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**Bear Grove**

**SITE NAME:** Bear Grove

**PREMISES ID:** 004ZWI3

**OUTBREAK INVESTIGATION DATE:** 10/11/2016

**RRC INVESTIGATOR(S):** Dr. Derald Holtkamp, Chris Mowrer

**HERD VETERINARIAN:** Dr. Elliot Stabler

**FARM MANAGER:** Tom Reed

# Introduction

|  |  |
| --- | --- |
| Type of herd: *(i.e. multiplier, commercial)* | *Commercial* |
| Stages of production: *(i.e. farrow to wean, nursery)* | *Farrow-to-Wean* |
| Site inventory: *(# of animals on site)* | *2,500* |
| Production system inventory: *(# of breeding females in production system)* | *2,500* |
| Parity segregation (if applicable): | *Mixed parity* |
| Average parity (if applicable): | *3.1* |

# Description of Current Outbreak

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| 1. Date that clinical signs were initially observed: | | October 6, 2016 |
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| 1. Describe clinical presentation of infection: | | |
| *Sows on the southeast side of gestation barn 2 were the first to go off feed and abort. Alerted herd veterinarian after severe increases in number of sows off feed and late term abortions. 170 late term abortions and 26 sow deaths to date. Virus took about 1 week to reach adjacent barns and 90 day bred sows were the first animals to go off feed.* | | |
|  | | |
| 1. Were the clinical signs observed in a specific barn, room or pen?   Yes *(describe location and pattern of spread below)*  No | | |
| *Southeast side of gestation barn 2 near feed bins 1 and 2* | | |
|  | | |
| 1. Date of diagnostic confirmation of outbreak: | *October 8, 2016* | |
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| 1. Date that pathogen was sequenced: | *October 10, 2016* | |
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| 1. Name out outbreak sequence: |  | |

**Table 1.** Describe diagnostic results performed after the outbreak.

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|  | **Test 1** | **Test 2** |
| Test Performed | *PRRSV PCR* | *PRRSV Sequence* |
| Date Submitted | *October 7, 2016* | *October 7, 2016* |
| Type of animal(s) tested | *Wean Pigs* | *Wean Pigs* |
| Specimen(s) collected | *Serum* | *Serum* |
| Number of samples | *20* | *20* |
| Pooling (Y or N; if yes, #samples/pool) | *Yes, 5* | *No* |
| Result | *4 of 4 pools positive* | *N/A* |
| Diagnostic Lab | *Iowa State University* | *Iowa State University* |
| Accession Number | *2016047832* | *2016047890* |

# Site Summary

## Characteristics of the Premises

### Premises Map

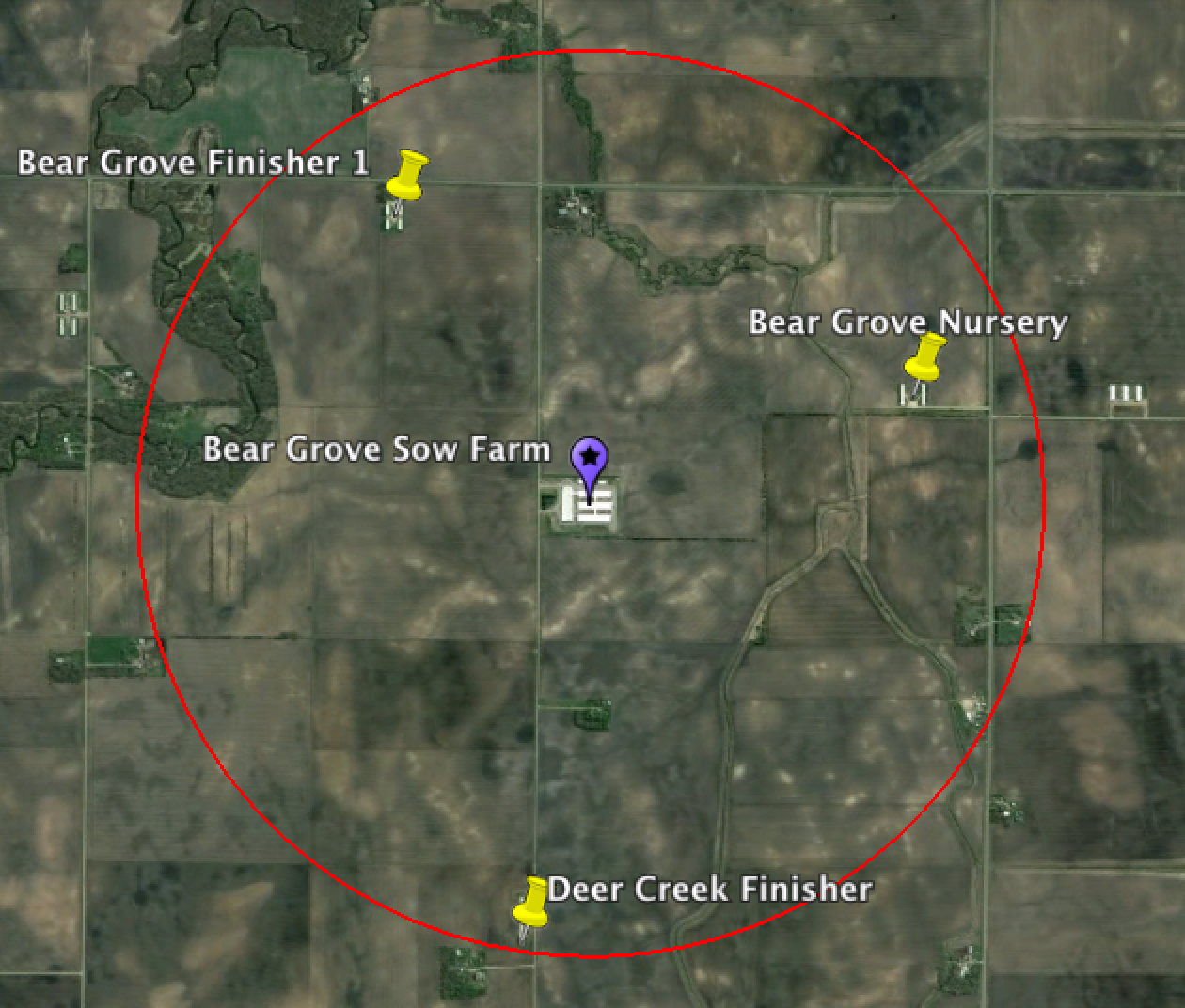


### Questions

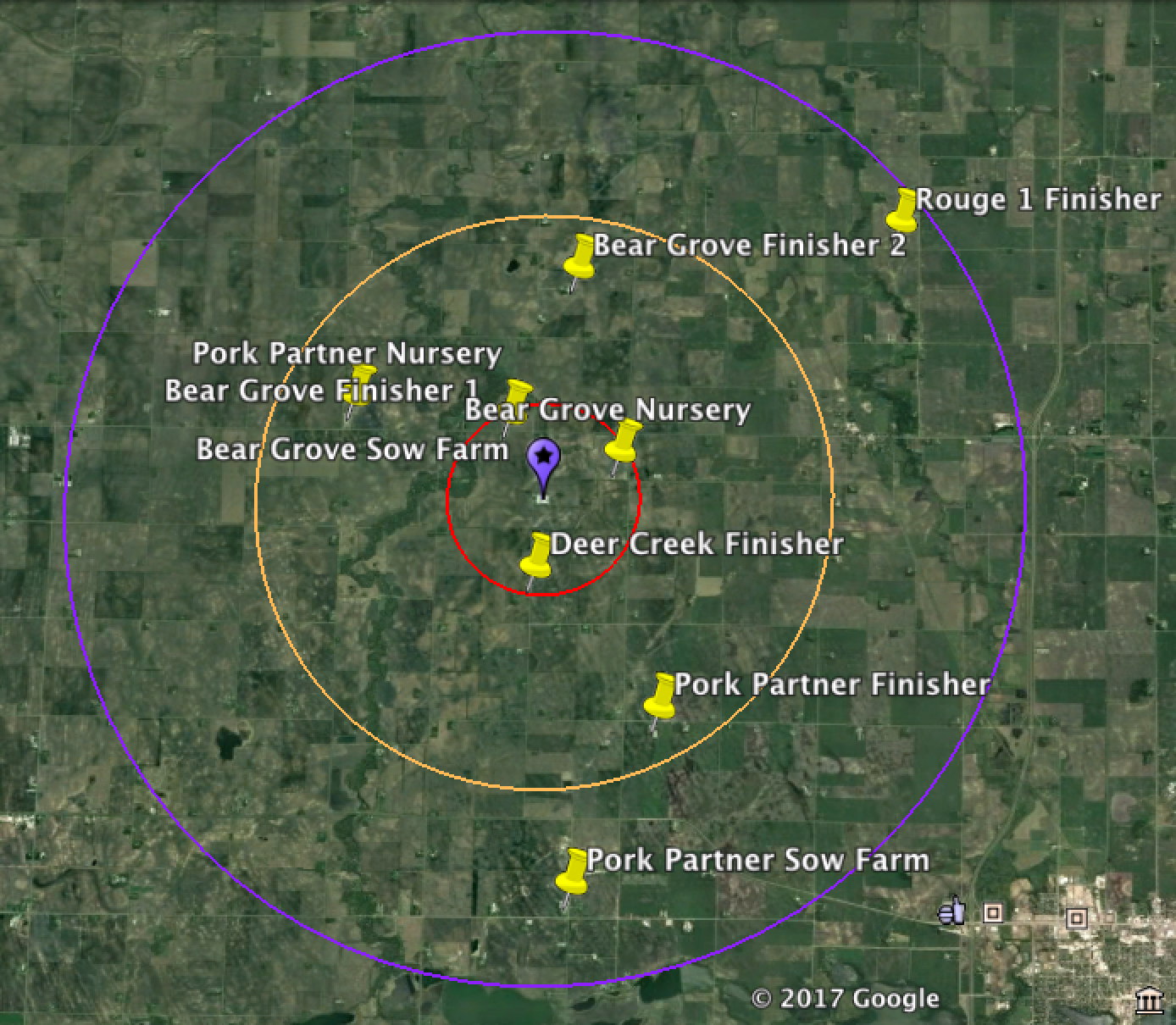
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| 1. Does the owner of the pigs and barns work more than half-time on the premises? |
| Yes  No |
| 1. What is the business arrangement for this premises? |
| Producer or production system owns pigs but facilities and labor are contracted  Producer or production system owns pigs and provides labor but facilities are contracted  Producer or production system owns pigs and facilities and provides labor |
| 1. Are the buildings on the premises surrounded by a perimeter fence? |
| Yes  No |
| 1. Is there a closed gate at all entrances to the premises? |
| No  Yes, closed and locked at all times  Yes, closed and locked only after hours  Yes, but never locked |
| 1. Are there doors at all entrances to the barns? |
| No  Yes, closed and locked at all times  Yes, closed and locked only after hours  Yes, but never locked |
| 1. Do any pigs on premises have access to the outdoors? |
| Yes  No |
| 1. How many vehicle entrances are there to the premises? |
| 1  2  3  Other *(explain in observations)* |
| 1. Is there an occupied house on the premises? |
| Yes  No |
| 1. Is there a common vehicle entrance to the barns and residence on the premises? |
| Yes  No  Not applicable |
| 1. Is there a disinfection/wash area used for vehicles entering the premises? |
| Yes  No |
| 1. Are there tree windbreaks on the premises? |
| Yes  No |
| 1. Are the premises well maintained (grass mowed, minimal feed spills, no junk piles, etc.)? |
| Yes  No *(describe in observations)* |
| 1. Is the premises located in a forested area (>50% of the area within a 3 mile radius is trees)? |
| Yes  No |
| 1. Are other livestock present on site? |
| Yes *(explain in observations)*  No |
| **OBSERVATIONS ON CHARACTERISTICS OF PREMISES:**   * *The premises is well maintained with no feed spills and the grass is mowed.* * *The premises does not have a perimeter fence or any signs indicating it is a biosecure area.* |
|  |

