

米国の4例目 BSE 症例の疫学調査最終報告書(米国農務省動物検疫局:APHIS)の概要について

8月3日、APHIS が、4月24日に確認されたカリフォルニアで発生した4例目の BSE 症例の疫学調査最終報告書を発表。主な内容は以下のとおり。

1. 概要

APHIS は、国際獣疫事務局 (OIE) のガイダンスに従い、症例発見後、総合的な疫学調査を実施。これには化製場、発生農場、関連施設等の現地調査及び記録調査のほか、患畜の子孫及び出生コホート牛の追跡調査が含まれる。

2. 当該牛について

- ・患畜は、中部カリフォルニア州の酪農場で飼養されていた10歳7か月齢の雌のホルスタイン種 (化製場で歯列により5歳以上と確認された、電子記録によると2001年9月25日生まれの牛)
- ・跛行し横臥するようになった後に安楽死処分された。その後、サーベイランスの一環として化製業者が検体を採取した。
- ・免疫組織化学法とウェスタンブロット法による検査の結果、非定型 BSE 陽性と判定された。検体をカナダと英国の OIE レファレンスラボに送付したところ、非定型 (L型) BSE 陽性と確認された。
- ・当該牛の死体は、化製場で密閉され、法令に基づいて認定された場所に埋却された。

3. 産子牛及び出生コホート牛

- ・患畜の子孫で生きていたのは1頭のみで、安楽死させて検査した結果、BSE 陰性であった。
- ・患畜の出生コホート牛 (2000年9月25日～2002年9月25日までに出生農場で生まれたすべての牛) で、生存している牛は確認されなかった。

4. 飼料について

- ・米国食品医薬品庁とカリフォルニア州食品農業部の調査の結果、飼料供給業者12社のうち11社が現存しており、いずれも所定の規則要件を順守していた。

Summary Report

California Bovine Spongiform Encephalopathy Case Investigation

July 2012

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



Executive Summary

On April 24, 2012, the U.S. Department of Agriculture (USDA) announced a fourth case of bovine spongiform encephalopathy (BSE) in the United States. The index animal was a 10 year 7 month-old Holstein cow from a central California dairy. The animal was sampled by a renderer contracted to collect samples as part of USDA's ongoing BSE surveillance. Results from immunohistochemistry and Western blot tests at USDA's National Veterinary Services Laboratories (NVSL) confirmed the animal positive for atypical BSE.

Two offspring of the index animal were designated as at-risk cattle. One was traced out-of-State and depopulated with "not detected" BSE test results. The other offspring was stillborn. The carcass of the index animal (along with approximately 90 other carcasses being held at the renderer's transfer station), were disposed of in a landfill in accordance with all Federal, State and local regulations. The carcass of the index animal did not enter the human or animal food chain.

In conjunction with USDA's investigation, the U.S. Department of Health and Human Services' Food and Drug Administration (FDA) and the California Department of Food and Agriculture (CDFA) conducted an extensive feed investigation. Twelve feed suppliers were identified to the index premises; one of which was no longer in business. The remaining 11 were found to be in compliance with FDA and CDFA regulations and requirements.

APHIS BSE Response Plan

This epidemiologic investigation was conducted in accordance with USDA's 2012 BSE Response Plan. An Incident Command Post (ICP) was established on April 23 to prioritize and complete epidemiology and tracing of all at-risk cattle and cattle of interest in the index and all associated herds.

Renderer Investigation

On April 18, the renderer transported the index carcass from the index premises to the renderer's transfer station in central California; this transport included dead stock from other premises. Seventy-one cattle delivered to the transfer station from all dead stock collection routes were identified as meeting the targeted criteria for BSE surveillance. The renderer routinely tags cattle that meet BSE surveillance targeted criteria with official USDA alphanumeric "bright" identification (ID) tags at the point of farm pick up. The tags were provided by CDFA personnel who ordered the devices directly from USDA's Kansas City Warehouse. The driver recorded all ID tags applied to carcasses on a route sheet that provides a daily list of premises requiring carcass retrieval. The carcasses were processed in accordance with the renderer's standard procedures (i.e., hide removed, heads removed from animals to be sampled, and carcasses transected and held in trailers for shipment to the rendering plant).

