

Texas BSE Investigation

Final Epidemiology Report

August 2005



Table of Contents

Executive Summary	3
Background of the Investigation	3
BSE Response Plan	3
<i>Definition of At-Risk Cattle</i>	3
<i>Definition of Cattle of Interest</i>	4
<i>Definition of Feed Cohort</i>	4
<i>Definition of Birth Cohort</i>	4
<i>Definition of At-Risk Progeny</i>	4
Epidemiology Investigation of Index Herd: Farm A	5
<i>Background</i>	5
<i>Progeny</i>	6
<i>Birth Cohort</i>	6
<i>Feed Cohort</i>	6
Removal of Cattle from the Index Farm	7
Tracing of Progeny	7
Tracing of Birth Cohorts	8
Tracing of Cattle of Interest	9
<i>Calculation of Minimum Estimated Ages</i>	9
Trace Herds	10
<i>Trace Herd 1</i>	10
<i>Trace Herd 2</i>	10
<i>Trace Herd 4</i>	11
<i>Trace Herd 5</i>	11
<i>Trace Herd 6</i>	11
<i>Trace Herd 7</i>	12
<i>Trace Herd 8</i>	12
Analysis of Data on Presumed Dead and Untraceable Animals	12
<i>Appendix 1 – Final Trace-Out Diagram</i>	13

Executive Summary

In June 2005, an inconclusive bovine spongiform encephalopathy (BSE) sample from November 2004, that had originally been classified as negative on the immunohistochemistry test, was confirmed positive on SAF immunoblot (Western blot). The U.S. Department of Agriculture (USDA) identified the herd of origin for the index cow in Texas; that identification was confirmed by DNA analysis. USDA, in close cooperation with the Texas Animal Health Commission (TAHC), established an incident command post (ICP) and began response activities according to USDA's BSE Response Plan of September 2004. Response personnel removed at-risk cattle and cattle of interest (COI) from the index herd, euthanized them, and tested them for BSE; all were negative. USDA and the State extensively traced all at-risk cattle and COI that left the index herd. The majority of these animals entered rendering and/or slaughter channels well before the investigation began. USDA's response to the Texas finding was thorough and effective.

Background of the Investigation

On June 10, 2005, USDA announced that the November 2004 inconclusive BSE sample tested positive on SAF immunoblot. The SAF immunoblot was run at USDA's National Animal Disease Center (NADC) upon the recommendation of USDA's Office of the Inspector General. Samples were sent to a World Organization for Animal Health (OIE) reference laboratory for BSE in Weybridge, England, for confirmatory tests. Farm A, located in Texas, was the suspected farm of origin for the index cow and was placed under hold order on June 20, 2005 pending confirmation of the positive results and DNA analysis of the herd. Weybridge confirmed the BSE positive on June 24, 2005. The carcass of the index cow had been disposed of by incineration in November 2004. Cattle from several units on Farm A were bled for DNA testing (a unit is a part of the business entity of a farm. For example, a pasture on which a group resides may be a unit). Farm A was confirmed as the farm of origin for the index cow on June 29, 2005, and an ICP was established in Texas to coordinate the response. Removal of at-risk cattle from the index herd, and tracing of at-risk cattle and COI that had left the index herd, commenced immediately.

BSE Response Plan

The September 2004 BSE Response Plan outlines the necessary tracing and removal of at-risk cattle and, in some cases, COI, in response to the identification of a BSE-positive animal. Response personnel removed at-risk animals from the index farm and traced at-risk animals and COI in accordance with the response plan.

Definition of At-Risk Cattle

At-risk cattle were cattle that were confirmed to be: part of the birth cohort; part of the feed cohort; or progeny of the positive cow born within 2 years prior to the positive test. Response personnel removed at-risk cattle from the herd, euthanized them, and tested them for BSE; all were negative.

Definition of Cattle of Interest

In many cases, at-risk cattle could not be definitively identified. Response personnel then analyzed herd inventories and herd records to identify a group of cattle that include all potential at-risk cattle and any other cattle that could not be distinguished from at-risk cattle. All of these cattle (at-risk cattle and any additional cattle as necessary) were defined as COI. COI that fell into the appropriate age range and could be part of the birth or feed cohort were removed from the herd, euthanized, and tested for BSE; all were negative.