## Characteristics of Surrounding Area

### 1-Mile radius map



### 5-Mile radius map



### Questions

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| 1. What is the topography of the surrounding area? |
| Steep hills or mountains  Flat or gentle rolling hills |
| 1. How far, in yards, is the nearest public road from the barns on the premises? |
| Name of road: Grizzly Lane  Distance from barns:\_125 yards |
| 1. Does the nearest public road carry the following swine related traffic, excluding traffic to and from this premises, more than 3 times per week? |
| 1. Market pigs or culls to markets Yes No  Unknown 2. Growing pigs to other swine premises Yes No  Unknown 3. Vehicles traveling to or from a wash facility Yes No  Unknown 4. Rendering trucks Yes No  Unknown 5. Feed trucks Yes No  Unknown |
| 1. Distance (miles) to the nearest major public road with intensive swine transportation? |
| Name of road: 130th Avenue  Distance from farm: 2.0 miles  Direction from farm (North, South, etc.): West |
| 1. Does the nearest major public road with intensive swine transportation carry the following swine related traffic, excluding traffic to and from this premises, more than 3 times per week? |
| 1. Market pigs or culls to markets Yes No  Unknown 2. Growing pigs to other swine premises Yes No  Unknown 3. Vehicles traveling to or from a wash facility Yes No  Unknown 4. Rendering trucks Yes No  Unknown 5. Feed trucks Yes No  Unknown |
| 1. What is the distance (miles) to the nearest swine market, slaughter plant, or collection point? |
| 24.3 miles |
| 1. Are there any other farms, or other locations, that reported relevant clinical signs within a 5-mile radius of this farm? |
| Yes *(explain in table below)*  No |
| **SURROUNDING AREA OBSERVATIONS:**   * *The topography of the surrounding area is flat.* * *Bear Grove Sow Farm is in a swine dense area and has farms from several other production systems within 5 miles of it.* * *Most of the farms nearby do not use the road that Bear Grove Sow Farm is on to transport their animals.* |

**Table 2.** Farms within a 5-mile radius of this farm.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm Name | Type of Farm *(breeding herd, nursery, etc.)* | Capacity *(number of animals)* | Approximate distance from farm *(miles)* | Direction from farm *(N, S, E, W, NE, SE, NW, SW)* | Pathogen Positive? *(Yes/No)* |
| *Bear Grove Nursery* | *Nursery* | *8,000* | *0.8 miles* | *NE* | *No* |
| *Bear Grove Finisher 1* | *Finisher* | *5,000* | *0.8 miles* | *NW* | *No* |
| *Deer Creek* | *Finisher* | *2,400* | *0.9 miles* | *S* | *No* |
| *Bear Grove Finisher 2* | *Finisher* | *4,800* | *2.2 miles* | *N* | *No* |
| *Pork Partner* | *Nursery* | *3,600* | *2.2 miles* | *NW* | *No* |
| *Pork Partner* | *Finisher* | *1,200* | *2.6 miles* | *SE* | *No* |
| *Pork Partner* | *Breeding* | *1,800* | *4.1 miles* | *S* | *No* |
| *Rouge 1* | *Finisher* | *1,500* | *4.8 miles* | *NE* | *Yes* |

# Risk Events that Occurred During the Investigation Period

## Swine Movements

##### SEMEN DELIVERED TO FARM

Consider the following carrying agents:

* Semen
* Semen packaging and container(s)
* Semen delivery vehicle
* Semen delivery driver

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **FREQUENCY** | | | | | | | |
| How many times during the investigation period was semen delivered to the farm? | | | *12 times* | | | | |
| Dates of delivery (if possible): | | | *All Mondays, Wednesdays, and Fridays* | | | | |
|  | | | | | | | |
| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | | | |
| Farm Name | Stages of Production | Number of Animals | | Distance from Farm (miles) | | Description of operational connections |
| *N/A* |  |  | |  | |  |
|  |  |  | |  | |  |
|  | | | | | | | |
| **CHARACTERISTICS OF BOAR STUD AND SURROUNDING AREA** | | | | | | | |
| 1. What is the name(s) of the semen source(s) used during the investigation period *(note health status of sources, if possible)*? | | | | | | | |
| *Pork Innovation Genetics (PRRSV Negative)* | | | | | | | |
| 1. Did the semen source change in the 3 months prior to the outbreak? | | | | | | | |
| Yes *(explain)*  No | | | | | | | |
| 1. Are all of the boar studs from which semen is delivered naïve to the pathogen? | | | | | | | |
| Yes  No *(explain)* | | | | | | | |
| 1. Have any of the boar stud(s) from which semen is received had a pathogen outbreak in the previous 3 years? | | | | | | | |
| Yes *(explain)*  No | | | | | | | |
| 1. Do all of the boar studs from which semen is received filter incoming air? | | | | | | | |
| Yes  No | | | | | | | |
| 1. Do any of the boar studs from which semen is received have other swine premises within a 3-mile radius? | | | | | | | |
| Yes  No | | | | | | | |
| **OBSERVATIONS ON CHARACTERISTICS OF BOAR STUD AND SURROUNDING AREA:**   * *The nearest swine site is approximately 7 miles away from the boar stud that supplies semen to Bear Grove Sow farm.* * *All of Pork Innovation Genetics boar studs have been negative pressure filtered since 2015.* | | | | | | | |
|  | | | | | | | |
| **BOAR STUD SAMPLING PROCEDURES** | | | | | | | |
| 1. Which samples from boars are tested for pathogen by PCR? | | | | | | | |
| a. Semen Yes No Unknown  b. Serum Yes No Unknown | | | | | | | |
| 1. Are samples from boars tested for pathogen by PCR at every collection of semen? | | | | | | | |
| Yes  No  Unknown | | | | | | | |
| 1. Is use of semen always delayed until the PCR results are obtained? | | | | | | | |
| Yes  No | | | | | | | |
| **BOAR STUD HEALTH STATUS OBSERVATIONS:**   * *After speaking with a representative at Pork Innovation Genetics, there are no reports of other swine farms breaking with a homologous strain.* * *Each week, half of the boars at each stud are tested for PRRSV by PCR on serum.* * *Bear Grove does not receive a report of the diagnostic testing that is performed. There is a verbal agreement that a representative would notify Bear Grove’s manager if a positive sample was detected.* | | | | | | | |
|  | | | | | | | |
| **SEMEN DELIVERY PRACTICES** | | | | | | | |
| 1. Approximately how many other swine premises is semen delivered to by the same driver and vehicle *(note names of premises, if possible)?* | | | | | | | |
| *None.* | | | | | | | |
| 1. What procedures are in place to prevent pathogen from a contaminated semen delivery vehicle or driver from being transmitted to herd? | | | | | | | |
| 1. All semen is delivered by on-farm employees 2. Driver not allowed past a clearly defined clean/dirty line. 3. Driver wears disposable boots when exiting the vehicle or changes boots between premises 4. Delivery vehicles are restricted to designated entrances and / or parking areas 5. A disinfectant is used to decontaminate floor mats, steering wheel, etc. inside semen delivery vehicle. | | | | | Yes No Unknown  Yes No Unknown  Yes No Unknown  Yes No Unknown  Yes No Unknown | | |
| 1. What steps are taken to prevent contamination or to decontaminate the semen packaging? | | | | | | | |
| 1. Double layer of clean, disposable packaging used to protect semen inside an insulated cooler 2. Packaging is decontaminated with disinfectant or other methods before entering the facility | | | | | Yes No Unknown  Yes No Unknown | | |
| 1. Did anything related to semen delivery change in the 3 months prior to the outbreak? | | | | | | | |
| Yes *(explain)*  No | | | | | | | |
| **SEMEN DELIVERY PRACTICES OBSERVATIONS:**   * *An on-farm employee picks up semen at a drop site about 6 miles from Bear Grove sow farm. The semen is placed at the drop site on Sunday, Tuesday, and Thursday afternoons between 2:00-3:00pm. It is picked up and taken to the farm within a few hours.* * *The semen courier also drops off semen for several other production systems at the same drop site. None of the other farms had similar PRRSV isolates to Bear Grove. (>98.5% homology)* * *The employee that picks up the semen will hold the outer bag open while an employee on the inside of the farm sprays disinfectant inside and then takes only the inside bag through a pass-through window.* * *The employee always wears disposable boots and follows disinfection protocols when entering semen into the facility.* | | | | | | | |
|  | | | | | | | |
| **Likelihood that semen was responsible pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** | | | | | | | |
| **Brief justification for risk assessment:**  *All boar studs remain PRRSV negative and no other swine farms that receive semen from Pork Innovation Genetics have recently tested positive for a similar isolate as Bear Grove.* | | | | | | | |
| **Follow-up and/or biosecurity recommendations:**  *To further reduce the risk of semen delivery leading to a future outbreak, it would be smart to delay use of semen until a PCR result is received and disinfect the semen delivery vehicle after each delivery event.* | | | | | | | |

*Considerations when assessing risk for* ***semen entry****:*

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Health status of swine sites to which carrying agent was exposed*
  + *Regional swine density*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Entry of carrying agent delayed until test results received*
  + *Semen entry biosecurity procedures effective and complied with*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Carrying agent has opportunity to contact swine*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with inseminated animals or other contact with potential carrying agents*
  + *An operational connection with a farm that has the similar sequence homology or same pathogen*

1. BREEDING REPLACEMENTS ENTERED INTO HERD

Consider the following carrying agents:

* Gilt
* Gilt truck/trailer, animal compartment
* Gilt truck/trailer, non-animal compartment
* Cab of gilt truck
* Cutting boards and other devices used to move gilts
* Gilt truck driver

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| **FREQUENCY** | |
| How many times during the investigation period were gilts delivered to the farm? | *1 time* |
| Dates of delivery (if possible): | *September 15th* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connections |
| *N/A* |  |  |  |  |
|  |  |  |  |  |

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| **BREEDING REPLACEMENT SOURCE** |
| 1. How many breeding herd sources are breeding replacements obtained from? |
| *1 source* |
| 1. What is the name(s) of the replacement gilt source(s) used during the investigation period? |
| *Gilt Source International* |
| 1. What is the names of the premises(s) from which gilts were delivered during the investigation period? (specify, if different than above) |
| *Combs Isolation* |
| 1. Did the source of replacement gilts change in the 3 months prior to the outbreak? |
| Yes (describe in observations)  No |
| **BREEDING REPLACEMENT SOURCE OBSERVATIONS:**   * *Gilt Source International has been supplying replacement gilts to Bear Grove Sow Farm for nearly 3 years.* * *Replacement gilts of multiple ages are delivered to an off-site GDU/Isolation unit ever 126 days by Gilt Source International.* * *The GDU is located approximately 14 miles away and is managed by Luke Combs.* |

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| **BREEDING REPLACEMENT ACCLIMATION & ISOLATION** | |
| 1. Are breeding replacements acclimated to PATHOGEN by exposure to any of the following prior to entry into the breeding herd? | |
| a. Live animals actively shedding  b. Feedback of feces or other tissues from animals actively shedding  c. Serum from animals actively shedding  d. Commercially available modified live vaccine  e. Other commercially available vaccines  f. Killed autogenous vaccine  g. Other vaccines or source of live virus | Yes No  Yes No  Yes No  Yes No  Yes No  Yes No  Yes No |
| 1. After the last exposure to acclimate breeding replacements how many days pass before they are entered into the breeding herd? (if no prior exposure, write N/A) | |
| *N/A* | |
| 1. How many days are breeding replacements isolated at another premises (off-site) before they are hauled to this premises? | |
| *30 days* | |
| 1. How many days are breeding replacements isolated at this premises (on-site) before they are entered into the breeding herd? | |
| *0 days* | |
| 1. Are breeding replacements naive to PATHOGEN at entry or, if acclimated, before they are acclimated? | |
| Yes  No *(describe in observations)* | |
| 1. Prior to entry into the breeding herd, how are breeding replacements tested for PATHOGEN? | |
| a. PCR on serum Yes No  b. PCR on oral fluids Yes No  c. ELISA on serum Yes No  d. ELISA on oral fluids Yes No  e. Other *(describe in observations)* Yes No | |
| 1. Did anything related to replacement animal acclimation change in the 3 months prior to the outbreak? | |
| Yes *(describe in observations)*  No | |
| **BREEDING REPLACEMENT HEALTH STATUS OBSERVATIONS:**   * *In recent history, the farm has been PRRSV category IV (Negative), so acclimation was not performed and naïve gilts were introduced into the herd.* * *Gilts are tested for PRRSV vis PCR and ELISA within 48 hours of arrival and again 3 weeks later, but they are not tested again immediately prior to their entry into the sow herd.* * *Replacement gilts are isolated for a minimum of 4 weeks prior to entry, but the last group to enter the herd will be in the GDU/Isolation unit for 16 weeks prior to entry into the herd.* * *New gilts were moved from the GDU to the sow herd on September 15th.* * *These gilts were not tested for PRRSV immediately prior to entry into the sow herd, but they tested negative for PRRSV after the sow herd broke.* | |