Surveillance samples were collected from 66 of the 71 age-eligible cattle. Samples were not collected from all 71 carcasses because of uncertainty about the premises from which 5 of the 71 cattle were obtained. All sampled animals were recorded as "died of unknown cause" and all noted as having eruption of the second permanent incisor.

On April 19, brain stem samples were sent to the California Animal and Food Safety Laboratory in Davis, California, for BSE enzyme-linked immunosorbent assay (ELISA) testing. A submission was entered into USDA's Veterinary Services Laboratory Submission Web site by rendering plant personnel. The index animal was recorded as a 5-year old female Holstein (estimated based on dentition) with official USDA ID tag #93AOE1141 (inserted by the renderer), and owner ID tag #W-182. Rendering plant personnel routinely record animals with the dentition of a full mouth in wear as being 5 years-old and do not estimate older ages. Therefore, any submissions from this renderer with ages recorded as 5 years-old must be interpreted as being a minimum of 5 years-old, with the precondition that animals may be older.

On April 19, APHIS received a verbal report of a BSE inconclusive test result from the California laboratory with notification received by CDFA early on April 20. APHIS and CDFA interviewed the rendering plant manager on April 20, and quarantined the carcasses and hides being held by the renderer). Identification devices from all carcasses submitted on April 18 were collected and shipped to NVSL. Tissues on ID tags were tested to identify DNA matching the positive tissue (microsatellite testing).

On April 23, APHIS and CDFA returned to the renderer to inventory, photograph, and collect DNA samples from hides of carcasses processed at the facility on April 18. One of the hides was noted as having the premises brand for the index animal. Hide samples were submitted to NVSL

for DNA comparison with the positive tissue. NVSL confirmed that the index premises hide brand listed on the submission form matched the brain tissue of the positive submission and the tissue from the ID tag listed for the index animal.

On May 1, the carcasses held at the renderer's transfer station were moved to 10 plastic vaults and sealed. The vaults were transported to an approved landfill and buried in accordance with all Federal, State, and local regulations.

Index Premises Investigation

On April 24, CDFA reported NVSL's test results to the index herd owner and placed the premises under hold order. On April 25, an epidemiological investigation of the index dairy was initiated (approximately 1,400 head). The premises' electronic records showed the index animal as a Holstein cow born September 25, 2001, with no brucellosis vaccination information or official USDA tag recorded. Heifers born on the index dairy at that time were sent as neonatal calves to a calf ranch to be raised until 90 days of age. The index animal and female herd mates at the calf ranch were subsequently sent to a now defunct dairy (Dairy A) where heifer calves were grouped by age and penned with heifers that were born on Dairy A. The index cow and female herd mates returned to the index premises as pre-parturient heifers.

Since 2007, the index premises moved neonatal heifer calves to an alternate premises (referred to in this report as the associated premises) instead of using a calf ranch. These heifers were kept at the associated premises where they were bred. The cows returned to the index premises when they were 7 months pregnant as pre-parturient heifers (see Figure 1).

Prior to the index animal becoming recumbent and humanely euthanized, the animal exhibited hind limb lameness that was attributed to a fungal infection that was being treated. The animal was also described by the owner as growing progressively weaker. The cow had completed her seventh lactation and was due to calve on May 17.

Progeny Investigation

Two offspring of the index animal were designated as at-risk cattle. A May 12, 2011, calf was stillborn, and a May 26, 2010, Holstein heifer calf was traced to a herd associated with the index premises and shipped out-of-State on April 14, 2012. The receiving State veterinarian was notified of the trace animal on April 26. The animal was identified at the receiving premises and indemnified by USDA. The heifer was humanely euthanized on April 28 and submitted for BSE ELISA testing at NVSL. Test results on May 1 reported "not detected" results on obex, cerebellum, and brain. The carcass was incinerated. NVSL parentage test results reported on May 14 confirmed the heifer was the offspring of the index animal.

