrhea virus (BVDV) infection. The highly mutable nature of BVDV and the emergence of highly virulent strains of BVDV contribute to limited success of present control programs. Also, persistently infected cattle are the primary source of infection and effective testing procedures are available to identify those infected carriers.*

*Therefore, it is the resolve of the Academy of Veterinary Consultants that the beef and dairy industries adopt measures to control and target eventual eradication of BVDV from North America.*

National Cattlemen’s Beef Association BVDV Position Statement:

*WHEREAS, BVD continues to cause significant health problems for cattle and economic losses for producers, and*

*WHEREAS, prior efforts to control and target eradication of BVD from beef herds have not been successful,*

*THEREFORE BE IT RESOLVED, NCBA supports the following position statement of the Academy of Veterinary Consultants (AVC):*

*“The beef and dairy industries suffer enormous losses due to effects of bovine viral diarrhea virus (BVDV) infection. The highly mutable nature of BVDV and the emergence of highly virulent strains of BVDV contribute to limited success of present control programs. Also, persistently infected cattle are the primary source of infection and effective testing procedures are available to identify those infected carriers.*

*Therefore, it is the resolve of the Academy of Veterinary Consultants that the beef and dairy industries adopt measures to control and target eventual eradication of BVDV from North America.”*

*BE IT FURTHER RESOLVED, NCBA encourages all possible efforts to develop economically efficient methods to control and/or eliminate BVD in beef cattle herds.*

**Appendix II. Academy of Veterinary Consultants and American Association of Bovine Practitioners Joint Statement on Disclosure of BVD-PI Animals**

The cattle industry has a moral, ethical and potentially legal obligation not to sell known diseased or damaged animals to other parties without full disclosure. Responsible disposition of animals persistently infected (PI) with BVDV is an important component of BVD control.

The dilemma of how to deal with known PI cattle becomes more critical as BVD testing becomes more widespread. Appropriate disposition of known PI cattle must take into account the adverse impact these cattle have on the health, welfare, and the economic return of other cattle and cattle operations they may expose to BVDV.

It is widely recognized that a PI animal is defective and once confirmed, the PI status should be thereafter disclosed – as exposure to these cattle has health ramifications for all cattle, especially those intended for reproductive purposes.

Marketing or movement of BVD PI animals in any manner that potentially exposes at-risk cattle is strongly opposed.

*Adapted from AVC Standards of Practice and AABP BVD PI disclosure position statement, 2006*

## Appendix III. Understanding BVD

### *Frequently Asked Questions:*

#### **What is bovine viral diarrhea virus?**

Bovine viral diarrhea virus (BVDV) is a potentially serious problem for cattle operations. When BVDV was first identified in 1946 in New York State the most common clinical symptom associated with the virus was diarrhea, hence the name bovine viral diarrhea (BVD). However, since its discovery, BVDV has also been implicated as a cause of infertility, abortions, shipping fever (bovine respiratory disease), immunosuppression (weakening of the immune system which leads to other disease problems), and much more.

#### **How is BVDV classified?**

Scientists classify BVDV according to genotype (type 1 and type 2) and biotype (cytopathic and noncytopathic) based upon genetic composition and how the virus affects cells in the laboratory. Both type 1 and type 2 genotypes contain cytopathic and noncytopathic biotypes. Type 1 and type 2 also mutate very frequently, creating many different strains of BVDV. Some strains cause more severe disease than others, but the important point to remember is that all strains of BVDV, regardless of genotype and biotype, are capable of causing disease. Also, because so many strains of BVDV exist, no vaccine is 100% effective against all strains.

#### **What clinical syndromes are associated with BVDV?**

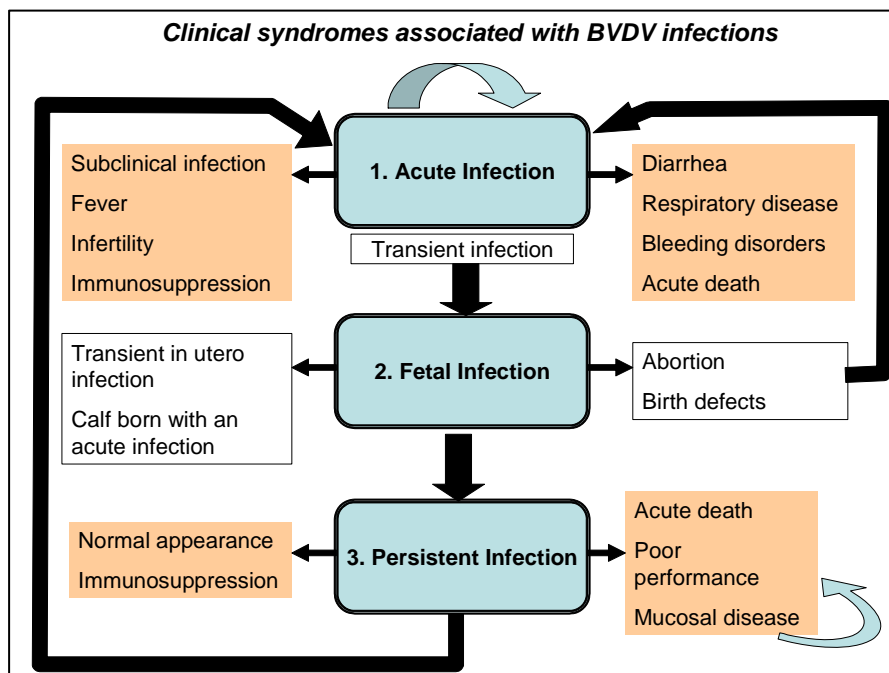
BVDV infections are classified into three clinical syndromes: acute (transient) infection, fetal infection, and persistent infection.