Definition of Feed Cohort

The feed cohort consisted of all cattle which, during their first year of life, were reared with the positive animal during its first year of life and consumed the same feed during that period. In the index herd, this definition applied to cattle in any unit that were weaned and fed with calves from the other units for a short period of time and then later returned to their respective units of origin from 1991-1995 (the range of years that could have coincided with the first year of life of the index cow).

Definition of Birth Cohort

In most cases, it was impractical or impossible to definitively determine which cattle were exposed to a feed source. Accordingly, response personnel used a birth cohort to determine which cattle to consider at-risk. The birth cohort included all cattle born on the positive animal's birth premises within 1 year before or after the BSE-positive animal's date of birth.

Since the index cow was approximately 12 years of age, but an exact date of birth did not appear in the herd records, response personnel used a potential age range of 12 years with 1 year added to each end of that age (age 11 to 13) to sufficiently cover the most likely age range of the animal. In addition, if the positive animal moved from the birth premises to any other premises during its first year of life, all cattle of less than 1 year of age that were present on such additional premises were also considered to be at-risk. Using the age range of the index animal, all cattle born on the index premises from 1990-1995 were part of the birth cohort of the index animal.

Definition of At-Risk Progeny

Since the index cow was not confirmed to have been exhibiting clinical signs of BSE prior to her positive test results, the at-risk progeny as defined by the OIE were those offspring that were born within the 2 years prior to the positive test result. Those 2 years prior to the positive test result would have included her calves from 2002, 2003, and 2004. According to the owner, the index cow produced her last calf either in Fall 2003 or Spring 2004, and the calf prior to that was born either in Fall 2002 or Spring 2003. Tracing activities focused on these two calves as at-risk progeny.

Epidemiology Investigation of Index Herd: Farm A

Background

The index cow was an approximately 12-year-old yellow or cream-colored Brahma cross that originated from Farm A located in Texas. The cow was sold through a livestock sale on 11/11/04, purchased by an order buyer, and was transported to a packing plant on Monday, 11/15/04. When the truck arrived at the packing plant during the late afternoon of 11/15/04, the index cow and one other were found dead on the truck and were transported to a pet food plant later that day where they were sampled for BSE testing as part of the enhanced BSE surveillance.

DNA analysis of blood samples taken from five of the six units of cattle that comprise Farm A yielded four animals from two different units that were genetically related to the index cow and confirmed Farm A as her herd of origin.

The herd on Farm A consisted of mixed breed beef cattle that are traditionally not used as seedstock replacement animals. Market records and preliminary tracing indicated that most animals that left the index herd either went to slaughter within a few days of sale or, in the case of younger animals, entered into known rendering and slaughter channels immediately following sale. There were only 11 cows identified during the investigation that were traced from Farm A into other herds where they had been used as replacement cows.

The owner of Farm A raised this cow from birth and stated that the cow had never been off the premises prior to its sale. She was marketed because of poor body condition (the animal's condition had not improved despite the early weaning of her 2003/2004 calf). The owner stated that the cow had always been excitable and had fallen while she was being loaded to go to the market, but that this was not unusual behavior for her in his opinion. In addition there was a report of this cow being down in the alley at the livestock market on 11/11/04, but she apparently got up again and was able to be loaded onto the truck to go to the packing plant. When questioned about any previous history of neurological signs in cattle on the farm, the owner reported that no cattle on the farm had ever shown any neurological signs, nor had there been any cases of rabies on the index farm.

Index Herd Census

Farm A consisted of 6 units (Units A through F) containing a total of about 217 adult cattle and approximately 100 to 120 calves. Early in the investigation, response personnel discovered that an additional unit belonging to the owner's son and located adjacent to Unit F could also contain COI. This group, Unit G, contained 16 adult cattle and made a seventh unit that became included in the investigation.

On 6/22/05, the first three of the original six units were sampled for DNA testing to confirm the herd of origin of the index cow. Those first three units consisted of: Unit A contained 62 head with some older cattle (more likely than the other units to provide a DNA match); Unit B with 28 head (3-year-old unit); and Unit C with 25 head (2-year-old unit). Two additional units were sampled for DNA on 6/23/05; Unit D with 31 head and Unit E with 30 head, both of which contained older animals.