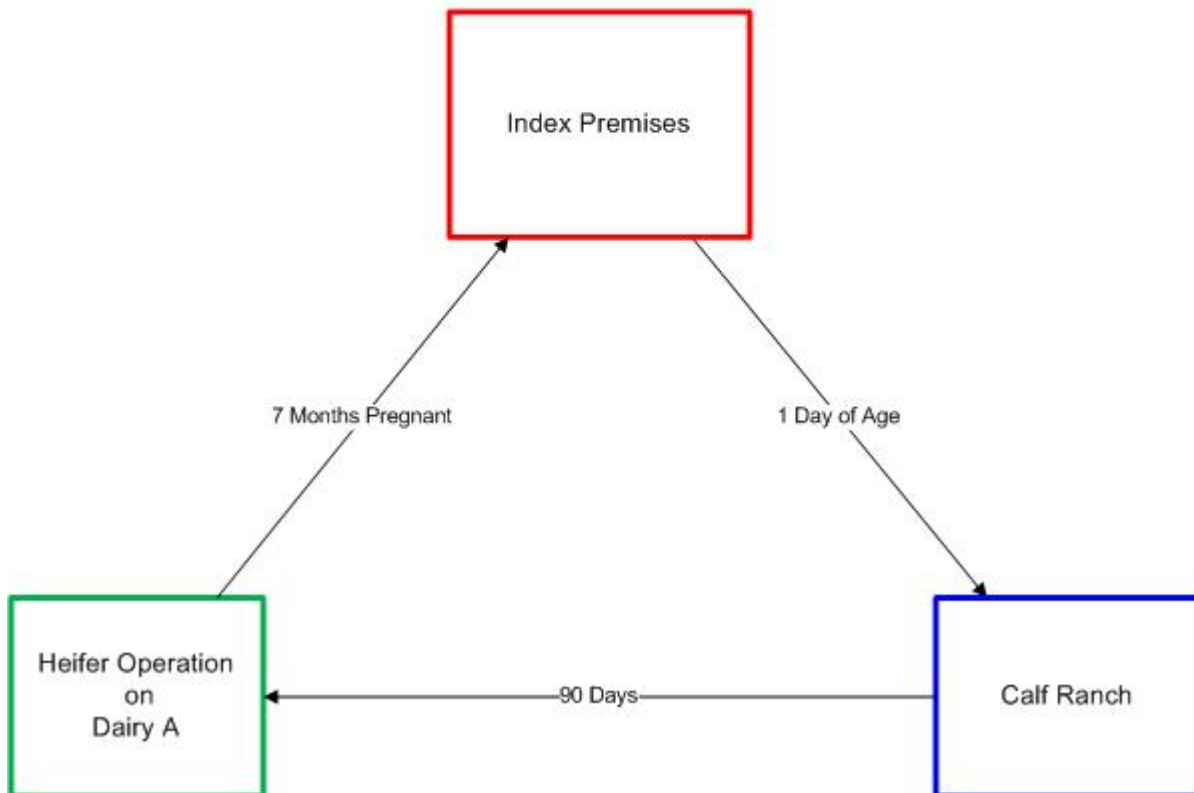
Birth Cohorts Investigation

No birth cohorts were identified in the index herd's inventory. Birth cohorts, as defined in the BSE Response Plan, include all cattle that were born on the positive animal's birth premises within a 24-month time period, from 1 year before the date of birth of the BSE-positive animal to 1 year after that birth (i.e. September 25, 2000 and September 25, 2002).