Acute (transient) infections result in fever, depression, diarrhea, respiratory disease, reproductive problems, and much more depending on the age and immune status of the animal infected, as well as the strain of BVDV involved. Some animals will show no outward signs of illness (subclinical disease), but the immunosuppressive effects of the virus leaves them susceptible to other diseases. Most animals recover from acute infections, but some animals will die.

#### **What happens if a calf develops an acute BVDV infection?**

A calf can develop an acute infection when it is exposed to BVDV either before or after weaning. The most susceptible calves are those that are not vaccinated, or those that are vaccinated but stressed. The following conditions are just a few examples of what can result from acute BVDV infections in calves:

1. Pneumonia (BVDV plays a major role in shipping fever)
2. Diarrhea
3. Decreased growth rate and/or poor feed conversion
4. Immunosuppression (which makes calves susceptible to other diseases)



### What happens if a cow is exposed to BVDV?

An acute BVDV infection can also occur in a beef cow, but a cow often shows no outward signs of illness (subclinical). However, depending on her reproductive status a fetal infection could occur with a variety of consequences. Fetal infections can occur anytime a fetus is exposed to BVDV, but the result varies depending on the strain of virus and the stage of gestation. Abortions can occur throughout gestation, but birth defects and persistent infections occur during specific periods of gestation:

1. Infection during the breeding season could result in infertility or early embryonic death.
2. Infection during the first half of gestation could result in abortions or the birth of persistently infected calves.
3. Infection during the second half of gestation could result in abortions, birth defects, still births, or weak calves.

### What are BVDV persistently infected (PI) calves?

Persistently infected (PI) calves are born infected with BVDV and remain infected their entire life, therefore constantly shedding BVDV to every animal they encounter. PI calves are created when a fetus is exposed to a noncytopathic strain of BVDV during the first half of gestation. During this time the fetal immune system is not developed enough to respond to a BVDV infection. The fetus might be aborted, but if the fetus survives it will likely develop into a PI calf. Always remember that PI animals are produced when they are a fetus, and they are not created after they are born.

### Can I detect PI animals visually?

Some PI calves are “poor-doers”, while others may look healthy and grow very well, making it impossible to consistently detect PI animals visually. Most PI animals die by two years of age, but some will survive for several years and constantly shed BVDV throughout their life. Therefore, it is extremely important to perform diagnostic tests to accurately identify PI animals.



**How common are PI animals?**

The prevalence of PI animals is relatively low (about 1% or less), but their ability to shed virus to other animals is tremendous. PI animals shed considerably more virus than acutely infected animals. The cattle industry is concerned about PI animals because of the impacts they have on the health of their herdmates, and it only takes one PI animal to infect a large number of cattle.

**How is BVDV transmitted?**

BVDV does not usually survive in the environment very long (less than 3 weeks), so direct transmission between animals is the most common route of transmission. Acutely infected animals are a temporary source of BVDV transmission, but PI animals shed millions of viral particles every day. PI animals therefore serve as a constant source of BVDV exposure in a herd because they continuously shed virus in saliva, mucous, tears, milk, feces, urine, and any other bodily secretion. Infected herds must therefore identify PI animals and remove them from the herd.

**How do I test my herd for BVDV?**

If you suspect a BVDV infection or if you are concerned about the possibility of a PI animal(s) being present in your herd contact your veterinarian. He or she will know the proper samples to send to the laboratory for BVDV testing.