The sixth unit, Unit F, containing 41 head, was purchased in 1993 from another source. Because it did not have animals that were genetically related to the other 5 units, this unit was not sampled for DNA testing. Unit F, and adjacent Unit G, contained COI because the weaned heifers from those units were commingled and fed with weaned heifers from the other units for a short period of time before they were returned to their respective units of origin. This practice of weaning and feeding together fit the definition of a feed cohort.

Progeny

The owner did keep some replacement heifers and, although he was relatively sure that he had not kept any offspring from the yellow cow because of her excitable demeanor, DNA analysis of the herd revealed several animals in the herd that may have been older offspring of the index cow. While the owner sold 12 calves at the sale with the index cow on 11/11/04, her last calf was not in that group. According to the owner, the index cow's last calf was born either in Fall 2003 or Spring 2004, weaned early, and sold through the livestock market some time between February and October 2004. The calf prior to that would have been born either in Fall 2002 or Spring 2003 and was sold at the livestock market sometime between January and December 2003.

Birth Cohort

The owner of Farm A kept very few herd records; this made finding documentation on this cow's birth cohort difficult. The birth cohort, by definition, included all cattle born on the positive animal's birth premises within 1 year, before or after, the positive animal's date of birth. The index cow was approximately 12 years of age in November 2004, but there was no exact birth date in the herd records. A potential age range of 11 to 13 years was used to sufficiently cover the animal's most likely age. Using this range, all cattle born on the index premises between 1990 and 1995 were considered part of the birth cohort.

In lieu of the owner's records, herd records from Veterinary Services' Generic Database (GDB) were used to compile a list of brucellosis calfhood vaccination (CV) tag numbers from the index herd that corresponded to animals to be included in the birth cohort. There were 121 animals identified through GDB as having been calfhood vaccinated on the index farm between 1991 and 1994. The owner of Farm A did not calfhood vaccinate after 1994. Moreover, calfhood vaccinates include only heifers. Therefore, the list of 121 animals was not a complete list of all birth cohorts. However the tracing that response personnel conducted on other COI was designed to account for the remainder of the birth cohorts.

Feed Cohort

Animals in Units A, D, and E, that were weaned and fed with the positive cow between 1991-1995, were already considered at-risk as part of the defined birth cohort. Animals in Units B and C were 3-year-olds and 2-year-olds, respectively, and were too young to be either birth or feed cohorts. Although Unit F was purchased separately and did not contain animals genetically related to the other units, calves from Unit F were weaned and fed for a short period of time with weaned calves from other units and all calves were later returned to their respective units of origin. Since Unit F was not purchased until 1993, the feed cohort consisted of those animals in Unit F that could have been weaned and fed with the index cow in 1993 or 1994. Additionally, Unit G contained possible feed cohorts that could have been weaned and fed with the index cow between the years of 1991 and 1995.

Feed

The feeding regimen for the cattle in this herd consisted of natural pasture, hay, mineral supplement, syrup tubs occasionally, and a breeder's supplement (predominantly a name brand manufactured breeder's cube). The Food and Drug Administration (FDA) investigated all sources of feed and supplements used on Farm A. In-depth investigations and site visits were conducted by FDA involving retail feed stores, feed manufacturers, slaughter plants, renderers, and brokers. A more detailed account of the investigation is contained in FDA's final report.

Removal of Cattle from the Index Farm

Any animal still present within the index herd that could have been a possible birth cohort or feed cohort of the index cow was targeted for removal as an at-risk animal. Units A, D, E, F, and G, all of which were known to contain older animals, were inventoried. Identification tags, tattoos, and brands were recorded, and all animals were aged based on their dentition and any man-made identification. Cattle whose estimated age indicated that they could have been part of the index cow's birth or feed cohort were removed from the herd, euthanized, and tested for BSE; all were negative.