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| **BREEDING REPLACEMENT TRAILER BIOSECURITY** |
| 1. How is the trailer(s)/vehicle(s) that hauls breeding replacements to this premises owned and managed? |
| Dedicated to this premises only *(Skip to Question 14)*  Managed by the producer or production system *(Skip to Question 14)*  Contracted to a 3rd party that hauls exclusively for this production system  Contracted to a 3rd party that hauls swine for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *Northern Transport Services* |
| 1. From how many other swine premises may swine be hauled, to or from, by the same trailer(s)/vehicle(s) used to transport breeding replacements? |
| *Unknown* |
| 1. Is the trailer(s)/vehicle(s) that haul breeding replacements to this premises allowed to haul other swine? |
| Yes *(describe in observations)*  No  Unknown |
| 1. Are PATHOGEN positive animals every knowingly hauled on the trailer(s)/vehicle(s) that transport breeding replacements to this premises? |
| Yes  No  Unknown |
| 1. Are environmental swabs collected from the trailer(s)/vehicle(s) that transport breeding replacements to this premises and tested for PATHOGEN by PCR? |
| Always  Sometimes  Never |
| 1. What sanitation and decontamination procedures are used on the trailer/vehicle(s) that haul breeding replacements to this premises? |
| a. Always washed between every load Yes No Unknown  b. Detergent is used during washing Yes No Unknown  c. Disinfectant is used during washing Yes No Unknown  d. Always allowed to dry naturally before Yes No Unknown  next load  e. Always dried using a TADD system Yes No Unknown  f. Minimum of 24 hours downtime is allowed Yes No Unknown  between loads   1. Disinfectant is used to decontaminate the Yes No Unknown   floor mats, steering wheel, etc. inside vehicle |
| 1. What biosecurity procedures, training and auditing are done for the truck washes where trailer/vehicle(s) that haul breeding replacements are washed? |
| a. SOPs are written in all languages spoken as Yes No Unknown  first language by employees  b. New employees are formally trained Yes No Unknown  c. All employees are periodically retrained Yes No Unknown  d. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a 3rd party  e. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a party affiliated with the  producer or production system  f. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a party affiliated with the  truck wash |
| 1. Did anything change regarding trailer sanitation in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| 1. What biosecurity procedures are followed by the driver of the trailer/vehicle(s) that hauls breeding replacements to this premises? |
| a. Wears disposable boots or changes boots Yes No Unknown  between sites  b. Wears clean or disposable coveralls on-site Yes No Unknown  c. Restricted from entering the chute or buildings Yes No Unknown |
| 1. Are cutting boards, whips and other tools used by the driver cleaned and disinfected prior to loading the breeding replacements? |
| Yes  No  Unknown |
| 1. Did anything change regarding the breeding replacement driver in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **BREEDING REPLACEMENT TRAILER BIOSECURITY OBSERVATIONS:**   * *The trailers that transport breeding replacements are used to transport swine to and from many other sites.* * *The trailers are reserved for PRRSV negative breeding replacements and sows only.* * *Although trailers are used to haul swine from other production systems, it is unlikely that they came in contact with PRRSV positive animals.* * *The trailer is washed, disinfected with Synergize, and dried completely before it hauls another load of pigs.* * It was confirmed by Northern Transport services that all equipment was running properly and each trailer was adequately disinfected to the best of their ability. |

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| **BREEDING REPLACEMENT UNLOADING PROCEDURE** | |
| 1. How is the unloading area for breeding replacements designed? | |
| a. Bumper-to-bumper transfer done off the Yes No Unknown  premises  b. Bumper-to-bumper transfer done on the Yes No Unknown  premises  c. Separate, unattached unloading area on the Yes No Unknown  premises  d .Attached to buildings housing swine Yes No Unknown  e. Chute is washed after every load Yes No Unknown  f. Chute is disinfected after every load Yes No Unknown | |
| **BREEDING REPLACEMENT UNLOADING PROCEDURE OBSERVATIONS:**   * *Trailers owned by Northern Transport Services never come in contact with the premises.* * *Bear Grove Sow Farm uses a transfer site located ¾ of a mile North of the premises.* * *Northern Transport Services arrives at the transfer site and uses the west chute to load animals into the holding area.* * *A Bear Grove employee hauls a trailer to the transfer site and backs up the east chute to load the gilts. The gilts are then taken to the sow farm.* * *The gilts are loaded into the farm through an attached chute. The chute is washed and disinfected after each load in or load out event.* * *The on-farm employee wears coveralls and disposable boots while picking up and unloading the gilts.* | |
|  | |
| **Likelihood that breeding replacements were responsible pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Breeding replacements were only delivered to the premises once during the investigation period. The animals were tested and verified PRRSV negative before being delivered, and transport biosecurity was acceptable. Although trailers are used to haul swine from other production systems, it is unlikely that the trailer used to deliver gilts was carrying the virus.* |
| **Follow-up and/or biosecurity recommendations:**  *It would be beneficial to require that Northern Transport Services gives all trailers at least 24 hours of downtime between loads.* |

*Considerations when assessing risk for* ***breeding replacement entry****:*

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Health status of swine sites to which carrying agent was exposed or was sourced from*
  + *Transport vehicle procedures, management, and routing*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Breeding replacements isolated or tested prior to entry*
  + *Transport vehicle biosecurity protocol*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Lines of separation or buffer zones*
  + *Carrying agent has opportunity to contact swine*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with breeding replacement entry*
  + *An operational connection with a farm that has the similar sequence homology or same pathogen*

1. CULL SOWS HAULED FROM FARM

Consider the following carrying agents:

* Cull sow truck/trailer, animal compartment
* Cull sow truck/trailer, non-animal compartment
* Cab of cull sow truck
* Cutting boards and other devices used to move cull sows
* Cull sow truck driver

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| **FREQUENCY** | |
| How many times during the investigation period were cull sows removed from the herd? | *2 times* |
| Dates of removal (if possible): | *September 10th and September 24th* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
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| **CULL SOW MARKET** |
| 1. What is the names of the market(s) to which culls were sent during the investigation period? |
| *Premium Protein, Inc.* |
| 1. Did the market(s)/location(s) to which cull sows were sent change in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **CULL SOW MARKET OBSERVATIONS:**   * *An on-farm employee hauls sows to Premium Protein, Inc. cull sow market every two weeks.* * *The cull sow market is located approximately 12 miles southwest of Bear Grove sow farm.* * *Sows have been marketed to Premium Protein, Inc. since 2003.* |

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| **CULL SOW TRAILER BIOSECURITY** |
| 1. How is the trailer(s)/vehicle(s) that haul cull sows from this premises owned and managed? |
| Dedicated to this premises only *(Skip to Question 5)*  Managed by the producer or production system *(Skip to Question 5)*  Contracted to a 3rd party that hauls exclusively for this production system  Contracted to a 3rd party that hauls swine for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *N/A* |
| 1. From how many other swine premises may swine be hauled, to or from, by the same trailer(s)/vehicle(s) used to transport cull sows? |
| 0 premises |
| 1. Is the trailer(s)/vehicle(s) that hauls cull sows from this premises allowed to haul other swine? |
| Yes *(describe in observations)*  No  Unknown |
| 1. Are PATHOGEN positive animals every knowingly hauled on the trailer(s)/vehicle(s) that transport cull sows from this premises? |
| Yes  No  Unknown |
| 1. Are environmental swabs collected from the trailer(s) / vehicle(s) that transport cull sows from this premises and tested for PATHOGEN by PCR? |
| Always  Sometimes  Never |
| 1. What sanitation and decontamination procedures are used on the trailer/vehicle(s) that haul cull sows from this premises? |
| a. Always washed between every load Yes No Unknown  b. Detergent is used during washing Yes No Unknown  c. Disinfectant is used during washing Yes No Unknown  d. Always allowed to dry naturally before next Yes No Unknown  load  e. Always dried using a TADD system Yes No Unknown  f. Minimum of 24 hours downtime is allowed Yes No Unknown  between loads  g. Disinfectant is used to decontaminate the floor Yes No Unknown  mats, steering wheel, etc. inside vehicle |
| 1. What biosecurity procedures, training and auditing are done for the truck washes where trailer/vehicle(s) that haul cull sows are washed? |
| a. SOPs are written in all languages spoken as Yes No Unknown  first language by employees  b. New employees are formally trained Yes No Unknown  c. All employees are periodically retrained Yes No Unknown  d. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a 3rd party  e. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a party affiliated with the  producer or production system  f. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a party affiliated with the  truck wash |
| 1. Did anything change regarding trailer sanitation in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| 1. What biosecurity procedures are followed by the driver of the trailer / vehicle(s) that haul cull sows from this premises? |
| a. Wears disposable boots or changes boots Yes No Unknown  between sites  b. Wears clean or disposable coveralls on-site Yes No Unknown  c. Restricted from entering the chute or Yes No Unknown  buildings  d. Changes boots at or wears disposable boots Yes No Unknown  that are removed before re-entering the  vehicle at the slaughter plant or collection point? |
| 1. Are cutting boards, whips and other tools used by the driver cleaned and disinfected prior to loading the cull sows? |
| Yes  No  Unknown |
| 1. Did anything change regarding the cull sow driver in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **CULL SOW TRAILER BIOSECURITY OBSERVATIONS:**   * *Cull sows are hauled from the premises using the farm’s own livestock trailer.* * *Sows are loaded onto the trailer through the chute and are taken directly to the cull sow market.* * *Bear Grove’s livestock trailer is also used for transfer of other animals coming to the premises.* * *The livestock trailer is washed and disinfected immediately following a cull sow delivery, however it returns to the premises before drying completely.* |

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| **CULL SOW UNLOADING PROCEDURE** |
| 1. How is the unloading area for cull sows designed? |
| a. Bumper-to-bumper transfer done off the Yes No Unknown  premises  b. Bumper-to-bumper transfer done on the Yes No Unknown  premises  c. Separate, unattached unloading area on the Yes No Unknown  premises  d .Attached to buildings housing swine Yes No Unknown  e. Chute is washed after every load Yes No Unknown  f. Chute is disinfected after every load Yes No Unknown |
| **CULL SOW UNLOADING PROCEDURE OBSERVATIONS:**   * *At the cull sow market, the trailer is backed up to a chute and the sows enter a holding area. The on-farm employee wears disposable boots when exiting the vehicle.* * *The chute through which cull sows are loaded is only washed once per day. It is disinfected with water and Synergize, but the employees not that the chute is usually dirty upon arrival.* * *Many PRRSV positive sow farms also haul their sows to the same market.* |

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| **Likelihood that cull sows were responsible pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Although biosecurity protocols are in place, the trailer used to haul cull sows has many opportunities to come in contact with PRRSV at the cull sow market. The employee that hauls cull sows does not change clothes and is allowed to reenter the facilities. The trailer has a high likelihood of coming into contact with PRRSV and is not completely dried when it returns to the premises.* |
| **Follow-up and/or biosecurity recommendations:**  *It would be helpful for Bear Grove to purchase a second livestock trailer and designate it for the hauling of cull sows and other loads that have a high likelihood of coming into contact with PRRSV. The same trailer should not be used to transfer weaned pigs and replacement females. The employee who hauls cull sows should have to shower out of the farm, obey a clean-dirty line when loading, and not reenter the farm after delivery to the market. The trailer should be allowed to dry completely before returning to Bear Grove sow farm.* |

*Considerations when assessing risk for* ***hauling cull sows:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Health status of swine sites to which carrying agent was exposed or was transported to*
  + *Transport vehicle procedures, management, and routing*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *On-farm biosecurity procedures in place to decontaminate/disinfect carrying agents (i.e. chutes washed between loads, etc.)*
  + *Transport vehicle biosecurity protocol*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Lines of separation or buffer zones*
  + *Carrying agent has opportunity to contact swine*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with the hauling of cull sows*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### WEANED PIGS HAULED FROM FARM

Consider the following carrying agents:

* Weaned pig truck/trailer, animal compartment
* Weaned pig truck/trailer, non-animal compartment
* Cab of weaned pig truck, and truck driver
* Cutting boards and other devices used to move weaned pigs