Electronic herd records for cattle in inventory on the index dairy were queried to identify animals with birthdates to qualify as birth cohorts. The data showed one record of an animal born in the specified date range; however, the cow was subsequently determined to have been a purchased addition (i.e., entered the index herd as a pre-parturient heifer), thus ruling it out as a birth cohort. On April 30, a physical inventory using Mobile Information Management System (MIMS) technology was conducted to confirm no additional birth cohort animals on the premises not identified in the electronic records as being in inventory with a known birthdate. All ID devices were recorded and radio frequency identification eartags (RFID) were applied to 1,470 cattle. All animals in the inventory were reconciled with the electronic inventory records; therefore, no birth cohorts were identified in the index herd's inventory.

Figure 1

Index Animal Movement History



Tracing Birth Cohorts from the Index Premises

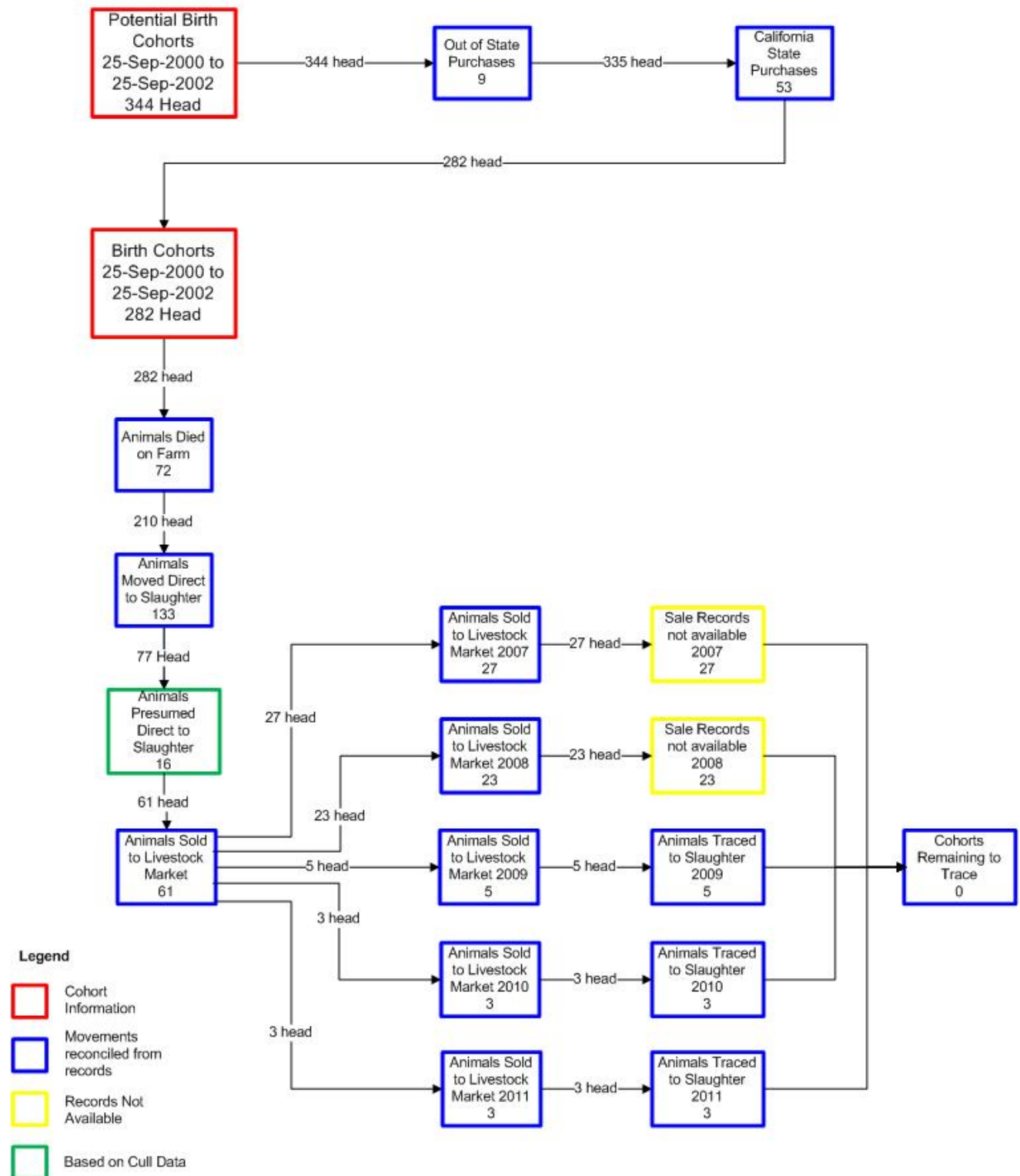
The size of the birth cohort was estimated using the CDFA Animal Health Information System database and was based on the size of the index dairy at the time the index animal was born (approximately 1,000 head). Assuming one calf per head per year, the size of the 2-year birth cohort of the index animal was an estimated 2,000 head, half of which would have been bull calves.