Units B and C were exempt from the cohort removal process because they contained only 3-year-old and 2-year-old animals respectively. Although the DNA analysis of animals in Units A through E determined that there were 2 animals present that could have been offspring of the index cow, their estimated age by dentition revealed that they were not of the appropriate age to be at-risk progeny. This verified the owner's claim that he had sold the index cow's last two calves at the livestock market and they were not currently present in the index herd.

After sorting by age, response personnel identified and removed the following numbers of cows from the herd on 7/6/05: Unit A, 11 cows; Unit D, 11 cows; Unit E, 7 cows. The same process was applied to Units F and G and the following numbers of cows were identified and removed from the herd on 7/7/05: Unit F, 28 cows; Unit G, 10 cows.

Of the 67 animals removed from the herd as possible birth cohorts and/or feed cohorts of the index cow, 42 were definitively identified as belonging to the birth cohort due to the presence of a calfhoo vaccination tag or tattoo that corresponded to the appropriate birth cohort years. All 67 animals were euthanized on 7/6/05 and 7/7/05 and samples were subsequently sent to USDA's National Veterinary Services Laboratories (NVSL) for BSE testing. All samples were run on the ELISA test and confirmed negative on 7/8/05 and 7/9/05. Upon confirmation of negative results, disposal of carcasses was completed by burial in an approved landfill facility. The index farm was released from hold order on 7/11/05.

Tracing of Progeny

The 2003/2004 progeny of the index cow was known to have left the farm through a specific livestock market sometime between February and October 2004. The 2002/2003 progeny of the index cow left the farm through the same market sometime between January

and December 2003. Response personnel learned early in the investigation that animals from the index farm were sold not only under the index farm owner's name and that of his wife, but also by other members of the owner's immediate family. Additionally, there were no herd records to indicate the gender of the two at-risk progeny. Therefore, market records for February through October 2004 and January through December 2003 were obtained for all calves sold both by Farm A's owner and by members of his immediate family; response personnel traced all such calves to determine their disposition.

With the index herd being composed of mixed breed beef cattle, the calves that left the farm were genetically unsuitable for use as replacement animals or for sale as breeding stock, a fact that was confirmed by the trace work and the documentation of the final disposition of the calves of interest.

Response personnel ultimately identified 213 calves of interest to be traced. Of these, 208 were confirmed to have entered known rendering/slaughter channels, 4 were presumed to have entered rendering/slaughter channels, and 1 was purchased in cash through a livestock market with no buyer name or contact information (this animal was classified as untraceable. See Appendix 1). A calf was categorized as presumed to have entered rendering/slaughter channels if it passed through at least one livestock market subsequent to its original sale and could not be individually traced due to unknown resale date and new backtag, but all calves resold matching that description during an appropriate date range were purchased by known rendering/slaughter order buyers.

It was not possible to DNA test the calves that entered known rendering and slaughter channels – most were of an age in which they were likely to have been slaughtered prior to the time of the investigation. There were no calves traced to farms outside of rendering and slaughter channels.

Tracing of Birth Cohorts

Since there were essentially no records maintained on the index farm, it was necessary to compile the list of known birth cohorts using brucellosis CV tag numbers for this herd from the period 1991 to 1994. The calves vaccinated during that time period were part of the index cow's birth cohort and tracing activities centered on finding those animals.

There were 121 animals whose CV tag number and/or tattoo included them as part of the birth cohort. Of those 121 animals, 67 animals were definitively accounted for (42 were found in the index herd, removed, and tested BSE negative; 25 were identified as having left Farm A through the market system and were traced, 11 of those were reported slaughtered, 13 were classified as presumed dead, and 1 was found alive, euthanized, and tested BSE negative). Of the remaining 54 animals from the birth cohort, there may have been several that died within the index herd, but the majority likely left the herd without identification and would have been either re-tagged at the livestock market or consigned directly to slaughter without identification. To account for these remaining birth cohorts, all adult cattle that left the index farm since 1990 were traced as COI.

Tracing of Cattle of Interest

The investigation revealed that many animals left Farm A, arrived at markets without any identification tags, and were subsequently re-tagged at the market. Due to lack of farm records, it is unknown which of these re-tagged animals may have belonged to the birth cohort. As a result, all animals that may have left Farm A since 1990 were traced as COI. Additionally, animals from the index farm were sold not only under the index farm owner's name and that of his wife, but also by other members of the owner's immediate family; therefore, cattle sold from the index farm by all pertinent family members were traced.