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| **FREQUENCY** | |
| How many times during the investigation period were weaned pigs hauled from the farm? | *8 times* |
| Dates of removal (if possible): | *All Mondays and Thursdays* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
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| **WEANED PIGS DESTINATION** |
| 1. What is the name(s) of the premises(s) to which weaned pigs were delivered during the investigation period? |
| *Bear Grove Nursery, Rock Valley Nursery* |
| 1. Were any of the premises(s) to which weaned pigs were delivered during the investigation period PATHOGEN positive? |
| Yes *(describe in observations)*  No  Unknown |
| **WEANED PIGS DESTINATION OBSERVATIONS:**   * *Weaned pigs from Bear Grove sow farm were used to fill Bear Grove’s own nursery as well as a Rock Valley nursery during the four weeks prior to the observation of clinical signs.* * *Monthly diagnostic testing is performed at both of the aforementioned nurseries, with the most recent samplings coming back PRRSV negative.* * *The nurseries were once again tested for PRRSV by oral fluid PCR and remained negative following the sow farm outbreak.* |

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| **WEANED PIGS TRAILER BIOSECURITY** |
| 1. How is the trailer(s) / vehicle(s) that hauls weaned pigs from this premises owned and managed? |
| Dedicated to this premises only *(Skip to Question 5)*  Managed by the producer or production system *(Skip to Question 5)*  Contracted to a 3rd party that hauls exclusively for this production system  Contracted to a 3rd party that hauls swine for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *Northern Transport Services* |
| 1. From how many other swine premises may swine be hauled, to or from, by the same trailer(s)/vehicle(s) used to transport weaned pigs? |
| *20 premises (approximately)* |
| 1. Is the trailer(s)/vehicle(s) that hauls weaned pigs from this premises allowed to haul other swine? |
| Yes *(describe in observations)*  No  Unknown |
| 1. Are PATHOGEN positive animals every knowingly hauled on the trailer(s)/vehicle(s) that transport weaned pigs from this premises? |
| Yes  No  Unknown |
| 1. Are environmental swabs collected from the trailer(s)/vehicle(s) that transport weaned pigs from this premises and tested for PATHOGEN by PCR? |
| Always  Sometimes  Never |
| 1. What sanitation and decontamination procedures are used on the trailer/vehicle(s) that haul weaned pigs from this premises? |
| a. Always washed between every load Yes No Unknown  b. Detergent is used during washing Yes No Unknown  c. Disinfectant is used during washing Yes No Unknown  d. Always allowed to dry naturally before next Yes No Unknown  load  e. Always dried using a TADD system Yes No Unknown  f. Minimum of 24 hours downtime between Yes No Unknown  loads  g. Disinfectant is used to decontaminate the floor Yes No Unknown  mats, steering wheel, etc. inside vehicle |
| 1. What biosecurity procedures, training and auditing are done for the truck washes where trailer/vehicle(s) that haul weaned pigs are washed? |
| a. SOPs are written in all languages spoken as Yes No Unknown  first language by employees  b. New employees are formally trained Yes No Unknown  c. All employees are periodically retrained Yes No Unknown  d. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a 3rd party  e. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a party affiliated with the  producer or production system  f. Compliance with biosecurity procedures are Yes No Unknown  formally audited by a party affiliated with the  truck wash |
| 1. Did anything change regarding trailer sanitation in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| 1. What biosecurity procedures are followed by the driver of the trailer/vehicle(s) that hauls weaned pigs from this premises? |
| a. Wears disposable boots or changes boots Yes No Unknown  between sites  b. Wears clean or disposable coveralls on-site Yes No Unknown  c. Restricted from entering the chute or Yes No Unknown  buildings |
| 1. Are cutting boards, whips and other tools used by the driver cleaned and disinfected prior to loading the weaned pigs? |
| Yes  No  Unknown |
| 1. Did anything change regarding the weaned pig driver in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **WEANED PIGS TRAILER BIOSECURITY OBSERVATIONS:**   * *The driver wears seemingly clean coveralls and disposable boots.* * *The driver typically uses cutting boards and rattle paddles to load pigs. According to the trucking company, they are washed along with the trailer after every load.* * *New disposable boots are worn and the driver does not enter the barn.* * *The trailer is washed, disinfected, and dried in a TADD unit at Northern Transport Services truck wash prior to hauling the next load.* * *Bear Grove has used Northern Transport Services to haul pigs for numerous years and they have a great reputation of thoroughly disinfecting trailers and segregating trailers used to haul PRRSV positive animals.* |

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| **WEANED PIGS UNLOADING PROCEDURE** |
| 1. How is the unloading area for weaned pigs designed? |
| a. Bumper-to-bumper transfer done off the Yes No Unknown  premises  b. Bumper-to-bumper transfer done on the Yes No Unknown  premises  c. Separate, unattached unloading area on the Yes No Unknown  premises  d .Attached to buildings housing swine Yes No Unknown  e. Chute is washed after every load Yes No Unknown  f. Chute is disinfected after every load Yes No Unknown |
| **WEANED PIGS UNLOADING PROCEDURE OBSERVATIONS:**   * *On-farm employees begin weaning pigs at 5:30am on Monday and Thursday mornings. The pigs are loaded onto Bear Grove’s livestock trailer and hauled to the transfer site.* * *Pigs are unloading into the holding area from the east chute.* * *Drivers for Northern Transport Services arrive at the transfer site at approximately 8:30am. The tractor/trailer is backed up to the west chute and loaded with weaned pigs.* * *The driver then hauls the weaned pigs to the appropriate nursery or wean-to-finisher.* |

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| **Likelihood that weaned pigs were responsible pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Although hauling weaned pigs is a common occurrence, there is a high level of consistency and biosecurity in the process. The manager verified that Northern Transport Services’ truck and trailers always arrive clean and disinfected.* |
| **Follow-up and/or biosecurity recommendations:**  *It would be beneficial to require that Northern Transport Services gives all trailers at least 24 hours of downtime between loads.* |

*Considerations when assessing risk for* ***hauling weaned pigs****:*

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Health status of swine sites to which carrying agent was exposed or was transported to*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *On-farm biosecurity procedures in place to decontaminate/disinfect carrying agents (i.e. chutes washed between loads, etc.)*
  + *Transport vehicle biosecurity protocol*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Lines of separation or buffer zones*
  + *Carrying agent has opportunity to contact swine*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with the hauling of weaned pigs*
  + *An operational connection with a farm that has the similar sequence homology or same pathogen*

## Vehicles/deliveries

##### REMOVAL OF DEAD PIGS FROM FARM

Consider the following agents:

* Rendering truck
* Rendering truck driver

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| **FREQUENCY** | |
| How many times during the investigation period did rendering trucks remove dead pigs from the farm? | *0 times* |
| Dates of removal (if possible): | *N/A* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
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| **DEAD ANIMAL REMOVAL FROM BARNS** |
| 1. How often are dead animals removed from the barn: |
| Multiple times a day  Once a day  Every other day  Few times a week  Weekly  Other *(specify in observations)* |
| 1. What are the standard operating procedures for removing dead animals from swine barns at this premises? |
| *Dead animals are removed from the barns once per day at the end of work hours. Employees inside the barn place animals just outside the doors of the barns without stepping outside. One employee showers out of the facility and uses Bear Grove’s skid loader to pick up the animals. Carcasses are composted in an enclosed building on the north end of the premises. All employees then shower out of the farm and do not return until the next work day.* |
| **DEAD ANIMAL REMOVAL FROM BARNS OBSERVATIONS:**   * *The employees treat the doors outside as a clean-dirty line. The employees inside do not cross to go outside and the employee running the skid loader does not enter the building again.* * *Although the skid loader is only used for transporting dead animals to the compost pile, it is not regularly disinfected.* * *After transporting dead animals and animal material to the compost pile, the employee uses the skid loader to cover it with corn stocks.* |

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| **DEAD ANIMAL ON-SITE DISPOSAL** |
| 1. Are dead animals disposed of on-site? |
| No  Yes, buried  Yes, incinerated  Yes, composted  Yes, other *(specify in observations)* |
| 1. Where is the on-site dead disposal located relative to swine barns and how is it designed? |
| *The on-site compost pile is located on the north end of the premise approximately 40 yards from the nearest barn. It is designed with concrete walls and a steel roof.* |
| 1. Is transport of dead animals to on-site disposal site or rendering pick-up site routed to avoid cross contaminate of other pathways (people and other vehicle traffic)? |
| Yes  No |
| **DEAD ANIMAL ON-SITE DISPOSAL OBSERVATIONS:**   * *The compost pile is completely enclosed and wild animals and birds are not frequently observed inside.* * *The skid loader does cross the same path as feed and supply trucks.* * *If the employee transporting dead animal material happens to see tracks from any other traffic, they do their best to avoid crossing paths.* |

***(Skip questions 6 through 11 if a rendering service is not used.)***

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| **DEAD ANIMAL RENDERING TRUCK** |
| 1. How is the rendering truck managed? |
| Dedicated to this premises only  Managed by the producer of production system  Contracted to a 3rd party that hauls exclusively for the producer or production system  Contracted to a 3rd party that hauls for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
|  |
| 1. Were there any changes to how the rendering vehicles were managed in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No  Unknown |
| 1. Were there any changes regarding the rendering vehicle driver in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No  Unknown |
| **DEAD ANIMAL RENDERING TRUCK OBSERVATIONS:** |

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| **RENDERING TRUCK BIOSECURITY** |
| 1. What procedures are followed to prevent pathogen from a contaminated rendering truck from being transmitted to the herd? |
| a. Dead animal pick-up site is more than 100 yards Yes No  from swine buildings  b. Dead animals are stored in an enclosed container Yes No  c. Dead storage area is enclosed by a fence or solid structure Yes No  d. Equipment used to move dead animals from barns to the Yes No  rendering collection site is dedicated to this premises  e. Equipment used to move dead animals to the collection Yes No  site does not cross paths with the rendering truck  f. People and vehicle traffic is purposely routed to avoid Yes No  crossing paths with rendering trucks on the premises  g. Employees are not allowed to re-enter swine barns after Yes No  moving deads to the collection site |
| 1. What procedures are in place to prevent pathogen from a contaminated rendering truck driver from being transmitted to the herd? |
| a. Not allowed to leave truck Yes No Unknown  b. Wears disposable boots or changes boots Yes No Unknown  between premises |
| **RENDERING TRUCK BIOSECURITY OBSERVATIONS:** |

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| **Likelihood that dead animal removal was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Dead animals are disposed of on-site, eliminating the need for rendering services. This greatly reduces the risk that a PRRSV outbreak would be caused by dead animal removal. Additionally, employees do not reenter the barn each day after removing the animals. The compost pile is enclosed within a building, limiting access to animals who could spread the virus.* |
| **Follow-up and/or biosecurity recommendations:**  *Disinfection of the skid loader periodically may further reduce the risk of dead animal removal causing a PRRSV outbreak.* |

*Considerations when assessing risk for* ***removing dead animals****:*

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Dead animals picked up by rendering truck and not disposed of on-site*
  + *Regional swine density and potential to contact pathogen at location(s) to which carrying agent was exposed*
  + *Transport vehicle biosecurity procedures, routing, and management*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. employees do not re-enter barn after handling dead animals, etc.)*
  + *Transport vehicle biosecurity protocol*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Lines of separation or buffer zones*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with the removal of dead animals*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### FEED OR FEED INGREDIENTS DELIVERED TO FARM

Consider the following agents:

* Feed
* Feed truck or wagon
* Tools and equipment used by feed truck driver
* Feed truck driver

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| **FREQUENCY** | |
| How many times during the investigation period were feed or feed ingredients delivered to the farm? | *8 times* |
| Dates of delivery (if possible): | *All Mondays and Thursdays* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| N/A |  |  |  |  |
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| **FEED MILL** |
| 1. Is there a feed mill on the premises? |
| Yes  No |
| 1. What is the name(s) of the feed mill(s) from which feed was sourced in the four weeks prior to the outbreak? |
| *Bear Grove Feed Mill* |
| 1. Does the feed mill have written biosecurity measures in place to reduce the risk of feed becoming contaminated with PATHOGEN? |
| Yes  No  Unknown |
| **FEED MILL OBSERVATIONS:**   * *The feed mill is approximately 15 miles away and has written biosecurity SOP’s.* |

