

REPORT OF THE COMMITTEE ON TUBERCULOSIS

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Vice Chair: Dr. Kathleen M. Connell, Olympia, WA

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The Committee met on October 25, 2004, from 12:30 pm-7:00 pm. There were over 145 attendees. Chair Chuck Massengill presided assisted by Vice Chair Kathleen Connell. After welcoming the Committee members and guests, the Chair reviewed the day's agenda.

Dr. Massengill briefly discussed the revised Bovine Tuberculosis (TB) Eradication Uniform Methods and Rules (UM&R) for cattle and

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bison. When the subcommittee formed to revise the UM&R provided a final draft, the document received unanimous approval from the full Committee. The recommended changes to the UM&R will be submitted to the USAHA President to be forwarded to the Deputy Administrator, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS). Attendees were urged to submit any suggested changes after reviewing and using this document.

Dr. Eric Ebel, USDA-APHIS-VS, gave a status report of the bovine TB eradication program in the United States. The full text of his report is included in these proceedings.

Dr. Carolyn Inch, National Manager, Disease Control, Animal Health and Production Division, Canadian Food Inspection Agency, Ottawa, Ontario, Canada, presented the "Status Report on Bovine Tuberculosis in Canada" prepared by Dr. Maria Koller, Senior Staff Veterinarian. Dr. Inch provided details on eradication, surveillance and area surveillance testing efforts for cattle, farmed bison and farmed cervids. Dr. Inch's complete report is included in these proceedings.

Dr. Luisa Pamela Ibarra, Director of Animal Health Campaigns, Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA), Mexico City, Mexico, gave the "Status Report on the Campaign Against Tuberculosis in Mexico." Dr. Ibarra discussed the classifications of states, TB testing and the Accredited Free herds. There are 18 states approved to ship cattle to the United States and 14 Non-approved states. Many Accredited Free herd owners receive a premium for their milk, which is an immediate benefit of the TB program and the producers.

Mexico reported that 2,590,583 tuberculin tests have been performed this calendar year. A reactor rate of 0.40% representing 10,455 animals in 2004 compares to a reactor rate of 0.54% in 2003. Mexico has accredited 3,759 tuberculosis free herds so far in 2004. The cattle export season of 2003/2004 resulted in the movement of 1,372,456 cattle compared to 969,191 cattle in 2002/2003. Slaughter surveillance in the United States discovered 15 animals with tuberculosis for an infection rate of 0.15/10 000 for 2003/2004 compared to a rate of 0.21/10,000 for 2002/2003. Dr. Ibarra described many of the ongoing initiatives in Mexico including work to modify the national animal health program standards, continue training of veterinarians involved in all aspects of the tuberculosis program, continue to identify regions of low tuberculosis prevalence, and continue depopulation of affected herds.

Dr. Billy Johnson, Bi-National TB and Brucellosis Committee (BNC) Coordinator, Conway, AR, and Dr. Alejandro Perera, USDA-APHIS, International Services, Mexico City, Mexico, presented a report on BNC activities. In addition to reviewing the history of the BNC, he discussed TB reviews in Mexico, the waiver conditions document and the current status of states.

Dr. Johnson gave a brief history of the 16 member BNC from the

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formation in 1993, the time of operation under the Border States Consensus Document, the transition to the current operation under the standards of the United States domestic rule and the addition of brucellosis programs. He discussed the effect of the waiver of the whole herd test required in Accreditation Preparatory states. He explained that all approved states must submit an annual report to USDA of the activities in their bovine tuberculosis. He reported that as the eradication program continues in each country new problems develop an example of these problems was the concern over the movement of animals from non-status states to states approved to export cattle to the United States. The movement of breeding stock under these conditions was addressed by establishing Certified Accredited Free Herds. The Committee will follow this program to assure that it is working as intended and does not allow the spread of tuberculosis.

Dr. Perera gave a presentation describing the ten conditions evaluated during review of a Mexican state for status under the USDA standards. He explained the five status levels and cattle movement requirements associated with each level. He explained in detail the particular information used to evaluate the compliance with each condition.