**How is BVDV prevented and/or managed?**

- Do not purchase BVDV infected cattle. Test all replacement animals for BVDV persistent infection prior to admission to the herd. In addition, the unborn calves carried by the replacement animals should be tested for persistent infection soon after birth. Isolate all newly purchased cattle for at least 30 days, preferably on another farm.
- Purchase only animals from herds with a known effective vaccination program. Get specific information about the vaccination history such as what vaccine was used and when it was given. If killed vaccines were used, make sure that a primary vaccination followed by a booster vaccination was administered.
- Make certain your own cattle are properly vaccinated according to the manufacturer's recommendations before bringing new cattle into the herd. Consult your herd veterinarian and/or extension agent when developing a vaccination program.
- Control farm traffic. Do not allow people to enter your farm without wearing clean footwear and coveralls.
- Consider enrollment in an official BVD control program, such as the Mississippi Voluntary BVDV Control Program.

More information on BVD can be found at: <http://www.avc-beef.org/links/BVDLinks.asp>

## Appendix IV. Biological Risk Management

### Biosecurity (Biological Risk Management)

A biosecurity plan is an innovative approach to managing the risk of disease introduction and spread on your livestock operation. A biosecurity plan is designed to help livestock producers identify disease risks and manage them through practical measures for common, everyday infectious diseases as well as new or unexpected diseases. An effective biosecurity plan manages disease by evaluating and addressing the primary routes of disease transmission, therefore controlling several diseases at one time. There are five primary routes of disease transmission: aerosol, direct contact, fomite or traffic, oral, and vector transmission.

1. Aerosol transmission occurs when disease agents contained in droplets pass through the air from one animal to another. Close proximity of infected and susceptible animals is typically required for aerosol transmission.
2. Direct contact transmission of disease agents occurs when a susceptible animal directly touches an infected animal or its open wounds, mucous membranes, blood, saliva, nose-to-nose contact, rubbing or biting.
3. Fomite transmission occurs when a disease pathogen is carried or spread from one animal to another by an inanimate object (such as boots, buckets, milking and grooming equipment). Vehicles, trailers, and even humans can also be considered fomites and can spread disease through traffic transmission.
4. Disease agents can also be spread through oral transmission, such as when an animal licks or chews on contaminated objects or consumes contaminated feed or water.
5. Vector-borne transmission involves the spread of disease through an insect. Ticks and mosquitoes are biological vectors, commonly spreading disease after becoming infected from a diseased animal and injecting the disease agent into another animal. Flies are a common mechanical vector, simply carrying the disease agent on their body and passing it from animal to animal.

A biosecurity plan involves multiple components, but results in practical measures for implementation. The first step involves assessing the risk areas on a livestock facility based on a 'routes of disease transmission' approach. After identifying risk areas, determine disease management measures, prioritize and start them. The following are examples of biosecurity practices that will greatly minimize the risk of disease transmission:

1. Do not intentionally commingle animals from different herds.
2. Provide a buffer between adjoining herds so no fence-line contact is available.
3. Isolate new herd additions for 4-6 weeks and test for appropriate diseases before allowing new animals to commingle with your herd. Identify isolation areas prior to purchase.
4. Isolate animals returning from livestock shows.
5. Post signs indicating that a biosecurity plan is in effect on your operation.
6. Educate all visitors about the biosecurity plan in effect on your operation.
7. Ensure that all visitors are dressed appropriately. Provide coveralls and boots, or make sure visitors are wearing clothing free from contact with other cattle.

8. Recognize the fact that you are also a source of contamination for your herd. If you are around other cattle, shower and change clothes before working with your livestock.
9. Clean and disinfect your truck and trailer after hauling cattle. Anyone hauling cattle for you should do the same. See chart below for common disinfectants and their uses.
10. Clean and disinfect other equipment as necessary.
11. Apply appropriate insect control to animals and premises.