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| **FEED DELIVERY PRACTICES** |
| 1. How is the feed delivery vehicle managed? |
| Dedicated to this premises only *(Skip to Question 6)*  Managed by the producer of production system *(Skip to Question 6)*  Contracted to a 3rd party that hauls exclusively for the producer or production system  Contracted to a 3rd party that hauls for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *N/A* |
| 1. Are feed or feed ingredient deliveries scheduled or routed according to the PATHOGEN status of the premises? |
| Yes  No  Unknown |
| 1. Are there any downtime requirements for the feed or feed ingredient delivery vehicle before it delivers feed to this premises? |
| Yes  No |
| 1. Were there any changes to how feed delivery was managed in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No  Unknown |
| **FEED DELIVERY PRACTICES OBSERVATIONS:**   * *Feed is delivered to Bear Grove sow farm on Monday and Thursday.* * *The same delivery truck is used to transport feed to Bear Grove’s nursery and finishers, as well. Feed is delivered to the nurseries on Tuesday and the finishers on Friday.* * *The nursery and finishers were negative for PRRSV upon testing at the time of the Bear Grove sow farm outbreak.* |

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| **ON-SITE FEED DELIVERY VEHICLE BIOSECURITY** |
| 1. What procedures are followed to prevent virus from a contaminated feed delivery vehicle or driver from being transmitted to the herd? |
| a. Driver is not allowed inside buildings Yes No  b. Driver wears disposable boots or changes boots between Yes No  premises  c. People and vehicle traffic are purposely routed to avoid Yes No  crossing paths with feed delivery vehicles on the premises |
| **ON-SITE FEED DELIVERY VEHICLE BIOSECURITY OBSERVATIONS:**   * *The feed truck enters from the south driveway and drives around the south side of the premise to reach the bins on the west side of the barns. The truck fills the bins, backs up, turns around and follows the same path out of the farm.* * *The delivery vehicle crosses paths with supply trucks and other miscelaneous traffic. The driver tries to avoid the path of the skidloader and employee vehicles.* * *The vehicle and employee also come in contact with several other swine sites in the production system.* * *There is at least 24 hours of downtime before the feed truck returns back to Bear Grove.* * *Additionally, the feed mill is located in a swine dense area with positive sites around it, as well.* |

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| **FEED OR FEED INGREDIENT BIOSECURITY** |
| 1. What procedures are followed to reduce the risk of contaminated feed or feed ingredients transmitting the virus to the herd? |
| a. Feed is pelleted or heat treated Yes No  b. Chemical or antimicrobial decontamination Yes No  (formaldehyde, etc.)  c. No dried distillers grains (DDGS) in diets Yes No  d. No porcine derived feed ingredients in diets Yes No  e. No animal derived feed ingredients in diets Yes No  f. Spilled feed is sometimes fed to pigs on the premises Yes No |
| 1. How frequently do wild animals have access to feed (i.e. open bags, bin covers left open, spillage that is fed to pigs, etc.)? |
| a. Non-migratory birds Always Sometimes Never  b. Migratory birds Always Sometimes Never  c. Rodents Always Sometimes Never  d. Wild animals (raccoons, coyotes, etc.) Always Sometimes Never |
| 1. Were there any changes to the types of diets, feed ingredients, etc. in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **FEED OR FEED INGREDIENT BIOSECURITY OBSERVATIONS:**   * *Spilled feed is never fed to pigs, but sometimes feed bin covers are left open by the feed delivery driver.* * *Non-migratory birds are seen around the feed bins on a regular basis.* * *Measures are not taken to inactivate virus that may be found in the feed.* |

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| **Likelihood that feed or feed ingredient delivery was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Feed is not treated or handled to reduce the risk of PRRSV contamination, and delivery vehicles are not closely managed to avoid crossing paths with the virus. It is also known that the first clinical signs were observed on the end of the barn near the feed bins, but this does not necessarily suggest it was caused by feed.* |
| **Follow-up and/or biosecurity recommendations:**  *It would be beneficial to more closely manage feed deliveries and delivery truck biosecurity. A feed treatment process could also be implemented.* |

*Considerations when assessing risk for* ***feed or feed ingredient delivery:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Feed mill biosecurity procedures*
  + *Transport vehicle biosecurity procedures, routing, and management*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. feed treated, bins closed at all times, etc.)*
  + *Transport vehicle biosecurity protocol*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with the feed delivery or other contact with potential carrying agent*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### PROPANE AND FUEL DELIVERED TO FARM

Consider the following carrying agents:

* Propane or fuel truck
* Propane or fuel truck driver

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| **FREQUENCY** | |
| How many times during the investigation period was propane and/or fuel delivered to the farm? | *1 time* |
| Dates of delivery (if possible): | *October 1st* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| N/A |  |  |  |  |
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| **PROPANE AND FUEL DELIVERY PRACTICES** |
| 1. How is the propane/fuel delivery vehicle managed? |
| Dedicated to this premises only  Managed by the producer of production system  Contracted to a 3rd party that hauls exclusively for the producer or production system  Contracted to a 3rd party that hauls for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *Rockwell Energy Company* |
| 1. What procedures are followed to prevent pathogen from a contaminated propane or fuel delivery vehicle or driver from being transmitted to the herd? |
| a. Tanks located more than 50 yards from swine barns Yes No  b. Driver not allowed inside buildings Yes No  c. Driver wears disposable boots or changes boots between Yes No  premises  d. People and vehicle traffic is purposely routed to avoid Yes No  crossing paths with propane and fuel truck on the premises |
| 1. Were there any changes to how propane/fuel delivery was managed in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **PROPANE AND FUEL DELIVERY PRACTICES OBSERVATIONS:**   * *The delivery driver enters through the north driveway and fills the propane tank which is found near the employee parking area.* * *The driver wears disposable boots and does not enter or come near the barns.* * *An on-farm employee picks up diesel for the skid loader at a gas station in town. The diesel can is sprayed with disinfectant before it returns to the premises.* * *The farm manager cannot recall the last time that diesel was purchased, but it is unlikely that the diesel can or employee would contact PRRSV while picking up fuel.* |

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| **Likelihood that propane and/or fuel delivery was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Propane is only delivered once each month and there are no known connections between the delivery and the PRRSV outbreak.* |
| **Follow-up and/or biosecurity recommendations:**  *Due to the layout of the premises, it would be difficult to route traffic to avoid the delivery truck crossing paths with other vehicles. Continue to pay close attention to the biosecurity protocols followed by the driver to keep risk low.* |

*Considerations when assessing risk for* ***propane and fuel delivery:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Transport vehicle biosecurity procedures, routing, and management*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. delivery personnel required to wear disposable boots, routing of premises traffic, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with the propane and fuel delivery*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### GARBAGE COLLECTION FROM FARM

Consider the following carrying agents:

* Garbage truck
* Garbage truck driver

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| **FREQUENCY** | |
| How many times during the investigation period was garbage collected from the farm? | *4 times* |
| Dates of collection (if possible): | *Wednesday or Thursday of each week* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
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| **GARBAGE COLLECTION PRACTICES** |
| 1. How is the garbage truck managed? |
| Dedicated to this premises only  Managed by the producer of production system  Contracted to a 3rd party that hauls exclusively for the producer or production system  Contracted to a 3rd party that hauls for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *Midwest Plains Sanitation* |
| 1. What procedures are followed to prevent pathogen from a contaminated garbage truck or driver from being transmitted to the herd? |
| a. Garbage pick-up is located more than 50 yards from barns Yes No  b. Driver not allowed to enter buildings Yes No  c. Driver wears disposable boots or changes boots between Yes No  premises  d. People and vehicle traffic is purposely routes to avoid Yes No  crossing paths with garbage trucks on the premises |
| 1. Were there any changes to how garbage removal was managed in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **GARBAGE COLLECTION PRACTICES OBSERVATIONS:**   * *Garbage is collected from the dumpster on the northwest end of the front barn.* * *The collector backs up to the dumpster and gets out of the truck to attach it to the truck.* * *Sanitation employees wear disposable boots and do not enter the barns.* * *Midwest Plains Sanitation is a relatively small, local company and the farm manager believes that most other nearby farms are serviced by a larger, statewide company.* |

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| **Likelihood that garbage collection was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Garbage collection has been performed by Midwest Plains Sanitation consistently for several years. Cross traffic around the dumpster is minimal, because employees usually deposit trash from the inside of the barn.* |
| **Follow-up and/or biosecurity recommendations:**  *If the dumpster was housed farther from the barn’s, it could help to lower the risk that pigs are indirectly exposed to virus carried on the truck or other garbage.* |

*Considerations when assessing risk for* ***garbage collection:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Transport vehicle biosecurity procedures, routing, and management*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. delivery personnel required to wear disposable boots, location of garbage collection point, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with garbage collection*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### NEW TOOLS AND SUPPLIES DELIVERED TO FARM

Consider the following carrying agents:

* New tools and supplies
* New tools and supplies delivery vehicle
* New tools and supplies delivery vehicle driver

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| **FREQUENCY** | |
| How many times during the investigation period were new tools and/or supplies delivered the farm? | *4 times* |
| Dates of delivery (if possible): | *All Wednesdays* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
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| **NEW TOOLS AND/OR SUPPLIES DELIVERY PRACTICES** |
| 1. What is the location from which new tools and supplies were sourced during the investigation period? |
| *Swine Systems and Supplies* |
| 1. Were there any changes to new tool / supply delivery in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **NEW TOOLS AND/OR SUPPLIES DELIVERY PRACTICES OBSERVATIONS:**   * *Supplies are delivered by the regional service representative once each week.* * *Swine Systems and Supplies’ headquarters is about 35 miles from Bear Grove sow farm.* * *They have been supplying to Bear Grove sow farm for 6 years.* * *Supplies also enter the premises occasionally when there are visitors. The site veterinarian occasionally brings sampling tools. The farm manager believes that all necessary supplies were already on the farm during the four weeks prior to the outbreak.* |

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| **NEW TOOLS AND/OR SUPPLIES BIOSECURITY** |
| 1. What procedures are in place to decontaminate new tools or supplies? |
| a. Dedicated room with a clearly defined clean and dirty Yes No  side through which tools and supplies are entered  b. Quarantined for a minimum of 24 hours Yes No  c. Decontaminated with disinfectant or other methods Yes No  before entering barns |
| 1. What procedures are in place to prevent pathogen from a contaminated delivery vehicle or driver from being transmitted to the herd? |
| a. All new tools / supplies delivered by on-farm employees Yes No  b. Driver not allowed past a clearly defined clean/dirty line Yes No  c. Driver wears disposable boots or changes boots between Yes No  premises  d. Delivery vehicles are restricted to designated entrances Yes No  or parking areas |
| **NEW TOOLS AND/OR SUPPLIES BIOSECURITY OBSERVATIONS:**   * *All supplies are entered through the D&D room where they are disinfected via a fogger and given at least 24 hours of downtime.* * *The delivery person does not cross the clean/dirty line into the D&D room and wears disposable boots while on the premises.* * *Deliveries from Swine Systems and Supplies are routed according to the health status of each farm. The first deliveries each day are to PRRSV negative breed-to-wean operations.* * *The driver is required to wipe down the steering wheel, floor mats, and pedals with disinfecting wipes each day.* * *The delivery vehicle is washed after each route is completed.* |

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| **Likelihood that new tools and/or supplies delivery was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *New tools and supplies are delivered by a representative who adheres to high standards of biosecurity. The supplies are thoroughly disinfected before they enter the barns. Only new supplies that have never come in contact with swine are used.* |
| **Follow-up and/or biosecurity recommendations:**  *In order to further lessen the risk that delivery of new tools and supplies would cause a disease outbreak, the delivery method could be further improved. Pick-up by an on-farm employee would eliminate any exposure to other swine sites that could be of concern.* |

*Considerations when assessing risk for* ***new tools and supplies:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Source of new tools and supplies*
  + *Transport vehicle procedures, management, and routing*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. disinfected or decontaminated prior to entering farm, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with entry of new tools and supplies*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### TRANSFERRED TOOLS AND SUPPLIES DELIVERED TO FARM

Consider the following carrying agents:

* Transferred tools and supplies
* Transferred tools and supplies delivery vehicle
* Transferred tools and supplies delivery vehicle driver

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| **FREQUENCY** | |
| How many times during the investigation period were transferred tools and/or supplies delivered the farm?z | *0 times* |
| Dates of delivery (if possible): | *N/A* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
|  |  |  |  |  |