Dr. Michael S. VanderKlok, Michigan Department of Agriculture, Lansing, MI, gave an update on bovine TB activities in Michigan. Michigan began a cooperative effort in 1995 with USDA, Michigan Department of Natural Resources, Michigan Department of Community Health, Michigan State University and the livestock industry to control and eradicate bovine TB from the state. This program was enhanced at routine intervals since that time and was expanded from efforts based primarily in the northeastern portion of Lower Michigan, where the disease had been discovered in free-ranging wildlife and livestock, to include surveillance of all cattle, goat and bison herds within the state.

Since the implementation of mandatory statewide whole herd TB surveillance in January 2001, over 990,000 animals in 17,000 herds have been tested. In addition, mandatory TB surveillance instituted for privately owned cervid herds in 1998 has resulted in over 34,000 negative single cervical tests and over 3,600 animals declared negative on slaughter surveillance. No bovine TB has been discovered in any privately owned cervid herds since that time. Currently, 32 cattle herds, all located in the Modified Accredited area of Lower Michigan, have been found to be infected. Only 70 positive animals have been found in the approximately 3,000 animals contained within those herds and 30 of the herds contained 2 or less infected animals. The number of TB infected cattle herds has decreased from seven in Fiscal Year 2001, to five in FY 2002 and three in FY 2003.

In addition, extensive TB surveillance in wildlife has included over 123,000 white tailed deer tested and over 1,500 non-cervid wildlife tested. This testing has revealed 481 infected white tailed deer and 42 positive non-cervid wildlife. Over 80 percent of the infected deer were

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located in a small area of the northeastern section of the Modified Accredited area and distribution of lesions in non-cervid wildlife has indicated that it is a spill-over host and not likely to cause transmission of the disease. Apparent prevalence in white tailed deer in the core area has been reduced from 4.9 percent in 1995 to 1.7 percent in 2003. The infection in yearlings, an indicator of newly infected animals, has been reduced from 1.9 percent to 0.3 percent in that same time frame. The strategies of reducing herd numbers and eliminating feeding and baiting, thought to be the primary causes allowing perpetuation of the disease, appear to be having an effect.

Michigan was granted official bovine TB split state status on April 19, 2004, which moved the majority of the Lower Peninsula and the entirety of the Upper Peninsula to Modified Accredited Advanced status. Along with this approval, state authorities were modified to require surveillance and movement requirements that are equivalent to those contained within the current draft revision of the UM&R. An aggressive animal identification, tracking and monitoring system was instituted for all cattle within the Modified Accredited area, which includes radio frequency identification device identification of all animals and an electronic tracking and permitting system for all cattle moved within this area. In addition, automatic tracking systems were installed and are operating in 12 Michigan livestock markets and seven slaughter plants located around the United States. A premises and individual animal identification system for the rest of Michigan is in the final stages of implementation.

Surveillance in the Modified Accredited zone is entering its third annual period. This surveillance includes annual whole herd testing of all 1,100 cattle herds located within this area and a random based surveillance program of 1,800 herds in the Modified Accredited Advanced area every two years. This random surveillance program is designed to detect 0.2 percent prevalence at 95 percent confidence, in addition to ongoing slaughter surveillance of over 350,000 cattle that undergo USDA, Food Safety Inspection Service inspection from Michigan each year.

Expansion of activities to eliminate the risk of TB transmission between livestock and wildlife is being implemented. This expansion includes mandatory risk reduction procedures in previously infected and TB accredited free-herds and implementation of educational programs and continued research into ways to eliminate this risk. USDA-APHIS Wildlife Services (WS) is a key contributor in this effort, including intensive efforts relating to assessment and control activities at infected farms. Michigan has also recently submitted an application for Accredited Free status for the Upper Peninsula, which has not had a case of bovine tuberculosis in any species, including wildlife, since prior to 1975.

Mr. Peter Butchko, State Director, Okemos, MI, and Mr. Mike Dunbar, Project Leader, both from USDA-APHIS-WS, presented a report on

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the activities of Wildlife Services in Michigan. USDA-APHIS-WS is participating in many programs to reduce the risk of transmission of bovine tuberculosis from wildlife to cattle. They provide deer removal at the request of the landowner. The meat is donated to charity and the heads are submitted for Chronic Wasting Disease (CWD) surveillance. This assistance has been requested on ten farms so far. Another program is to provide fencing materials and the pay the cost of fence construction to exclude wildlife from feed storage areas. The landowner is responsible for maintenance of the fence and Wildlife Services makes visits to evaluate effectiveness. So far the fences have excluded wildlife from the fenced areas. Areas under fence range from 0.1 acre to 3 acres.