The index dairy routinely sold bull calves to a buyer who subsequently sold the animals as veal or feeding for beef. The bull calves were of grade quality and unlikely to have been purchased with the intent to use as breeding animals. Therefore, the remaining estimated birth cohort was

1,000 head of heifers. Records from electronic herd records were obtained for all cattle that exited the index premises (exit data); however, the owner was unable to provide data for cattle that left the premises before January 1, 2007. Potential birth cohorts (i.e., animals with birth dates within 1 year of the index, but unknown if they were purchased or natural additions) that left the index dairy prior to the discovery of a BSE positive animal were identified from available electronic herd records. The records included management ID, official USDA ID, birth date, exit date, exit reason, and cull reason. Data were available for 344 potential birth cohorts. Figure 2 outlines the disposition of the 344 potential birth cohorts for which records were available.

Figure 2

Disposition of Recorded Birth Cohorts to the Index Animal



Because the exit data did not differentiate between purchased and natural additions, brucellosis vaccination data was used to identify cattle that were tagged with official brucellosis ID applied in herds other than the index herd. Nine cattle were determined to have been vaccinated or officially identified in another State, and 53 were identified as having been vaccinated in and originating from California dairy operations other than the index herd. Sixty-two animals were classified as purchased cattle and ruled out as birth cohorts.

The remaining 282 cattle (that died or were sold since January 1, 2007) were identified as birth cohorts of the positive animal. Electronic records indicated that 72 birth cohorts died on the farm, leaving 210 sold cattle that required tracing.

Cattle Sales Investigation

The herd owner's electronic records showed 1, 897 cattle sold (based on records of identified checks received from the local slaughter plant or livestock market since 2007). Data included information on the date checks were deposited, the number of animals, and the buyer (livestock market or slaughter plant). Exit data were summarized to obtain a total number of cattle sold by individual dates. A column for the number of birth cohort animals leaving on individual dates was added.

Financial records were sorted by deposit date and compared to cattle exit dates to correlate animal exits with specific financial transactions, thereby linking the exit date of an animal or group of animals with a disposition either to a market or a slaughter plant. Records at the CDFA district office were investigated to locate the consignor for sales to livestock markets. All sales of birth cohort cattle to livestock markets were to one market (market A). Sixty-one birth cohort cattle were sold to this market and required additional tracing. A total of 133 cattle were determined to be consigned directly to slaughter (132 to plant A and 1 to plant B). Sixteen birth cohorts could not be traced to a livestock market or slaughter plant and required additional analysis.

CDFA district office market records were reinvestigated to determine whether the 16 birth cohort cattle were consigned to livestock markets. No record of consignments from the index farm to a livestock market was located that corresponded to the exit dates. USDA analysis of the herd owner's electronic records indicated that most cows (85 percent) consigned to livestock markets were culled for low productivity, and most cows (84 percent) sent directly to slaughter were culled for other reasons such as mastitis, reproductive problems, sickness or injury. Data also showed that consignments to livestock markets consisted of 7 to 24 cattle, with most (84 percent) shipments consisting of more than 7 head of cattle. The following chart shows the cull reason and group size of the 16 birth cohort cattle (including both birth cohort and other cattle exiting the herd for the same cull reason).