***(Skip questions 1 through 5 if tools and supplies are never transferred.)***

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| **PATHOGEN STATUS OF TRANSFERRED TOOLS/SUPPLIES SOURCE** |
| 1. What is the location from which transferred tools and supplies were sourced during the investigation period? |
|  |
| 1. If transferred tools and supplies were sourced from a swine facility, what is the pathogen status of the swine facility? |
| Unknown  Positive  Negative  Naïve |
| **PATHOGEN STATUS OF TRANSFERRED TOOLS/SUPPLIES SOURCE OBSERVATIONS:**   * *N/A* |

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| **TRANSFERRED TOOLS AND SUPPLIES DELIVERY PRACTICES** |
| 1. What procedures are in place to decontaminate transferred tools or supplies? |
| a. Dedicated room with a clearly defined clean and dirty Yes No  side through which tools and supplies are entered  b. Quarantined for a minimum of 24 hours Yes No  c. Decontaminated with disinfectant or other methods Yes No  before entering barns |
| 1. What procedures are in place to prevent pathogen from a contaminated delivery vehicle or driver from being transmitted to the herd? |
| a. All new tools/supplies delivered by on-farm employees Yes No  b. Driver not allowed past a clearly defined clean/dirty line Yes No  c. Driver wears disposable boots or changes boots between Yes No  premises  d. Delivery vehicles are restricted to designated entrances Yes No  or parking areas |
| 1. Were there any changes to transferred tool/supply delivery in the 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **TRANSFERRED TOOLS AND/OR SUPPLIES DELIVERY PRACTICES OBSERVATIONS:**   * *Transferred tools and supplies are not used at this premises.* |

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| **Likelihood that transferred tools and/or supplies delivery was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *No transferred tools and supplies were delivered to the farm.* |
| **Follow-up and/or biosecurity recommendations:**  *Supplies that have been exposed to other swine pose a large risk. Bear Grove should continue to restrict transferred tools from being used.* |

*Considerations when assessing risk for* ***transferred tools and supplies:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Source of transferred tools and supplies*
  + *Transport vehicle procedures, management, and routing*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. disinfected or decontaminated prior to entering farm, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with entry of transferred tools and supplies*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

## people movement

##### ON-FARM EMPLOYEES

Consider the following carrying agents:

* On-farm employee
* On-farm employee electronics
* On-farm employee clothing and footwear
* On-farm employee vehicle

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| **FREQUENCY** | |
| How many times during the investigation period did on-farm employees enter the farm? | *Avg. # of employees entered per day 8.9 .*  *X Daily entries per employee 1.3 .*  *X # of days in the investigation period 28 .*  *=* ***324 times*** |
| Dates of entry (if possible): | *Daily* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
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| **ON-FARM EMPLOYMENT** |
| 1. On an average day, how many people work on the farm? |
| *8 employees* |
| 1. On average, how many times per day do employee exit and re-enter the barns?   *(# of employees x avg. daily frequency)* |
| *8 employees x 1.3 times = 10 times* |
| 1. What is the average annual employee turnover at this premises in the last two years? |
| 44% |
| 1. Are part-time employees used? |
| Weekly *(describe in observations)*  Less than weekly *(describe in observations)*  Never |
| **ON-FARM EMPLOYMENT OBSERVATIONS:**   * *Eight employees enter the farm on each week day. Four employees work every other weekend.* * *On farm employees pick up and deliver semen and haul cull sows.* * *Employees also have to leave the barn to facilitate animal transfer.* * *Employees are not allowed to leave for lunch, therefore they typically bring a meal along with them each morning.* * *All exit and re-entry events are approved by the farm manager for necessary swine movement events only.* |

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| **ON-FARM EMPLOYEE BIOSECURITY PRACTICES** |
| 1. What procedures are followed by employees when entering barns on the premises? |
| a. Shower-in-shower-out Yes No  b. Clearly defined clean / dirty line Yes No  c. Bench entry Yes No  d. Required to wear boots dedicated to the premises Yes No  e. Required to wear clothing dedicated to the premises Yes No  f. Hands must be washed prior to entering barns Yes No |
| 1. Do the sanitation procedures for employees exiting and re-entering the barns differ from those when employees first arrive? |
| Yes *(describe in observations)*  No |
| 1. What biosecurity procedures are in place for personal equipment (e.g. Cell phones, watches, etc.) brought into barns by on-farm employees? |
| a. Equipment may not be entered Yes No  b. Equipment is entered through a dedicated room with a Yes No  clearly defined clean and dirty side  c. Equipment is decontaminated with disinfectant or other Yes No  methods before entering the facilities  d. Equipment is restricted to the office area Yes No |
| 1. Are on-farm employees allowed to perform other swine related activities (i.e. delivering feed, hauling pigs, etc.)? |
| Yes *(describe in observations)*  No |
| 1. What procedures are in place if employees visit or work on other swine premises? |
| a. Not allowed to visit or work on other swine premises Yes No  b. Minimum of overnight downtime is required Yes No  c. Employee must wash vehicle and disinfect interior Yes No  before returning to the premises  d. Members of on-farm employee households are not allowed Yes No  to be employed by other swine production or swine  related operations |
| 1. What are the biosecurity, training and auditing protocols for the premises? |
| a. Standard operating procedures (SOP) are written in Yes No  all language(s) spoken as first language by employees  b. New employees are formally trained Yes No  c. All employees are periodically formally retrained Yes No  d. Compliance with biosecurity procedures is formally audited Yes No  by a party affiliated with the producer or production system  e. Compliance with biosecurity procedures is formally audited Yes No  by an independent 3rd party |
| **ON-FARM EMPLOYEE BIOSECURITY PRACTICES OBSERVATIONS:**   * *Employees are not allowed to visit or work with any other swine, however they often reenter the facilities after hauling cull sows, delivering semen, or facilitating animal transfers.* * *Employee enter the facility each morning and remove their shoes while crossing over a Danish-style bench.* * *The employees then walk with socked feet to the shower room and shower thoroughly.* * *In order to exit the premises, the employees must shower out and perform the reverse bench protocol.* * *In the case of reentry, the same strict protocols are followed.* |

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| **POTENTIAL PATHOGEN EXPOSURE OF ON-FARM EMPLOYEES** |
| 1. Did any on-farm employee visit another swine site in the four weeks prior to the outbreak? |
| Yes *(describe in observations)*  No |
| 1. Does any employee live with an individual that worked on another swine site, visited another swine site, or owns exhibition swine? |
| Yes *(describe in observations)*  No |
| 1. Do any on-farm employees own exhibition swine? |
| Yes *(describe in observations)*  No |
| 1. Are on-farm employee vehicles restricted to designated entrances and/or parking areas? |
| Yes *(describe in observations)*  No |
| **POTENTIAL PATHOGEN EXPOSURE OF ON-FARM EMPLOYEES OBSERVATIONS:**   * *Two of the employees have family members who work on swine sites that are part of different production systems. According to the employees, good biosecurity procedures are followed on the premises they work on.* |

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| **Likelihood that on-farm employee entry was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Employee entry is a very common event on sow farms, making it inherently riskier. Relatives of the farm employees are exposed to swine from other production systems. Additionally, reentry of employees after coming in contact with a semen courier, tractor/trailer, or cull market increase the risk further. Despite these risks, good biosecurity protocols are in place and compliance is good.* |
| **Follow-up and/or biosecurity recommendations:**  *Try to schedule the movement of animals and delivery of semen so that employees do not have to reenter the barn without downtime. When new employees are hired, make it a requirement that they do not have family members who come in contact with swine on a regular basis.* |

*Considerations when assessing risk for* ***on-farm employee entry:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?\**
  + *Location(s) and swine contacted in the previous 3 days*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. shower in/shower out, bench entry, etc.)*
  + *Proper downtime compliance*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
  + *Records are kept*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent (i.e. employee handling pigs)*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with employee entry event, oftentimes in association with faulty biosecurity compliance*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

*\*note: frequent movement on premises allows employees to act as common secondary carrying agent*

##### REPAIR/SERVICE PERSONNEL, WORKING INSIDE BARNS

Consider the following carrying agents:

* Inside equipment repair tools and supplies
* Inside equipment repair vehicle
* Inside equipment repairmen

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| **FREQUENCY** | |
| How many times during the investigation period were repair/service personnel working inside of the barns? | *2 times* |
| Dates of repairs (if possible): | *September 20-21st* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *Tree Hill* | *Breeding* | *7,500* | *10 miles* | *Repair/ service personnel inside barns* |
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| **REPAIR/SERVICE PERSONNEL WORKING INSIDE THE BARNS** |
| 1. How are repairs that are done inside of swine barns managed? |
| Dedicated to this premises only  Managed by the producer of production system  Contracted to a 3rd party that works exclusively for the producer or production system  Contracted to a 3rd party that works for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *Marv’s Maintenance Men* |
| **REPAIR/SERVICE PERSONNEL WORKING INSIDE THE BARNS OBSERVATIONS:**   * *Two repairmen, Jim Lancing and Michael Thomas, entered the premises to repair a feedline on September 20th and 21st.* * *The repairmen appeared to be new to the maintenance company.* * *Upon talking with Marv, from Marv’s Maintenance Men, they farm manager discovered that the repairmen and their tools had been at Tree Hill sow farm prior to entering Bear Grove sow farm.* * *The first clinical signs were observed near the work area of the repairmen.* |

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| **INTERIOR REPAIR/SERVICE PERSONNEL BIOSECURITY PROCEDURES** |
| 1. What procedures are followed by repair, maintenance, electrical and plumbing personnel when entering barns on premises? |
| a. Shower-in-shower-out Yes No  b. Clearly defined clean / dirty line Yes No  c. Bench entry Yes No  d. Required to wear boots dedicated to the premises Yes No  e. Required to wear clothing dedicated to the premises Yes No  f. Hands must be washed prior to entering barns Yes No |
| 1. Are entry procedures relaxed when repair personnel exit and re-enter the barns? |
| Yes *(describe in observations)*  No |
| 1. How much downtime (hours) is required for repair personnel? |
| *12 hours* |
| 1. What biosecurity procedures are in place for tools, supplies and equipment brought into barns by repair personnel? |
| a. Entered through a dedicated room with clearly defined Yes No  clean and dirty side  b. Quarantined for a minimum of 24 hours Yes No  c. Decontaminated with disinfectant or other methods Yes No  before entering the facility |
| 1. Are vehicles driven by repair personnel restricted to designated entrances and parking areas? |
| Yes *(describe in observations)*  No |
| **INTERIOR REPAIR/SERVICE PERSONNEL BIOSECURITY PROCEDURES OBSERVATIONS:**   * *Entry procedures are not supposed to be relaxed, but the manager was not present at the time of their entry. Employees are unsure if biosecurity protocols were followed correctly.* * *When the employees were asked about the biosecurity requirements at Bear Grove sow farm, they seemed unsure of what was expected.* * *Tools and parts brought by the repairmen were sprayed with disinfectant, but were not thoroughly washed or quarantined.* |

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| **Likelihood that repair/service personnel working inside the barn was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *The level of biosecurity followed by the repairmen is questionable. Their tools and parts were not properly disinfected or quarantined and are likely to have been contaminated with virus. There is a strong correlation between the timing and location of the feedline repair and the timing and location of the first clinical signs.* |
| **Follow-up and/or biosecurity recommendations:**  *It is important that a manager or trusted farm employee oversees the entry of all visitors. In the future, be sure that all items entering the farm are properly decontaminated. It would also be helpful to make a longer downtime requirement for visitors.* |

*Considerations when assessing risk for* ***repair/service personnel working inside barns:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Location(s) and swine contacted in the previous 3 days*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. shower in/shower out, bench entry, etc.)*
  + *Proper downtime compliance*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
  + *Records are kept*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with repair/service entry event, oftentimes in association with faulty biosecurity compliance*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### REPAIR/SERVICE PERSONNEL, WORKING OUTSIDE BARNS

Consider the following carrying agents:

* Outside equipment repair tools and supplies
* Outside equipment repair vehicle
* Outside equipment repairmen

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| --- | --- |
| **FREQUENCY** | |
| How many times during the investigation period were repair/service personnel working outside of the barns? | *0 times* |
| Dates of repairs (if possible): | *N/A* |

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| --- | --- | --- | --- | --- | --- |
| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
|  |  |  |  |  |