There were some older animals that left the index farm but were able to be excluded from further trace work because they were known not to have been part of the birth cohort or feed cohort of the index cow despite their being of the appropriate age. The index farm owner's late father had maintained a herd of cattle separate from the index farm but which was added to the index farm in 1997. Complete herd test data and CV data from the GDB was obtained for the father's herd and those animals were excluded from the tracing activities.

There were a total of 200 COI traced: 143 were reported to have been slaughtered (131 of those were confirmed as having been slaughtered), 1 is known to have died previously and was buried, 2 were found alive (1 was a known birth cohort that tested negative, 1 was determined not to be one of the cattle of interest due to her young age), 34 were classified as presumed dead, 20 were classified as untraceable. (See Appendix 1). Animals were confirmed at slaughter using GDB slaughter testing data or the hard copies of slaughter testing Form 4-54.

An animal was classified as presumed dead if records that could be used to advance the tracing of the animal were exhausted or did not exist, and the age of the animal at the time of the investigation was estimated to be at least 11 years old or older. Since the index herd was not a purebred or seedstock operation, and animals leaving the herd were unlikely to be purchased as replacement cattle, standard industry practices indicated that most adult animals that had left the herd would have been culled and slaughtered by the time they were in this age group. Additionally, this age cutoff was arrived at through review of market records and the specific years in which Farm A sold cattle through the market. An animal was classified as untraceable if all records to advance the tracing of the animal were exhausted or did not exist, and the age of the animal at the time of the investigation was estimated to be less than 11 years of age (the animal, therefore, could not be presumed dead).

Calculation of Minimum Estimated Ages

Throughout the tracing process, personnel used minimum estimated ages of the 200 COI to evaluate whether those individuals could be old enough to be part of the birth or feed cohort of the index cow. Since Farm A's owner maintained no records on the ages of animals, GDB data assisted in assigning minimum estimated ages. Animals that were wearing brucellosis CV eartags could be aged quite accurately because the exact CV date was recorded in the GDB and those animals would have been vaccinated between 4 to 12 months of age. The GDB also contained lists of individual eartags for all animals on the

index farm that were included in complete herd brucellosis testing in 1991, 1993, and 1994. Cattle included in those herd tests would have been at least 18 months of age at the time of the test and their minimum age today could be extrapolated from that data. Finally, the GDB also contained livestock market testing data that could also be used to assign a minimum age because the animal would have been at least 18 months of age on date the earliest brucellosis market test was conducted. The minimum ages calculated for the cattle of interest were used later in an analysis by USDA's Centers for Epidemiology and Animal Health (CEAH) to determine the probable disposition of untraceable and presumed dead animals based on their age.

Trace Herds

Response personnel made every attempt to trace COI to their final dispositions (which, in most cases, was slaughter). If an animal was traced to a herd owner and the owner could not provide information that indicated that the animal of interest was not currently present within his/her herd, the owner's herds were placed under hold order pending a herd inventory to determine whether or not the animal of interest had been retained. There were eight herds identified as the last traceable location of the animal of interest and were, therefore, subjected to herd inventories in an attempt to locate the animal.

When an animal of interest was located within a herd, the age of the animal was estimated using dentition and any man-made identification. If the animal fell into the appropriate age range to be a possible birth cohort or feed cohort of the index cow, the animal was removed from the herd and tested. If an animal of interest was located within the herd and fell into the appropriate age range to be a possible at-risk progeny of the index cow, the animal was sampled for DNA testing.

Trace Herd 1

The owner of Trace Herd 1 was identified as having received one of the adult COI from the index herd. Trace Herd 1 contained 909 head of cattle in multiple pastures and was placed under hold order on 7/21/05. Upon completion of herd inventory, the animal of interest was not found within the herd. A GDB search of all recorded herd tests conducted on Trace Herd 1 and all market sales by the owner failed to locate the identification tag of the animal of interest and she was subsequently classified as untraceable. The hold order on Trace Herd 1 was released on 8/8/05.