### Common disinfectants and their uses:

Compound	Example*	Effective against	Ineffective against	Contact time	Comments
<b>Alcohol</b> 70-95%	Isopropyl alcohol Rubbing alcohol	Bacteria Viruses Fungi Mycobacteria	Cryptosporidium Giardia Bacterial spores Fungal spores **Non-enveloped viruses	5-10 min	-Common topical disinfectant -Corrosive to rubber and plastic. -Evaporates rapidly -Limited residual activity -Nonpenetrating -Inactivated by dirt/debris
<b>Aldehydes</b> 1-2%	Wavicide® Formaldehyde (2-3% in water)	Bacteria, spores Viruses Fungi Mycobacteria Cryptosporidium Giardia		5-10 min (longer for Crypto)	-Can be malodorous, irritating -Must use in evacuated premises -Moisten surface before applying -Gas formulations can be used for large areas -Good activity in dirt/debris -Fairly expensive
<b>Chlorhexidine</b> 0.05-0.5%	Nolvasan® Chlorhex®	Bacteria Viruses (some) Fungi (some)	Cryptosporidium Giardia, Coccidia Bacterial spores **Non-enveloped viruses Mycobacteria	5-10 min	-Common antiseptic -Allergic reactions reported -Precipitates in hard or alkaline water -Good residual activity, some activity in dirt/debris -Limited pH – may become inactivated w/soaps, detergents
<b>Chlorine</b> 0.01-5%	Clorox® Household bleach	Bacteria, spores Viruses Fungi Mycobacteria	Cryptosporidium Giardia	5 min	-Low cost, easily available -Corrosive, irritating -Poor surface penetration -Poor residual activity -Inactivated by dirt/debris, sunlight
<b>Iodine Iodophore</b> 0.5-5%	Tinctures Povidone Betadine®	Bacteria Viruses Fungi Mycobacteria	Cryptosporidium Giardia Bacterial spores	10 min	- Common antiseptics, relatively non-toxic -Discoloration/stains -Tinctures can be irritating, corrosive -Should not be used >120°F -Not good for hard surfaces -Inactivated by dirt/debris, sunlight
<b>Oxidizing agents</b> 0.2-3%	Hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> ) VirkonS®	Bacteria Viruses (not H <sub>2</sub> O <sub>2</sub> ) Fungi Mycobacteria	Cryptosporidium Giardia Bacterial spores Fungal spores	5-10 min	-H <sub>2</sub> O <sub>2</sub> - Common antiseptic, but may delay tissue healing -VirkonS® -only disinfectant with a label claim for Foot and Mouth Disease virus, residual activity -Some activity in dirt/debris (Virkon)
<b>Phenol</b> 0.2-3%	Lysol® Amphyl® One-Stroke®	Bacteria Viruses (some) Fungi Chlamydia	Cryptosporidium Giardia Bacterial spores Non-enveloped viruses**	< 5 minutes	-Good for porous and cracked surfaces -Malodorous and irritating -Good residual activity, some activity in dirt/debris
<b>Quaternary Ammonium</b> 0.1-2%	Roccal-D® Di-Quat® Zephiran®	Bacteria Viruses (some) Fungi Chlamydia	Cryptosporidium Bacterial spores Mycobacteria Non-enveloped viruses**	10 min	-Works on hard & porous surfaces -Works best at pH 9-10 -Deactivated by extremely hard water, soaps and detergents -Some activity in dirt/debris

\* Listing of products does not constitute endorsement by Mississippi State University  
 \*\* Non-enveloped viruses include Bovine adenovirus (respiratory virus), Bovine papilloma virus (warts), Rotavirus, Foot and Mouth Disease Virus, Bluetongue virus.

Modified by C. Huston 11/2006

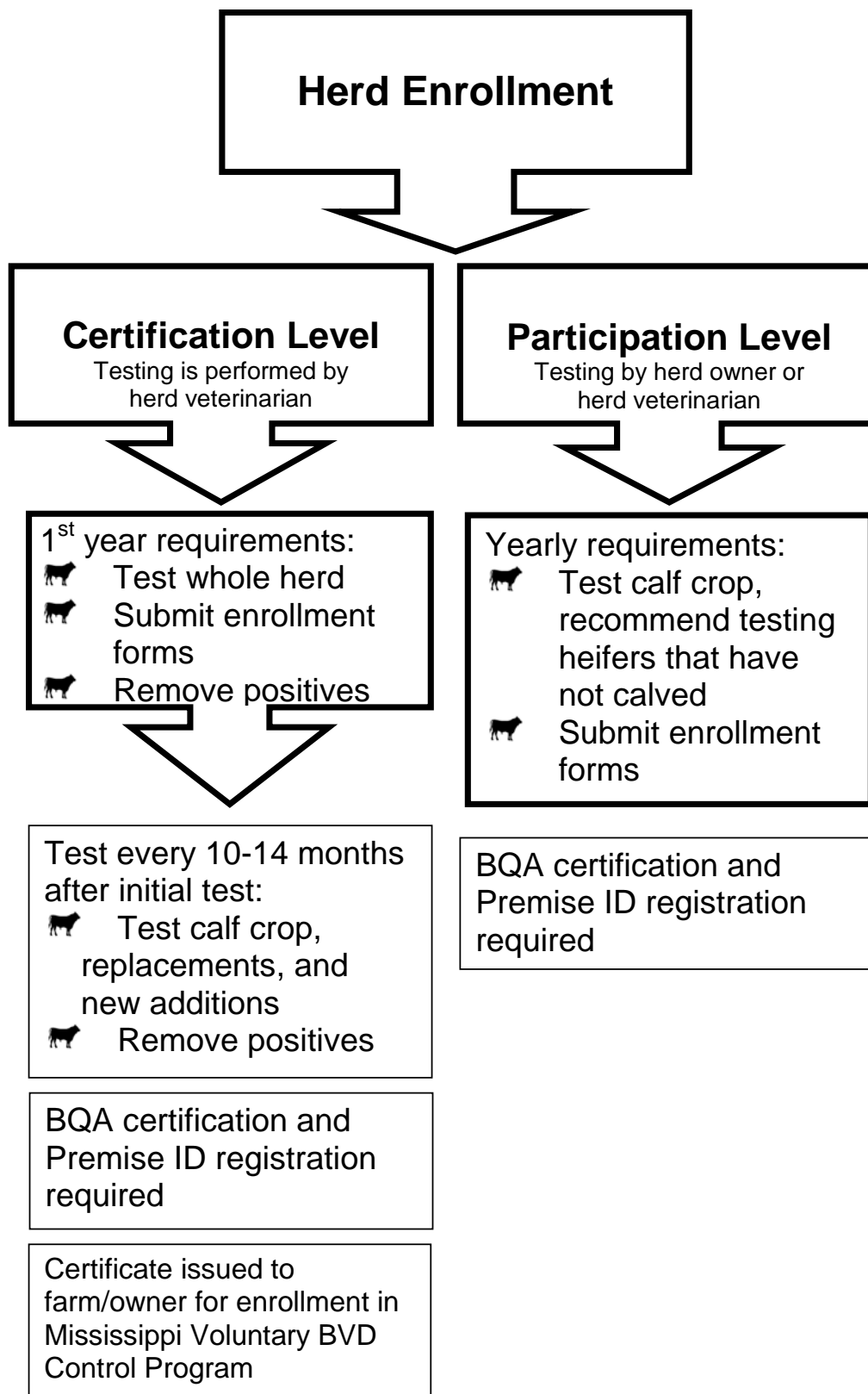
### Appendix V: Farm Risk Assessment and Management Plan for BVD