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| **REPAIRS PERFORMED OUTSIDE OF THE BARNS** |
| 1. How are repairs that are done outside of swine barns managed? |
| Dedicated to this premises only  Managed by the producer of production system  Contracted to a 3rd party that hauls exclusively for the producer or production system  Contracted to a 3rd party that hauls for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *Marv’s Maintenance Men* |
| **REPAIRS PERFORMED OUTSIDE OF THE BARNS OBSERVATIONS:**   * *No repairs were performed outside the barn by Marv’s Maintenance Men during the investigation period.* |

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| **EXTERIOR REPAIR/SERVICE PERSONNEL BIOSECURITY PROCEDURES** |
| 1. How much downtime (hours) is required for repair personnel? |
| *12 hours* |
| 1. What procedures are followed to prevent pathogen from a contaminated repairmen’s vehicle or repair personnel from being transmitted to the herd? |
| a. Repair personnel wear disposable boots or changes Yes No  boots between premises  b. People and vehicle traffic is purposely routed to avoid Yes No  crossing paths with repairmen and their vehicles on the  premises |
| 1. Are vehicles driven by repair personnel restricted to designated entrances and parking areas? |
| Yes *(describe in observations)*  No |
| **EXTERIOR REPAIR/SERVICE PERSONNEL BIOSECURITY PROCEDURES OBSERVATIONS:**   * *No repairs were performed outside the barn by Marv’s Maintenance Men during the investigation period.* |

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| **ELECTRICAL METER READING PERSONNEL** |
| 1. How many times per month is the electrical reader read on this premises? |
| *1 time* |
| 1. What procedures are in place to prevent pathogen from a contaminated vehicle or driver from being transmitted to the herd when the electrical meter is read? |
| a. Electrical meter is located more than 50 yards Yes No  from swine barns  b. Driver not allowed inside buildings Yes No  c. Driver wears disposable boots or changes boots Yes No  between premises |
| **ELECTRICAL METER READING PERSONNEL OBSERVATIONS:**   * *Midwest energy is in charge of reading the electrical meter each month.* * *The electrical meter is only read once per month and the driver does not come near the barn.* * *The driver does not wear disposable boots, but there is a low level of cross traffic due to the meters location at the edge of the premises.* |

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| **LAWN MOWING PRACTICES** |
| 1. How many times per month is the lawn mown? |
| *4 times* |
| 1. How is lawn mowing managed? |
| Mowing equipment is dedicated to this premises and lawn is mowed by on-farm personnel  Managed by the producer or production system  Contracted to a 3rd party that mows exclusively for the producer or the production system  Contracted to a 3rd party that mows swine sites for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *N/A* |
| **LAWN MOWING PRACTICES OBSERVATIONS:**   * *The lawn is mowed approximately once per week by the owner of Bear Grove production system.* * *His personal lawn mower is transported by his truck and flatbed trailer. The lawn mower tires are disinfected before it arrives on the premises.* * *The same lawn mower is used to mow at Bear Grove’s other swine sites. Mowing is always done at the sow farm after several days of downtime and before the other sites are mowed.* |

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| **SNOW REMOVAL PRACTICES** |
| 1. How many times per month is the snow removed? |
| *0 times* |
| 1. How is snow removal managed? |
| Snow removal equipment is dedicated to this premises and is done by on-farm personnel  Managed by the producer or production system  Contracted to a 3rd party that removes snow exclusively for the producer or the production system  Contracted to a 3rd party that removes snow from swine sites for other producers or production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| *N/A* |
| **SNOW REMOVAL PRACTICES OBSERVATIONS:**   * *During the investigation period, there was no snow to be removed. During the winter months, it is removed approximately ever 1-2 weeks. It is managed by the owner of Bear Grove.* |

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| **Likelihood that repair/service personnel working outside the barn was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Four of the five events in this category were mowing of the lawn. The owner understands that there is risk involved in using the same equipment at multiple sites and does a good job of managing biosecurity. The meter reader does not pose a significant threat to the operation due to his far proximity from the barns and irregular event.* |
| **Follow-up and/or biosecurity recommendations:**  *If possible, the energy company could read the meter electronically. It would also be beneficial for the owner of Bear Grove to purchase or gain access to separate lawn mowers for each of Bear Grove’s premises. There may be a neighbor or friend who is interested in grooming the premises that does not have contact with pigs.* |

*Considerations when assessing risk for* ***repair/service personnel working outside barns:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Location(s) and swine contacted in the previous 3 days*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. personnel working outside barns do not enter, etc.)*
  + *Proper downtime compliance*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
  + *Records are kept*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with repair/service entry event, oftentimes in association with faulty biosecurity compliance*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

##### VETERINARIANS, VENDORS/VISITORS, AND OFF-FARM PRODUCTION PERSONNEL

Consider the following carrying agents:

* Veterinary tools and supplies, electronics, clothing, footwear, vehicle, and veterinarian
* Off-farm production personnel, tools and supplies, electronics, clothing, footwear, and vehicle
* Vendors and other visitors, tools and supplies, electronics, clothing, footwear, and vehicle

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| --- | --- |
| **FREQUENCY** | |
| How many times during the investigation period did any of the above personnel enter the barns? | *3 times* |
| Dates of entry (if possible): | *September 8th, September 18th, and September 22nd* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *N/A* |  |  |  |  |
|  |  |  |  |  |

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| **VETERINARIANS, VENDORS/VISITORS, OFF-FARM PRODUCTION PERSONNEL’S PREVIOUS EXPOSURE** |
| 1. Where were veterinarians, off-site production personnel, vendors, and other visitors during the 3 days prior to their entry into the barn? |
| *The veterinarian had 3 days of downtime before entry. The off-site production personnel had been in contact with other Bear Grove sites that remained negative until after the break of the sow farm.* |
| 1. If personnel visited a swine facility, what is the pathogen status of the swine facility? |
| Unknown  Positive  Negative  Naïve |
| 1. Does any veterinarian, vendor, visitor, or off-farm production personnel that entered your farm in the four weeks prior to the outbreak live with an individual that comes into contact with commercial or exhibition pigs on a regular basis? |
| Yes *(describe in observations)*  No  Unknown |
| 1. Does any veterinarian, vendor, visitor, or off-farm production personnel that entered your farm in the four weeks prior to the outbreak own exhibition pigs? |
| Yes *(describe in observations)*  No  Unknown |
| **VETERINARIANS, VENDORS/VISITORS, OFF-FARM PRODUCTION PERSONNEL’S PREVIOUS EXPOSURE OBSERVATIONS:**   * *The veterinarian and off-site production personnel did not come in contact with any positive swine sites within the three days prior to their visit.* |

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| **VETERINARIANS, VENDORS/VISITORS, OFF-FARM PRODUCTION PERSONNEL BIOSECURITY PRACTICES** |
| 1. How much downtime (hours) is required for veterinarians, off-site production personnel, vendors, and other visitors? |
| *12 hours* |
| 1. Are vehicles of veterinarians, off-site production personnel, vendors, and other visitors restricted to designated entrances and/or parking areas? |
| *Yes (describe in observations)*  No |
| 1. What procedures are followed by veterinarians, off-site production personnel, vendors, and other visitors when entering barns on the premises? |
| a. Required to wear disposable boots from vehicle to Yes No  building entry  b. Shower-in-shower-out Yes No  c. Bench entry Yes No  d. Required to wear boots dedicated to the premises Yes No  e. Required to wear clothing dedicated to the premises Yes No  f. Required to wear disposable boot covers inside barns Yes No  g. Required to wear disposable clothing (i.e. Tyveks) inside Yes No  barns |
| 1. What biosecurity procedures are in place for tools, supplies and equipment (e.g. cell phones, veterinary equipment, etc.) brought into barns by veterinarians, off-site production personnel, vendors and other visitors? |
| a. May not be entered Yes No  b. Entered through a dedicated room with a clearly defined Yes No  clean and dirty side  c. Decontaminated with disinfectant or other methods before Yes No  entering the facility  d. Equipment is restricted to the office area Yes No |
| 1. Are vaccination crews used on this premises? |
| *Yes (describe in observations)*  No |
| 1. Are load-out crews used on this premises? |
| *Yes (describe in observations)*  No |
| 1. Is a visitors log used to record visitors to the premises? |
| Always *(attach photograph of visitors log)*  Sometimes*(attach photograph of visitors log)*  Never |
| **VETERINARIANS, VENDORS/VISITORS, OFF-FARM PRODUCTION PERSONNEL BIOSECURITY PRACTICES OBSERVATIONS:**   * *Veterinarians typically visit once a month, while off-site production personnel visit every two weeks.* * *A detailed visitors log was kept that showed the dates of entry of each visitor.* * *All visitors are required to adhere to bench entry and shower-in shower-out protocols.* * *Disposable boots are always put on prior to exiting the vehicles and they are removed before stepping inside the farm.* * *Dr. Elliot Stabler and the production staff always wash their vehicles before arriving at a sow farm premises.* |

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| **Likelihood that veterinarians, vendors/visitors, off-farm production personnel entry was responsible for pathogen introduction***(circle one)*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *The veterinarian and off-site production personnel were on the premises for regular, scheduled visits. They adhered to all biosecurity protocols and downtime requirements. They do not pose a significant risk to the farm.* |
| **Follow-up and/or biosecurity recommendations:**  *Continue requiring visitors to follow the same strict entry procedures that employees do. Make sure that downtime requirements are followed and limit cross traffic as much as possible.* |

*Considerations when assessing risk for* ***veterinarians, vendors, off-farm production personnel:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Location(s) and swine contacted in the previous 3 days*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. entry procedures not relaxed, etc.)*
  + *Proper downtime compliance*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
  + *Records are kept*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Nature of carrying agent*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with entry of other personnel event, oftentimes in association with faulty biosecurity compliance*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

## pork/food product entry

##### PORK AND OTHER FOOD PRODUCTS

Consider the following carrying agents:

* Uncooked pork meat
* Cooked or processed pork meat
* Other food
* Food containers and utensils

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| **FREQUENCY** | |
| How many times during the investigation period did any pork or food products enter the barns?  *[avg. daily frequency x # of days in investigation period]* | *210 times* |
| Dates of entry (if possible): | *Daily* |

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| **PORK AND OTHER FOOD PRODUCT ENTRY PRACTICES** |
| 1. Are pork / food products prohibited from entering the premises? |
| a. Uncooked pork Yes No  b. Processed or cooked pork Yes No  C. Other food / beverages Yes No |
| 1. If pork / food products enter the premises, how are they entered? |
| a. Entered through a dedicated room with a clearly defined Yes No  clean and dirty side  b. Decontaminated with disinfectant or other methods before Yes No  entering the facility |
| 1. Are pork / food products restricted to the office or lunchroom area of the facilities? |
| Yes *(describe in observations)*  No |
| **PORK AND OTHER FOOD PRODUCT ENTRY PRACTICES OBSERVATIONS:**   * Employees are not allowed to leave the farm for lunch, so they typically bring a meal along with them each day. * Lunches must be double bagged upon entry to the farm. * The employee will approach the pass-through window and hold the outer bag open. The manager or another employee inside the farm sprays disinfectant inside the bag and then brings the inner bag through the window. * The packaging is then wiped down with disinfectant wipes. * Raw pork is prohibited from the premises. * Employees store their lunch in the fridge in the break room. Medication and other pig-related products are not allowed to be stored in the same fridge. * Lunches are restricted to the breakroom/office area only. |

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| **Likelihood that pork/food product entry was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Uncooked pork is prohibited from entering the premises and food packaging is disinfected before entering. The employees only eat in the office/lunch area.* |
| **Follow-up and/or biosecurity recommendations:**  *Appropriate biosecurity protocols are already in place.* |

*Considerations when assessing risk for* ***pork and food product entry:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Pork is not raw*
  + *Location(s) and swine contacted in the previous 3 days*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. lunches disinfected, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Food allowed in barn*
  + *Carrying agent may contact secondary carrying agent that will come in contact with swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with entry food products*

## MANURE REMOVAL FROM FARM

Consider the following carrying agents:

* Manure removal equipment in pit, next to barns, away from barns
* Manure removal vehicles and personnel

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| **FREQUENCY** | |
| How many times during the investigation period was manure removed from the farm? | *1 time* |
| Dates of removal (if possible): | *September 26th* |

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| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS** | | | | | |
| Farm Name | Stages of Production | Number of Animals | Distance from Farm (miles) | Description of operational connection |
| *Minnesota Select 23* | *Breed-to-wean* | *3,600* | *17 miles* | *Visited by manure removal personnel* |
|  |  |  |  |  |