By working cooperative with the involved agencies and the live-stock producers, wildlife services is able to perform observations on affected premises before the herd is depopulated and therefore better able to evaluate the interaction between wildlife and cattle. There is also more intensive sampling of wildlife including deer and small mammals.

The trapping of wild deer, collection of blood samples and application of a radio collar that can be detached remotely allows for the testing of animals with the Cervigam® test. The positive animals can be located and culled. Radio collars from negative animals can be detached and recovered for re-use.

USDA-APHIS-WS in Michigan also assists with the research projects in Michigan.

Mike Dunbar discussed the findings of a variety of animal species testing positive for bovine tuberculosis in Michigan. The positive animals were white tail deer, coyote, bobcat, red fox, grey fox, raccoon, opossum, and black bear. Dunbar also described studies to determine the amount of direct contact between cattle and deer. During the study, on case of direct contact occurred and was concluded to be an extremely rare occurrence. However, indirect contact between deer and cattle was found to be a fairly common occurrence. Various studies are in process to evaluate such means as dogs, fences, and scary devices to protect cattle from direct and indirect contact with wildlife. A study is also in process to evaluate the use of coyotes as sentinel animals due to their relatively small home range and their status as second most common tuberculosis infected wildlife in the study area.

Dr. Konstantin Lyaschenko, Chembio Diagnostic Systems, Inc., Medford, NY, gave a presentation entitled "Serological based assay for detection of tuberculosis in multiple species." He described the MultiAntigen Print ImmunoAssay, a rapid test based on lateral-flow immunochromatography, and the use of various antigens including synthetic peptides, recombinant proteins and polyepitope fusion proteins.

The assays detect antibody responses in samples from white-tailed deer and cattle experimentally infected with *M. bovis*. The assays have

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also been used for detection of antibody responses in naturally infected cattle, elephants and other animal species. Results presented demonstrated that antibody responses varied among different antigens used for the assays. Using a combination of antigens resulted in detecting more infected animals than using any single antigen.

Ms. Diana L. Whipple, USDA, Agriculture Research Service (ARS), National Animal Disease Center (NADC), Ames, IA, and chair of the Scientific Advisory Subcommittee (SAS), gave the SAS report. The report was approved by the Committee and is included in these proceedings.

Dr. Dan Baca, USDA-APHIS-VS, San Antonio, TX, reported on Tuberculosis Surveillance in Captive Cervids. Dr. Baca serves as Chair of the Cervid TB State Status Working Group. Dr. Baca discussed the amount of sampling to detect tuberculosis at various levels of infection with various levels of confidence in a herd and in a state. The working group separated cervid herds into marketed operations which move live animals and non-marketed operations which do not move live animals. He described the specific requirements for cervid tuberculosis status in a state or zone including:

- State authority and infrastructure;
- Demographics of the cervid industry;
- Interstate and intrastate movement regulations;
- Movement test requirements;
- Animal identification requirements;
- Surveillance-live animal tests, slaughter inspection, postmortem examination;
- Biosecurity in states or zones with a wildlife reservoir of TB; and
- Monthly and annual reports.

He also discussed four proposed TB surveillance plans for a state or zone. The working group recommended the adoption of the plan with four levels of state classification. That plan assigned: Non Status-infected herd prevalence of 6% or greater; Modified Accredited-infected herd status less than 6%; Modified Accredited Advanced-infected herd status less than 1%; and Accredited Free-infected herd status less than 0.1%.

The Committee instructed the chair to forward the information to the Cervid Uniform Methods and Rules Subcommittee encouraging the use of the four status level recommended by the working group.