Risk Category	Risk Level (high, med or low)	Risk Management Strategies	Farm Risk Factors	Farm Priority (high, med or low); Person assigned
Vaccination practices	<p>High</p> <p>High</p> <p>High</p> <p>High</p> <p>High</p> <p>High</p>	<ul style="list-style-type: none"> <li>▪ Design a proper vaccination protocol with herd veterinarian</li> <li>▪ Protect heifers during highest risk times: 3-6 mos of age and early pregnancy</li> <li>▪ Protect mature cows during early pregnancy and late gestation</li> <li>▪ Ensure boosters are given properly and in proper intervals</li> <li>▪ Utilize modified-live BVD vaccines according to veterinarian's recommendations</li> <li>▪ Handle vaccines properly and administer according to label directions</li> </ul>		
Other Herd Health Practices	<p>High</p> <p>High</p> <p>Med</p> <p>Med</p>	<ul style="list-style-type: none"> <li>▪ Annually screen test-eligible cattle for PI-BVD status (calves, any cow or heifer not previously tested, bulls, new additions, dams of PI calves)</li> <li>▪ Cull PI animals (and their offspring) from herd since they serve as a continuous source of infection</li> <li>▪ Have a comprehensive herd management plan developed under the guidance of the herd veterinarian that involves, but is not limited to nutrition, biosecurity, vaccination practices, parasite control, reproductive management, and Beef Quality Assurance (BQA)</li> <li>▪ Keep written records of all vaccinations and procedures done on animals such as castration, dehorning, implants, etc.</li> </ul>		

**Appendix V: Herd Risk Assessment and Management Plan for BVD (continued)**

<b>Risk Category</b>	<b>Risk Level (high, med or low)</b>	<b>Risk Management Strategies</b>	<b>Farm Risk Factors</b>	<b>Farm Priority (high, med or low); Person assigned</b>
Biosecurity practices	High	<ul style="list-style-type: none"> <li>▪ Avoid comingling with different herds and minimize animal contact with outside animals since BVD can be shed in saliva, nasal secretions, blood, milk and manure of infected animals</li> </ul>		
	High	<ul style="list-style-type: none"> <li>▪ Isolate animals returning from livestock shows and exhibits</li> </ul>		
	High	<ul style="list-style-type: none"> <li>▪ Segregate ill animals and investigate any unusual illnesses or deaths</li> </ul>		
	Med	<ul style="list-style-type: none"> <li>▪ Assure that employees and visitors use clean clothing and boots, or have disposable footwear/coveralls available for persons in contact with animals/animal facilities</li> </ul>		
	Med	<ul style="list-style-type: none"> <li>▪ Clean and disinfect all common use equipment</li> </ul>		
	Med	<ul style="list-style-type: none"> <li>▪ Clean and disinfect trailers and trucks after hauling cattle and after visiting any areas where livestock are congregated</li> </ul>		
	High-Med	<ul style="list-style-type: none"> <li>▪ Have a written biosecurity plan in place for all farm employees and visitors, and post signs at farm entrances</li> </ul>		
Herd additions	High	<ul style="list-style-type: none"> <li>▪ Test herd additions and vaccinate prior to arrival</li> </ul>		
	High	<ul style="list-style-type: none"> <li>▪ Isolate new additions from rest of herd for 4-6 weeks to allow for disease testing and vaccination, and to allow potential disease incubation if infected</li> </ul>		
	High	<ul style="list-style-type: none"> <li>▪ Treat any animals that leave the farm for any reason (show, rearing, breeding, etc..) as new additions</li> </ul>		