Trace Herd 2

Trace Herd 2 was identified as having received one of the adult COI from the index herd. Trace Herd 2 contained 19 head of cattle on one pasture and was placed under hold order on 7/25/05. The owner of Trace Herd 2 identified the animal of interest by her eartag while he was feeding his cattle out of a bucket and individually penned her for inspection by field personnel. While the cow was identified as one of the animals that had left the index farm, her age by dentition was estimated to be only 5 years old, which was too young to have placed her as part of the birth or feed cohort of the index animal. She was classified as found alive but determined not to be one of the COI; the hold order on Trace Herd 2 was released on 7/26/05.

Trace Herd 3

The owner of Trace Herd 3 was identified as possibly having received an animal of interest. The herd was placed under hold order on 7/27/05. The herd inventory was conducted on 7/28/05. The animal of interest was not present within the herd, and the hold order was released on 7/28/05. The person who thought he sold the animal to the owner of Trace Herd 3 had no records and could not remember who else he might have sold the cow to. Additionally, a search of GDB for all cattle sold through the markets by that individual did not result in a match to the animal of interest. The animal of interest traced to this herd was classified as untraceable because all leads were exhausted.

Trace Herd 4

The owner of Trace Herd 4 was identified as having received one of the COI through an order buyer. Trace Herd 4 was placed under hold order on 7/29/05. A complete herd inventory was conducted on 8/22/05 and 8/23/05. There were 233 head of cattle that were examined individually by both State and Federal personnel for all man-made identification and brands. The animal of interest was not present within the herd. Several animals were reported to have died in the herd sometime after they arrived on the premises in April 2005. A final search of GDB records yielded no further results on the eartag of interest at either subsequent market sale or slaughter. With all leads having been exhausted, this animal of interest has been classified as untraceable. The hold order on Trace Herd 4 was released on 8/23/05.

Trace Herd 5

The owner of Trace Herd 5 was identified as having received two COI and was placed under hold order on 8/1/05. Trace Herd 5 is made up of 67 head of cattle in multiple pastures. During the course of the herd inventory, the owner located records that indicated that one of the COI, a known birth cohort, had been sold to Trace Herd 8 where she was subsequently found alive. Upon completion of the herd inventory, the other animal of interest was not found within the herd. A GDB search of all recorded herd tests conducted on Trace Herd 5 and all market sales by the owner failed to locate the identification tag of the animal of interest and she was subsequently classified as untraceable due to all leads having been exhausted. The hold order on Trace Herd 5 was released on 8/8/05.

Trace Herd 6

The owner of Trace Herd 6 was identified as possibly having received an animal of interest and was placed under hold order on 8/1/05. This herd is made up of 58 head of cattle on two pastures. A herd inventory was conducted and the animal of interest was not present within the herd. The owner of Trace Herd 6 had very limited records and was unable to provide further information on where the cow might have gone after he purchased her from the livestock market. A search of GDB for all cattle sold through the markets by that individual did not result in a match to the animal of interest. Additionally, many of the animals presented for sale by the owner of the herd had been re-tagged at the market effectually losing the traceability of the history of that animal prior to re-tagging. The animal of interest traced to this herd was classified as untraceable due to all leads having been exhausted. The hold order on Trace Herd 6 was released on 8/3/05.

Trace Herd 7

The owner of Trace Herd 7 was identified as having received an animal of interest and was placed under hold order on 8/1/05. Trace Herd 7 contains 487 head of cattle on multiple pastures in multiple parts of the State, including a unit kept on an island. The island location is a particularly rough place to keep cattle and the owner claimed to have lost 22 head on the island in 2004 due to liver flukes. Upon completion of the herd inventory, the animal of interest was not found present within Trace Herd 7. A GDB search of all recorded herd tests conducted on Trace Herd 7 and all market sales by the owner failed to locate the identification tag of the animal of interest. The cow was subsequently classified as untraceable. It is quite possible though that she may have died within the herd, especially if she belonged to the island unit. The hold order on Trace Herd 7 was released on 8/8/05.