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| **MANURE REMOVAL PRACTICES** |
| 1. How many times per year is manure or effluent removed from the premises? |
| *2 times* |
| 1. How is manure handled and stored? |
| a. Deep pit collection and storage under pigs Yes No  b. Shallow pit collection Yes No  c. Outdoor unenclosed lagoon or storage Yes No  d. Outdoor enclosed storage Yes No  e. Flush system using fresh water Yes No  f. Flush system using recycled water Yes No |
| 1. Were there any changes relating to manure of effluent removal or storage in 3 months prior to the outbreak? |
| Yes *(describe in observations)*  No |
| **MANURE REMOVAL PRACTICES OBSERVATIONS:**   * *Dan’s Manure pumps manure for Bear Grove and many other swine sites nearby.* * *Manure is stored in a deep pit and collected twice per year in the spring and fall.* * *Around the time of manure removal, the weather conditions were favorable for aerosol spread of PRRSV.* |

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| **MANURE REMOVAL PERSONNEL** |
| 1. What parties are involved with manure or effluent removal from the premises? |
| a. Manager or on-farm employees Yes No  b. Other personnel employed by producer or production Yes No  system  c. 3rd party that removes manure exclusively for the producer Yes No  or production system  d. 3rd party that removes manure for other producers or Yes No  production systems |
| 1. If contracted, what is the names of the contracting company(ies)? |
| Dan’s Manure |
| 1. Are parties involved with manure removal allowed to enter the barns? |
| Yes  No |
| **MANURE REMOVAL PERSONNEL OBSERVATIONS:**   * *Manure has been pumped by the same employees of Dan’s Manure for the last two years.* * *They are experienced and knowledgable about their jobs.* * *The manure removal personnel wear disposable boots on the premises but do not wear farm-exclusive or disposable coveralls.* * *The employees always seem to be in a rush and downtime requirements do not exist between swine sites.* * *After the outbreak, employees admitted to being at Minnesota Select 23, a positive farm, the day before they pumped manure at Bear Grove.* |

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| **MANURE REMOVAL EQUIPMENT** |
| 1. How is manure removal equipment managed? |
| a. Some or all dedicated to this premises Yes No  b. Some or all managed by the producer of production system Yes No  c. Some or all contracted to a 3rd party that removes manure Yes No  exclusively for this producer or production system  d. Some or all contracted to a 3rd party that removes manure Yes No  for other producers or production systems |
| 1. Approximately how many other swine premises is the manure removal equipment used on? |
| *The manager is unsure of how many sites Dan’s Manure, but he assumes that the equipment comes in contact with many other swine premises during this busy time of year.* |
| 1. If manure was removed during the investigation period, where was the manure equipment in the 3 days prior to entering the premises? |
| *The manure removal equipment was used at Minnesota Select 23 the day prior to arriving at Bear Grove. All of the other locations that the manure removal equipment came in contact with are unknown, but the machinery did not appear to be clean upon arrival.* |
| 1. Pathogen status of other site(s) manure equipment was used on during investigation period: |
| Unknown  Positive  Negative  Naïve |
| 1. How much downtime (hours) is required for manure removal equipment? |
| *There is no strict downtime requirement.* |
| 1. Is the manure removal equipment washed and disinfected before entering the premises? |
| Yes  No  Unknown |
| 1. Are environmental swabs collected from manure removal equipment and tested for PATHOGEN? |
| Always  Sometimes  Never |
| **MANURE REMOVAL EQUIPMENT OBSERVATIONS:**   * *The farm manager has been unable to get detailed information from Dan’s Manure, but found out that the equipment did come in contact with a positive site the day prior to arriving at Bear Grove.* * *The equipment appeared to be dirty and probably was not washed between sites.* |

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| **Likelihood that manure removal was responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *The manure removal equipment came in contact with a positive farm within 24 hours of pumping manure at Bear Grove. In addition, weather conditions were favorable for the aerosol spread of PRRSV around the same time that manure was being pumped. The equipment did not appear to be cleaned and due to the time of year, many swine sites were probably visited around the same time.* |
| **Follow-up and/or biosecurity recommendations:**  *Changes need to be made to decrease the risk of manure removal at this premises. Dan’s Manure should be required to wash and disinfect equipment between sites and obey at least a 24-hour downtime requirement. The manure removal personnel should also be required to obey a downtime requirement and wear disposable boots and coveralls on the premises. It may also be helpful to plan manure removal when the weather does not favor aerosol spread of PRRSV.* |

*Considerations when assessing risk for* ***manure removal:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Location(s) and swine contacted in the previous 3 days*
  + *Manure removal equipment biosecurity procedures, routing, and management*
  + *Manure personnel equipment biosecurity procedures, routing, and management*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. proper downtime, wash/disinfection, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Biosecurity procedures in place to prevent carrying agents from entering barn (i.e. manure removal personnel do not enter barn, etc.)*
  + *Proximity of equipment/pumping site to swine*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with entry food products*
  + *An operational connection with a swine site that has the similar sequence homology or same pathogen*

## ENTRY OF OTHER ANIMALS

##### OTHER ANIMALS OUTSIDE OF BARNS

Consider the following carrying agents:

* Feral swine
* Rodents
* Non-swine domestic animals (cats, dogs, horses, cattle, etc.)
* Non-swine wild animals (raccoons, opossum, coyotes, etc.)
* Non-migratory birds
* Migratory birds

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| 1. How frequently are the following types of animals seen on the premises outside of barns? |
| a. Feral Swine Weekly Less than Weekly Never  b. Rodents Weekly Less than Weekly Never  c. Non-swine domestic animals Weekly Less than Weekly Never  d. Non-swine wild animals Weekly Less than Weekly Never  e. Migratory birds Weekly Less than Weekly Never  f. Non-migratory birds Weekly  Less than Weekly  Never |

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| **Likelihood that other animals outside of the barns were responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Although animals and birds are occasionally seen outside the barns, it is rare and bait traps are set periodically. They do not seem to disturb the feed or perimeter of the barn.* |
| **Follow-up and/or biosecurity recommendations:**  *Continue to set bait traps and clean up spilled feed immediately.* |

##### OTHER ANIMALS INSIDE OF BARNS

Consider the following carrying agents:

* Feral swine
* Rodents
* Non-swine domestic animals (cats, dogs, horses, cattle, etc.)
* Non-swine wild animals (raccoons, opossum, coyotes, etc.)
* Non-migratory birds
* Migratory birds

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| 1. How frequently are the following types of animals seen inside swine barns? |
| a. Feral Swine Weekly Less than Weekly Never  b. Rodents Weekly Less than Weekly Never  c. Non-swine domestic animals Weekly Less than Weekly Never  d. Non-swine wild animals Weekly Less than Weekly Never  e. Migratory birds Weekly Less than weekly Never  f. Non-migratory birds Weekly Less than Weekly Never |
| 1. Are rodent bait stations used and checked regularly? |
| Always  Sometimes  Never |

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| **Likelihood that other animals inside of the barns were responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Rodent bait stations are found inside the barns as well, and animals are rarely to never seen inside the building.* |
| **Follow-up and/or biosecurity recommendations:**  *Continue to set bait traps and ensure that there are no easily accessible entry areas for animals and birds.* |

*Considerations when assessing risk for* ***other animals:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Animal is not carrier*
  + *Location of animal prior to premises entry*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. traps, sprays, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
  + *Observations of evidence of other animals*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Biosecurity procedures in place to prevent carrying agents from entering barn (i.e. other animals do not have access to feed or water, other animals do not have access to tissue or feces, etc.)*
* *Strength of Evidence:*
  + *Timing/location of first clinical signs correlates with evidence of animal entry*
  + *Farm is in close proximity to a farm that is pathogen positive*

##### INSECTS

Consider the following carrying agents:

* Insects

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| 1. In SUMMER months, what is the concentration of insects seen inside of the barns? |
| Severe  Light to moderate  None |
| 1. In WINTER months, what is the concentration of insects seen inside of the barns? |
| Severe  Light to moderate  None |
| 1. Is insect control (e.g. Insecticide sprays, foggers, baits, etc.) used consistently? |
| Always  Sometimes  Never |

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| **Likelihood that insects were responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *Insects are well controlled when necessary.* |
| **Follow-up and/or biosecurity recommendations:**  *Continue to use insecticides and bait stations on a regular basis.* |

*Considerations when assessing risk for* ***insects:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Insect is not carrier*
  + *Location of insects prior to premises entry*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. traps, sprays, etc.)*
* *How frequently does risk event occur?*
  + *Event occurred during investigation and may have occurred frequently*
  + *Observations of evidence of insects*
* *Does the contaminated or infected carrying agent have access to pigs in the herd?*
  + *Biosecurity procedures in place to prevent carrying agents from entering barn (i.e. insects do not have access to feed or water, insects do not have access to tissue or feces, etc.)*
* *Strength of Evidence:*
  + *Farm is in close proximity to a farm that is pathogen positive.*

## AIR AND WATER ENTRY

Consider the following carrying agents:

* Air
* Water

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| **AIR ENTRY** |
| 1. Is incoming air filtered? |
| Yes  No |
| 1. Are barns negative pressure ventilated? |
| Yes  No |
| 1. How many years ago were filters installed? |
| *4 years ago* |
| **AIR ENTRY OBSERVATIONS:**   * *The barn was converted to negative pressure filtration in 2013.* * *There have not been any recent breaches to the filters or ventilation system.* * *Air enters through the attic and passes through cool cells.* * *No cracks have been identified recently, but in the case that a crack is found it is repaired immediately.* |

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| **WATER ENTRY** |
| 1. What is the source of drinking water for the pigs? |
| Surface waters (lakes, ponds, etc.)  Well  Rural water  Municipal water |
| 1. Is drinking water treated? |
| a. Chlorination Always Sometimes Never  b. Acidifiers Always Sometimes Never  c. Iodine Always Sometimes Never  d. Peroxide Always Sometimes Never  e. Other Always Sometimes Never |
| **WATER ENTRY OBSERVATIONS:**   * *Water is sourced from a deep well on the premises.* * *The water is not chlorinated or acidified.* |

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| **Likelihood that air and water entry were responsible for pathogen introduction***(circle one):*  **LOW MEDIUM HIGH** |
| **Brief justification for risk assessment:**  *There are no recent events that suggest a risk to the herd in regard to PRRSV introduction.* |
| **Follow-up and/or biosecurity recommendations:**  *Using a water additive could add an additional layer of prevention for PRRSV outbreak.* |

*Considerations when assessing risk for* ***air/water entry:***

* *Is there opportunity for the carrying agent to be contaminated or infected with an infectious pathogen?*
  + *Weather conditions*
  + *Health statuses of nearby swine sites*
* *Is the contamination or infection mitigated prior to entering the farm?*
  + *Biosecurity procedures in place to prevent carrying agents from entering farm (i.e. windbreaks, filters, etc.)*
* *Strength of Evidence:*
  + *Farm is in close proximity to a farm that is pathogen positive*

# DETAILED WEATHER SUMMARY DURING INVESTIGATION PERIOD

Airport in closest proximity to the site that reports both daily and hourly observations, used to identify conditions favorable for aerosol spread of the virus: **Rockwell Municipal Airport**

Weather during the investigation period had the following general characteristics:

* Daily Temperatures
  + Maximum: 84 F
  + Average: 68 F
  + Minimum: 45 F
* Daily Wind Speed
  + Maximum: 26 mph
  + Average: 11 mph
  + Minimum: 2 mph
* Daily Cloud Cover
  + Maximum: 75%
  + Average: 64%
  + Minimum: 45%
* Daily Relative Humidity
  + Maximum: 91 %
  + Average: 72%
  + Minimum: 52%

**Table 3.** Weather that was favorable for aerosol spread of the virus in the 4 weeks before the outbreak

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | Time | Cloud cover | Temperature | Wind direction | Wind speed | Humidity |
| *9/25/16* | *12 am* | *71%* | *47 F* | *South* | *5 mph* | *81 %* |
|  |  |  |  |  |  |  |
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# OPERATIONAL CONNECTioNS

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| --- | --- | --- |
| **OPERATIONAL CONNECTIONS WITH POSITIVE FARMS SUMMARY** | | |
| Farm Name | Shared Risk Event | Description *(include nature of possible carrying agent)* |
| *Rouge 1* | *N/A* | *Positive site within 5 miles* |
| *Tree Hill* | *Manure Removal* | *Contaminated equipment* |

**Attachment A:** Visitor’s Log