## Appendix VI. The Mississippi Voluntary BVD Program: Program Levels



Appendix VII. Mississippi Voluntary- BVD Control Program Herd Enrollment Certificate (example)

*Certificate of Enrollment*



**Farm X, under Producer Y**

Premise Identification Number(s): 00MSUXY

as outlined by the Uniform Program Standards on 01/01/09.

BVD Certification Number: MS050-09  
animal test results are on file with the bearer of this certificate.

<p><i>James Watson, DVM</i></p> <p>Dr. James Watson, State Veterinarian Mississippi Board of Animal Health</p> <p>This certificate is issued by the Mississippi Board of Animal Health in agreement with the:</p> <ul style="list-style-type: none"> <li>Mississippi State University College of Veterinary Medicine</li> <li>Mississippi State University Extension Service</li> <li>Mississippi Carlemen's Association</li> <li>Mississippi Beef Cattle Improvement Association</li> <li>Mississippi Veterinary Medical Association</li> </ul>	<p><i>Carla Huston</i></p> <p>Dr. Carla Huston, Program Coordinator MSU College of Veterinary Medicine</p>
01/01/09	01/01/09
Date	Date

## Appendix VIII: MISSISSIPPI BVD VOLUNTARY CONTROL PROGRAM

### Instructions for Ear Notch Sample Collection, Storage and Submission

#### MATERIALS NEEDED:

##### Provided inside BVD Test Kit:

- MVRDL Submission Form
- Program Enrollment Form
- Waterproof Envelope (i.e. zip-lock bag)
- Styrofoam block containing sample tubes
- Mailing Instructions
- Ice Packs (**place immediately into freezer**)
- An insulated shipping box to be used to return collected samples to MVRDL for testing.

##### Other Materials needed (not provided):

- Medium-sized Ear Notchers
- Permanent Marker to label tubes
- Ballpoint Pen to complete submission form(s)
- Packing Tape
- Brush
- Paper Towels
- Liquid Dishwashing Soap
- Disinfectant (i.e. Virkon-S, Chlorohexidine)
- Two Buckets – for Soap Water & Rinse Water

#### \*\* I M P O R T A N T \*\*

Please retain all original shipping materials for use in returning the collected samples back to the Laboratory. The kit must be stored at room temperature. Do NOT allow the kit to overheat.

#### COLLECTING EAR NOTCH SAMPLES:

1. Properly restrain the animal for safe, easy access to one ear. Collect samples from the same ear (right or left) and the same location on the ear (lower margin) to track animals that have been tested for BVD (Illustration 1).
2. If the ear is dirty or wet:
  - a. Remove any mud, feces, and/or water with a brush and/or paper towel.
  - b. Collect ear notch sample with an appropriately sized ear notcher (medium-sized hog ear notcher) from the lower margin of the ear as depicted in Illustration 1.
3. If the ear is clean and dry, then collect the ear notch sample with an appropriately sized ear notcher (medium-sized, ¼ to ½ inch) from the lower margin of the ear as depicted in Illustration 1. The same sized notchers should be used for all samples collected.
4. Place the ear notch in the submission tube and securely close the tube lid. **NOTE: Only one ear notch should be placed into each tube.**
5. Tap or shake the closed tube so that the ear notch moves to the bottom of the sampling tube and is completely submerged in the preservation fluid. Keep the tube in an upright position.



**Illustration 1.**  
Example of Location of Ear Notch Collection



6. Use a permanent marker to label the submission tube with the animal's individual, permanent location. Also, label the submission tubes sequentially with the appropriate specimen number to match the specimen number on the submission form (Illustration 2).
7. Use a ballpoint pen to record the animal's permanent identification number in the appropriate location on the submission form. Be sure that the specimen number and animal identification on the submission form corresponds to the specimen number and animal identification on the submission tube.
8. Place the submission tube back into the Styrofoam block. **Be sure to keep all of the tubes in sequential order (Illustration 3).**
9. Clean hair, blood, and ear tissue from the ear notchers prior to obtaining each sample. A dilute liquid dishwashing soap solution in a bucket of water can be used to clean the instrument; then rinse the ear notchers in a bucket of water.
10. Disinfect the ear notchers in disinfectant (i.e. Virkon-S or diluted Chlorhexidine) between isolated farms to reduce the transmission of infectious diseases.