Cull Reason	No. Culled	No. Birth Cohort
Sold Mastitis	3	1
Sold Mastitis	6	1
Sold Injury, Sick	6	1
Sold Injury, Sick	2	1
Sold Injury, Sick	4	1
Sold Abort	1	1
Sold Injury, Sick	3	1
Sold Mastitis	4	1
Sold Injury, Sick	7	1
Sold Mastitis	7	1
Sold Injury, Sick	13	1
Sold Injury, Sick	5	1
Sold Low Productivity	1	1
Sold Low Productivity	2	1
Sold Abort	8	1
Sold Injury, Sick	7	1
Total	79	16

None of the cattle fit the pattern for cows consigned to a livestock market. Those culled for low productivity were sold in groups of one and two head. Multiple payments were received from slaughter plants during this period. Based on this information, the 16 cattle were considered as consigned directly to slaughter.

Sixty-one birth cohorts were traced to livestock market A. Consignor records were obtained for these sales from the CDFA district office. Livestock market A was contacted to supply the buyer records for these sales. Market records at the market of interest were maintained for 3 years (markets are only required to retain records for 2 years). The chart below illustrates the cohort traces by year.

Livestock Market Traces By Year	
Year	Birth cohorts
2007	27
2008	23
2009	5
2010	3
2011	3
2012	0
Total	61

Fifty birth cohort animals consigned to the market in 2007 (27) and 2008 (23) could not be traced because buyer records were no longer available for these sales, resulting in 11 traceable

birth cohorts. The following chart shows information from the market for 2009 to 2011 sale dates.

Buyers for Consignments With Birth Cohort Cattle 2009 – 2012									
Sale Date	Birth Cohorts	Total Consigned	Plant A	Slaughter Buyer A	Plant C	Plant D	Plant E	Plant F	Slaughter Buyer B
2/11/09	2	11	9	2					
9/22/09	1	15	8	7					
11/12/09	1	15	3					12	
12/14/09	1	24	6	1	11	3	3		
6/30/10	1	14	4	2	5		2	1	
10/20/10	1	16	12	1				3	
11/1/10	1	9	6	2		1			
1/12/11	2	19	3	7		2	6		1
1/27/11	1	10	5	1				4	

One buyer was from a State other than California. All cattle were purchased by slaughter plants or slaughter buyers.

Associated Premises Investigation

Since 2007, the index premises moved neonatal heifer calves to another premises (referred to in this report as the associated premises) instead of using the calf ranch. The heifers stayed at the associated premises where they were bred and returned to the index premises when the animals were 7-months pregnant (see Figure 1). Currently, heifers are sold from the associated premises instead of returning to the index premises.

A physical inventory was done on April 28 using MIMS. All ID devices were collected and RFID ear tags were applied to all cattle (4,374). This inventory was compared to the electronic herd records to validate the accuracy of the records in which no birth cohort animals had been identified as present. No additional at-risk cattle were identified after reconciliation of the electronic records with the physical inventory. On May 1, all adult cattle were removed from “cattle of interest” designation and the quarantine released on those cattle.

Calf Ranch Investigation

There were no records from the calf ranch to identify animals exposed to the potentially contaminated feed as the index animal. The FDA and CDFA investigations found no evidence that this facility had received animal proteins prohibited in animal feed.

The calf ranch on which the index animal had resided for the first 90 days of life had moved from the location it had been at the time the index animal was present. There are no records for the time period that the index animal was there. Based on interviews with the chief financial

officer and owner, there was no evidence that this facility had received animal proteins prohibited in animal feed.

Investigation of Feed Suppliers of the Index Premises

Twelve feed suppliers were identified as feed suppliers to the index premises; one operation is no longer in business. The remaining 11 were found to be in compliance with FDA and CDFA requirements.