Trace Herd 8

Trace Herd 8 received an animal of interest, which happened to be a known birth cohort of the index cow, from Trace Herd 5. Trace Herd 8 consists of 146 head of cattle that were placed under hold order on 8/4/05. A herd inventory was conducted, the birth cohort was found alive in the herd, and she was purchased and euthanized. The hold order on Trace Herd 8 was released on 8/4/05. The cow was sampled on 8/5/05 and BSE tested by ELISA at NVSL. Results were negative (as reported on 8/6/05); carcass disposal was completed by alkaline digestion.

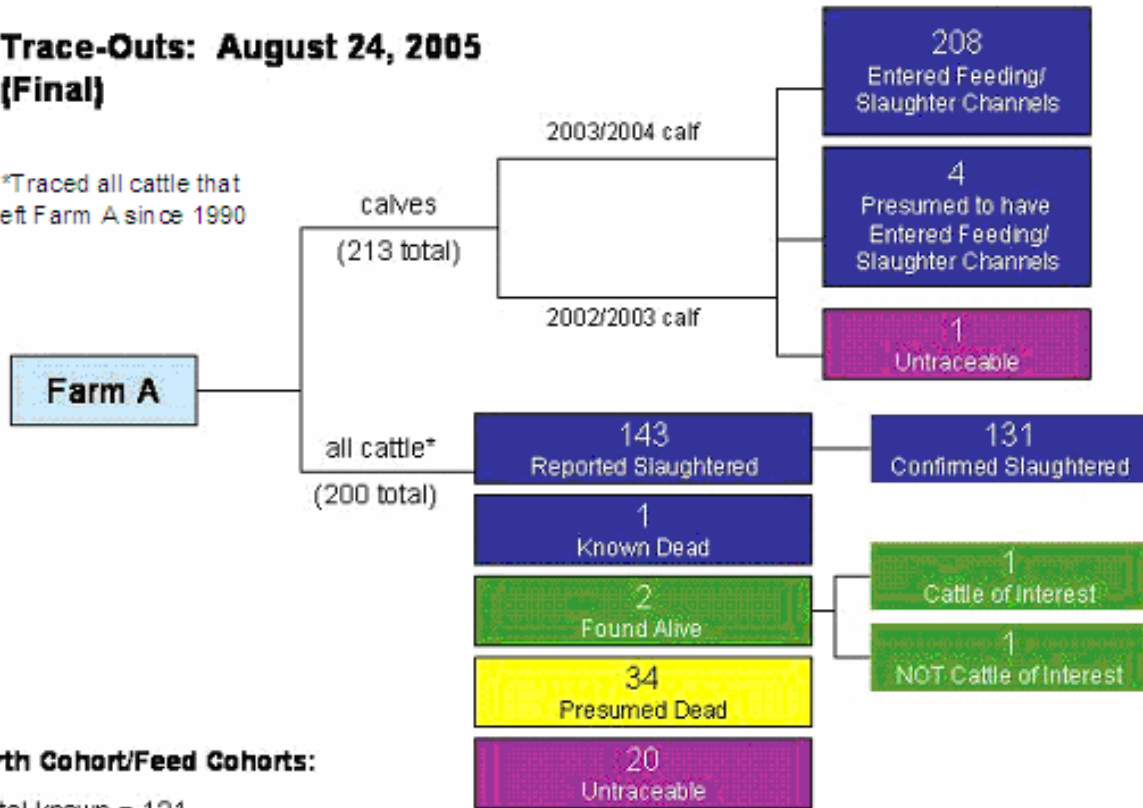
Analysis of Data on Presumed Dead and Untraceable Animals

CEAH performed an analysis of the minimum estimated ages of those COI that were classified as either presumed dead or untraceable to determine the likely disposition of those animals based on their ages. Moreover, CEAH performed an analysis of the likely disposition of the one calf that was classified as untraceable during the investigation.

Appendix 1 – Final Trace-Out Diagram

**Trace-Outs: August 24, 2005
(Final)**

*Traced all cattle that left Farm A since 1990



Birth Cohort/Feed Cohorts:

Total known = 121

Number found in Index herd = 42

Number known to have left herd = 25

(11 slaughtered, 13 presumed dead,
1 found alive – tested negative)