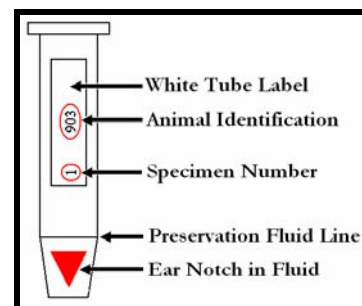
#### SAMPLE HANDLING, PACKAGING, AND SHIPPING (3 OPTIONS):

1. Repackage and ship directly overnight:
  - a. Wrap and seal (with packing tape) the submission tubes/Styrofoam rack inside original plastic covering and then place into the original insulated box with the frozen ice packs.
  - b. Ensure that all information on the submission form is completed and correct, including your preferred method of receiving results.
  - c. Make a copy of the submission form for your records.
  - d. Place and seal the completed submission form back inside the original waterproof envelope that is provided, and then place into the insulated box with the submission tubes.

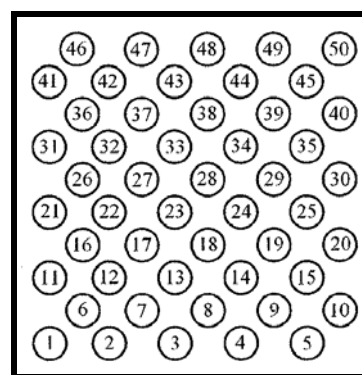
#### \*\*Additional forms can be found at:

[www.mbah.state.ms.us/disease\\_programs/bvd/](http://www.mbah.state.ms.us/disease_programs/bvd/)

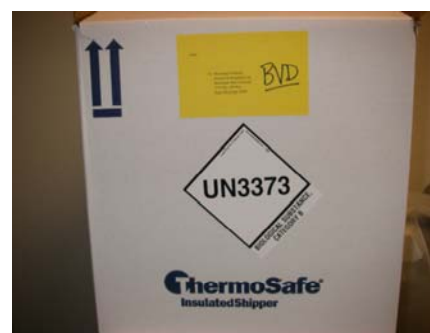
- e. **If the box was originally shipped to you**, you MUST affix the enclosed labels according to Illustration 4 to comply with federal regulations for shipping diagnostic specimen. The yellow address label must be placed over the original address label. If the box was hand-delivered to you, the labels will already be affixed in the proper location.
- f. Close and seal (with packing tape) the insulated box, and complete the yellow shipping label on the outside of the box. **Do not remove the UN3373 label.**
- g. Ship the insulated box overnight via FedEx, UPS or USPS.
- h. You may keep the ear notchers, if purchased from the MBAH.



**Illustration 2.**  
Properly Labeled Submission Tube with Ear Notch.



**Illustration 3.**  
Appropriate sequential order for specimen tubes when placed in Styrofoam block.



**Illustration 4.**  
Proper label placement.

2. Refrigerate:
  - a. Samples can be refrigerated (with the Styrofoam block) for up to 48 hours prior to shipment.
  - b. When ready to ship, follow shipping instructions in 1a – 1f.
  - c. If not shipped within 48 hours, all samples should be frozen.
3. Freeze:
  - a. All samples that are not shipped within 48 hours should be frozen.
  - b. Place Styrofoam block with submission tubes directly into a freezer.
  - c. When ready to ship, follow shipping instructions in 1a – 1h.
  - d. Samples frozen for more than 90 days should be discarded.

**REMEMBER!!** The quality of the samples that you collect, record the data for and submit into the program directly impacts the quality of your results. Samples that have not been prepared properly could cause incorrect or inconclusive results. If you have any questions regarding any aspect of the program, please call Dr. Mike Zhang at (601-420-4700, [mzhang@mvrld.msstate.edu](mailto:mzhang@mvrld.msstate.edu)) or Dr. Carla Huston (662-325-1183, [huston@cvm.msstate.edu](mailto:huston@cvm.msstate.edu)).

## Appendix IX: BVD Ear notch testing submission forms

ACCESSION NUMBER:
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## MISSISSIPPI BVD VOLUNTARY CONTROL PROGRAM

MISSISSIPPI VETERINARY RESEARCH & DIAGNOSTIC LABORATORY  
PO Box 97813 / 3137 Highway 468 West  
Pearl, Mississippi 39288-7813 / 39208  
Lab: 1-800-852-1279 (601) 420-4700 Fax: (601) 932-7505  
[www.mvrdd.msstate.edu](http://www.mvrdd.msstate.edu)