Dr. Bill Johnson, TB Eradication Strategic Plan Subcommittee Facilitator, Conway, AR, presented the 2004 Strategic Plan for the Eradication of Bovine Tuberculosis in the United States. Dr. Johnson reported that the subcommittee was formed at the request of President

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Don Lein and President-Elect Rick Willer. Twenty-three people were appointed to the subcommittee and worked for three months to revise the 2000 Strategic Plan in 2004. Four strategies were delineated in the 2000 plan: an eradication strategy with a total cost estimate of \$10.4 million; a wildlife management and TB strategy with a total cost estimate of \$2.55 million; a laboratory and diagnostic support strategy with a total cost estimate of \$5.3 million; and a surveillance strategy with a total cost estimate of \$5.6 million. Two additional strategies were added to the 2004 plan: an outreach strategy with a total cost estimate of \$2.04 million; and a risk mitigation strategy with a total cost estimate of \$7.45 million. The total per year cost of the 2004 Strategic Plan for the Eradication of Bovine Tuberculosis is \$38.84 Million for five years. The 2004 Strategic Plan for the Eradication of Bovine Tuberculosis is included in these proceedings.

Dr. Dan Baca, USDA-APHIS-VS, San Antonio, TX, gave a report on Use of the Gamma Interferon Assay in Texas in 2004. Dr. Baca had presented the same report in writing during the SAS meeting.

Dr. Larry Judge, USDA-APHIS-VS, Lansing, MI, presented a talk entitled "Gamma interferon testing experiences in Michigan". Dr. Judge had presented the same talk earlier during the SAS meeting.

At the conclusion of the formal presentations, Dr. Massengill reported on Resolutions and Recommendations from 2003. Dr. Ron DeHaven, former Deputy Administrator, USDA-APHIS-VS, had responded in writing to all three recommendations from 2003. Dr. Massengill read those responses to the attendees.

Three recommendations were approved by the Committee.

1. USDA-APHIS-VS should compile and analyze data on all skin testing done on reindeer in the United States. Data should be presented to the SAS before the 2005 USAHA meeting to determine if the scattergram for reindeer should be further modified to improve specificity of the CCT.
2. USDA-APHIS-VS should adopt and implement the revisions to the TB UM&R as prepared by the special subcommittee on the UM&R and adopted by the Committee.
3. The Cervid UM&R Subcommittee should include the state status surveillance plan recommended by the working group on surveillance methods.

One resolution was approved by the Committee and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. That resolution urged USDA-APHIS-VS to adopt and implement the 2004 Strategic Plan for the Eradication of Bovine Tuberculosis.

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STATUS OF THE STATE AND FEDERAL COOPERATIVE BOVINE TUBERCULOSIS (TB) ERADICATION PROGRAM FISCAL YEAR 2004

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Part I. Status and operations

For the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Tuberculosis (TB) Program, fiscal year (FY) 2004 saw some decline in the number of cattle herds that were found to be TB-infected relative to the previous year. In FY2003, a total of 10 infected herds were found. In contrast, only six infected herds were discovered in FY2004. Although slaughter surveillance for TB continued to improve through FY2004, four of the six newly discovered herds were the result of active surveillance programs in Michigan and Texas (i.e. not because of infection first detected at slaughter). One of these six newly discovered herds was disclosed via interstate testing requirements imposed by a State, while the remaining infected herd was disclosed as a result of epidemiologic tracing from the herd detected via interstate testing. Therefore, surveillance systems other than slaughter inspection were responsible for all infected herds detected during FY2004.

At the end of FY2004, 46 states, Puerto Rico and the U.S. Virgin Islands were TB Free. Texas, New Mexico and California are currently classified as Modified Accredited Advanced. During FY2004, Michigan was granted split state status. Therefore, Michigan is now divided into two zones; 11 counties and portions of two other counties in north-eastern Lower Michigan continue to be Modified Accredited while the remaining counties in Michigan have been classified as Modified Accredited Advanced.

Three of the six infected cattle herds discovered in FY2004 were in Michigan. One beef herd and two dairy herds were identified in north-eastern Lower Michigan. The most probable source of these infections is spill-over to the cattle from the endemic infection in free ranging white tail deer in that area of Michigan. One newly affected dairy was found in Texas during that State's massive active surveillance project during FY2004. One consequence of that detection is Texas' count-down until application for Accredited Free status is now delayed until latter 2006.

During FY2004 two newly affected premises were dairy calf growing operations in Arizona and New Mexico. Such premises pose substantial problems for the national TB program. Identification systems

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for young dairy heifers and steers have not supported epidemiologic tracing of infected and exposed cattle in these investigations. Nevertheless, both of these dairy calf operations are responsible for supplying commercial dairies throughout the United States with large numbers of replacement heifers. Completing the epidemiologic trace-outs from these affected premises, in a timely manner, is critical to identifying potentially exposed commercial dairies and preventing subsequent infection in those dairies, as well as other dairies that receive cattle from these dairies.

These two calf raising operations also supply large numbers of Holstein steers to feedlots throughout the United States. During FY2004 there were 11 Holstein steer cases identified on slaughter surveillance (via VS Form 6-35 investigations) as TB-infected. Many of these cases likely trace-back to these, or other similar, calf-raising operations. Therefore, the role that growing facilities might play in transmitting infection within their cattle populations, and subsequently disseminating TB infection to other herds in the United States, must be evaluated. Notably, the detection of this many Holstein steer cases is reminiscent of a period in the early 1990's in the United States when a large share of the TB cases detected at slaughter were Holstein steers imported from Mexico. In response to these cases, the United States placed an embargo on Holstein cattle from Mexico. As a result of this regulatory action in the mid-1990's, TB cases among Holstein steers were essentially eliminated in the United States until this year.

Discovery of TB in these dairy calf growing operations raises multiple hypotheses concerning the source of their infection. One possibility is that these growing operations purchased calves from infected U.S. dairies that have not been detected through our various surveillance systems. This hypothesis seems less plausible given the large number of dairies that have recently been tested in California, Texas and New Mexico without detection of any heavily infected herds. Such surveillance evidence does not rule out the possibility that one or more heavily infected dairies might exist in the States that primarily supply the calves to these operations, but it certainly lowers the likelihood of that hypothesis being true. The plausibility of this hypothesis is further diminished when we consider that most dairy calves in the western United States spend a very small amount of time in their birth herds before they move into calf raising/grower marketing channels. This consideration suggests that these calves seemingly have a low likelihood of substantial exposure to TB while in their birth herds. If these calves are not entering the calf grower operation infected, then they must become infected while in residence there. This possibility raises questions about the potential exposure of dairy calves to feeder animals housed in the same operation. Mixing of dairy calves with feeder cattle might explain how these dairy calves become infected. If this

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hypothesis were true, then the source of infection for the feeder cattle would need to be determined. Other possible hypotheses include the entry into these calf-raising operations of calves moved illegally from known-infected herds or areas; a persistent environmental reservoir; or exposure of calves to infected cattle prior to their entering the calf-raising operation.

To sort out these hypotheses, VS will provide more epidemiologic resources to investigate these occurrences in New Mexico and Arizona. These resources include assembling teams to complete the massive amount of trace-in and trace-out testing generated from these premises. Nevertheless, the potential for successfully concluding these investigations is hindered by our inability to trace younger cattle and account for their movements throughout their lifetimes. The shortcomings of our investigations may highlight the importance of good identification and traceability for U.S. cattle. However, VS is committed to investigating these operations to the greatest extent possible with the goal of uncovering how these dairy calves became infected.

Depopulation of the two dairy calf growing operations, the Texas dairy herd and the Michigan beef herd was accomplished in FY2004. There remain four affected dairy herds (2 large herds in New Mexico and 2 small herds in Michigan) under test and removal herd plans. The New Mexico dairies are carryover herds from FY2003 while the Michigan dairies were detected this year. In FY2004 two other dairies in Michigan that were detected in FY2003 qualified for quarantine release following a test and removal herd plan. Affected herds in Michigan will no longer be able to qualify for release of quarantine without meeting the requirements of the revised UM&R which are generally six or more tests without infection over a 4-5 year time frame.

The FY2004 depopulations were accomplished at the cost of \$6,547,971. Indemnity costs for caudal fold tuberculin test positive animals in affected herds, comparative cervical tuberculin test- or gamma interferon-positive and suspect animals in non affected herds and for certain other situations were \$903,245 for the fiscal year. These funds were paid out to 262 different producers. Total indemnity costs for all purposes were \$7,478,217.

In FY2004, a process for transferring indemnity funds from staff to the regions in \$50,000 increments was implemented with good results. This process has improved the government's service to affected producers by shortening the time it takes to indemnify them. The availability of these funds has improved the efficiency of our diagnostic capabilities in the TB program – it has expedited diagnostic investigations by enabling suspect cattle to be slaughtered and examined for evidence of TB instead of waiting for 60-day retests of suspicious animals (during which time the entire herd is quarantined pending classification of the suspect).