PROGRAM COORDINATOR Dr. Jim Watson 601-359-1170 jimw@mdac.state.ms.us
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<b>DATE RECEIVED:</b>		<b>INSTRUCTIONS:</b> • To obtain a BVDV sample collection kit, please contact the Diagnostic Laboratory or Dr. Jim Watson at the contact information listed above. • Complete each non-shaded box with relevant information before submitting to the laboratory. An incomplete submission form <b>will delay</b> the testing and results.	
<b>DELIVERED BY:</b> USPS UPS FedEx Lab Delivery			
<b>VETERINARIAN</b> Name:		<b>PRODUCER/OWNER</b> Name:	
Address:		Address:	
City/State/Zip:		City/State/Zip:	
Phone:		Phone:	Fax:
Fax:		Email:	
Email:		Member Number:	Premises ID:
Report Preference (circle one):    Mail    Fax		Ear Notchers Requested (circle one):    Yes    No	

**\*\* NOTE: For Ear Notch sample collection procedure, refer to instructions provided inside each collection kit. \*\***

Specimen Number	Animal Identification (one animal per line)	Breed	Sex (M/F)	Age	***** LAB USE ONLY ***** BVD Virus Results Antigen Capture ELISA			
					Detected	Not Detected	Suspect	Technician/Comment
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								



**Appendix X: Application for herd enrollment: Certification Program**

**Application for Herd Enrollment in the Mississippi Voluntary BVD Herd Certification Program:**

1. \_\_\_\_\_  
(FARM/RANCH NAME)
2. The above farm/ranch has a Veterinary-Client-Patient-Relationship with an accredited veterinarian, and this veterinarian, Dr. \_\_\_\_\_, is involved in the herd’s BVD surveillance and risk management protocols.
3. The producer and veterinarian have read the two documents provided as part of the Mississippi Voluntary BVD Control Program Herd Enrollment application packet titled *Understanding BVD* and *Biological Risk Management*.
4. The herd has a comprehensive herd health management plan developed under the guidance of the herd veterinarian that involves, but is not limited to, nutrition, biological risk management, herd immunization, parasite control (internal and external), reproductive management, and Beef Quality Assurance (BQA).
5. The herd annually screens appropriate test-eligible animals for BVD-PI status by individual antigen capture ELISA at the MVDRL, Pearl MS. For a list of test-eligible animals please see Part IV. The producer consults with the herd veterinarian to identify the proper animals for BVD-PI surveillance.
6. All test-eligible animals are associated with the following Premises Identification Number(s):  
\_\_\_\_\_  
\_\_\_\_\_
7. All test-eligible animals are identified with unique, permanent identification.
8. All BVD-PI diagnostic samples were collected and sent to the MVDRL, Pearl MS as instructed in the “Instructions for BVD ear notch sample collection, storage, and submission” document included in the BVD Test Kit.
9. The producer has read Appendix II regarding the *Ethical Disposal of BVD-PI Animals* included in the Mississippi Voluntary BVD Control Program Herd Enrollment application packet and agrees to properly dispose of positive animals.

By signing below I verify the above statements:

\_\_\_\_\_  
Veterinarian’s Signature

\_\_\_\_\_  
Producer’s Signature

\_\_\_\_\_  
Veterinarian’s Name (Print)

\_\_\_\_\_  
Producer’s Name (Print)

\_\_\_\_\_  
Veterinarian’s License Number/State

\_\_\_\_\_  
Date

\_\_\_\_\_  
BQA certification #

Please return completed form along with samples to:

**MS Veterinary Research &  
Diagnostic Laboratory  
PO Box 97813  
Pearl, MS 39288**

\_\_\_\_\_  
Producer’s Address

\_\_\_\_\_  
Producer’s Telephone Number

## Appendix XI: Application for herd enrollment: Participation Program

### Application for Herd Enrollment in the Mississippi Voluntary BVD Herd Participation Program:

1. \_\_\_\_\_  
(FARM/RANCH NAME)
2. The herd has screened appropriate test-eligible animals for BVD-PI status by individual antigen capture ELISA at the MVDRL, Pearl MS. For a list of test-eligible animals please see Part IV.
3. All test-eligible animals are associated with the following Premises Identification Number(s):  
\_\_\_\_\_  
\_\_\_\_\_
4. All test-eligible animals are identified with unique, permanent identification.
5. All BVD-PI diagnostic samples were collected and sent to the MVDRL, Pearl MS as instructed in the "Instructions for BVD ear notch sample collection, storage, and submission" document included in the BVD Test Kit.
6. The producer has read Appendix II regarding the *Ethical Disposal of BVD-PI Animals* included in the Mississippi Voluntary BVD Control Program Herd Enrollment application packet

By signing below I verify the above statements:

Producer's Signature	Producer's Address
Producer's Name (Print)	Producer's Telephone
Date	BQA Certification #

Please return completed form along with samples to:

**MS Veterinary Research &  
Diagnostic Laboratory  
PO Box 97813  
Pearl, MS 39288**