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There were no TB infected captive or farmed cervid herds found in FY's 2000 and 2001; three were found in FY2002, none were found in FY2003, but one was found in FY2004. These numbers continue to be encouraging, considering that a total of 41 infected cervid herds have been disclosed in the U.S. since 1991, but only four affected herds have been found in this century. Of those affected herds, 30 were depopulated (including the herd found this year) and 11 were tested out and qualified for release from quarantine. One of these 11 herds was a recrudescence and was again found to be affected this fiscal year, and was depopulated as noted above.

Nevertheless, there is continuing concern that the level of surveillance for TB in captive cervids may be inadequate. During FY2004, a working group of State-Federal personnel developed a surveillance plan for captive cervids that was presented to, and conditionally approved by, cervid industry leadership. This surveillance plan is integral to the TB eradication program's designation of individual State's TB status. This surveillance plan outlines necessary procedures for achieving and advancing through the different TB status levels (e.g. Modified Accredited to Accredited Free). Given the evolution of this plan, an interim rule that would reclassify the status of 23 states has not been published. The current captive cervid status of all States, therefore, remains at Modified Accredited. During this meeting of the USAHA Committee on TB, the surveillance plan for captive cervids will be presented for discussion and input. In addition, work has begun on drafting a Uniform Methods and Rules (UMR) document specifically for captive Cervidae. If the surveillance issue can be resolved, we expect that a revised UM&R will be available sometime during FY2005

Currently there are 14 states and the U.S. Virgin Islands that have achieved and maintained their TB Free status for over 25 years; 16 states that have been TB Free for 15 or more years; 8 states that have been TB Free for 10 or more years; and 8 states and Puerto Rico have been TB Free for 5 or more years. Given the six herds discovered this year and the four herds that remain under quarantine from last year, there are 10 infected herds among the estimated 1,086,210 cattle herds in the United States for FY2004. Therefore, the national prevalence for FY2004 is estimated to be 0.0009%, or one affected herd per 108,621 U.S. herds. Though TB does exist in the United States, this extremely low level of prevalence should certainly be a significant factor in convincing international trading partners of the very low level of risk with TB in our cattle; and especially so for cattle originating in states with no disease for 5 or more years, of which there are 46 (and two territories). Additional evidence for the low incidence of TB in the US is provided by the low prevalence of infection detected during the extensive active surveillance activities in California, Texas, Michigan, and New Mexico during FY2003 and FY2004.

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VS is overseeing the implementation of the agreements to remove all dairy operations from the El Paso, Texas milk shed. The process is progressing as anticipated and is on track to be completed during FY 2006. There are a total of 9 dairy operations, some with multiple production units, being removed to create a buffer zone between the U.S. and the TB affected dairy operations immediately across the border in Juarez, Mexico. Five of the 9 operations have completed the depopulation of their livestock. Cleaning and disinfection is complete for three of these depopulated dairies. Currently, VS has two personnel, and Texas Animal Health Commission (TAHC) has one person, who are responsible for ensuring that every animal leaving any of the premises is identified and permitted to slaughter or a quarantined feedlot for eventual slaughter. This oversight will continue until all the herds are completely depopulated within the next two years. With one exception, the remaining premises with cattle have removed substantial numbers of their dairy cows. These cows were inspected at slaughter and, to date, have not had TB lesions detected. The rather complicated legal details for ensuring that each depopulated dairy will remain out of operation, in the El Paso area, for at least the next 20 years are nearly finalized for one of the depopulated herds and will be finalized for the others in due course.

Also, during this fiscal year, the TB reviews in Mexico have been ongoing under the umbrella of the U.S./Mexico Bi-National Tuberculosis Committee. Thirteen States or Regions in Mexico have had status either suspended or granted or continued as a result of this activity. One of the milestones in the phased transition of Mexican States or Regions to equivalence with the U.S. program was to reach a prevalence level of .25% by June of 2003. The second milestone is to achieve 0.1% prevalence and qualify as equivalent to the U.S. Modified Accredited status by June of 2005. These milestones have been and will be a focal point for the Review Teams. For this fiscal year there have been 16 review trips completed during which time the teams review the TB program integrity, progress and the level of prevalence. These efforts have covered 13 states in Mexico. The travel, salary and related costs covered by Veterinary Services (VS) were \$242,067. There were 5 reviewers working under contract, 5 that were VS or IS employees, and 7 that were employed with and paid by state or industry from Texas, Oklahoma, Missouri, New Mexico and Arizona. The financial contributions of those states and industry groups are recognized.

Though remarkable progress has been made in the National TB Program, much work remains. Eradication is a daunting goal and it is the nature of eradication campaigns that the difficulty of the work increases as the goal gets closer. During FY2004, progress was made in bolstering the foundations of the National TB program to enable us to achieve our goal. A revised UM&R for cattle and bison was com-

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pleted by a State-Federal working group. It is intended that this UM&R be finalized at this USAHA meeting. Nearly all of the VS memoranda that serve to standardize our program have been re-written and finalized. State/Industry personnel can now access these memoranda through the Area Veterinarian-In-Charge (AVIC) in their State. Also, accredited herd requirements for goats are now in a separate VS memorandum, instead of part of the UM&R. The Annual State Report (Form 6-38) has been expanded via a memorandum and its importance will increase once the revised UM&R is finalized. These State reports are essential for documenting and scrutinizing the progress of the National TB program. The monthly State reports (Form 6-2) are also crucial to monitoring progress in our program. In FY2005, an automated process for submitting Form 6-2 will be implemented. That process will include a crucial component previously missing from the manual submission process; all Form 6-2's will be audited by one or more responsible individuals in each submitting State prior to the transmission of the form to the National database. It is expected that data quality will be improved by the incorporation of this auditing step.

In our view, one of the major responsibilities and expectations of VS is to monitor and provide oversight and coordination for the National TB Program and, in so doing, establish and maintain assurance that the program is sound in all its facets and administered uniformly across the nation. Rulemaking and maintenance of the TB sections (parts 50 and 77) of Title 9 of the Code of Federal Regulations (9 CFR) are critical VS responsibilities. During FY2004 regulations were finalized to grant split state status to Michigan and prohibit the entry of Holstein-cross steers and spayed heifers into the United States from Mexico. Work also began on several other regulations during FY2004. A major rule that should be proposed soon deals with movement requirements for feeder cattle that originate in Modified Accredited Advanced States. This rule intends to address the lower-risk status of such cattle and facilitate their interstate movement into feedlots for eventual slaughter. The same rule also addresses the need for some herds to attain commuter status so that interstate movement can occur when an operation extends into more than one State. Further this rule will propose a provisional TB Accredited Free status as an alternative, under certain conditions, for States that have 2 or more epidemiologically unrelated herds disclosed in a 24 month period.

During FY2005, a rule will be developed to enable producers to move cattle interstate through one livestock market and then to slaughter without meeting the testing requirements applicable to their State of origin. This rule is most important for producers in States that are not Accredited Free and have limited opportunities to market their slaughter cattle within their State. Another pending rule intends to strengthen the import requirements for so-called "roping steers" that originate in

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Mexico. This rule depends on a credible method for determining the ultimate purpose of a steer offered for importation at the U.S. border. Another rule in the drafting stage will propose to eliminate the provision for individual animals in Modified Accredited zones with wildlife reservoirs to move for 6 months following a whole herd test. It is also the intent of VS to finally remove its requirement for TB testing for the purposes of export from the United States. This requirement is either unnecessary or redundant for the purposes of international trade.

The program to control and eradicate Bovine TB came into being in 1917. After 60 years of reasonable progress the effort began to languish from the mid 1980's through the 1990's. To remedy this, a strategic plan was finished in 2000 in concert with the declaration of an emergency on the final eradication of TB from cattle, bison, and captive cervids. There were a total of 25 action items listed under 4 major strategies designed to improve the program and provide the best opportunity to realize a goal of eradication by year's end 2003. That plan resulted in many of the action items being fully or largely completed. There was a significant increase in the appropriated and emergency Commodity Credit Corporation (CCC) funding available for TB and the level of complacency in the United States was lowered with better case finding a result. Nevertheless, as 2003 ended and 2004 came, there were a number of factors that were disconcerting for State-Federal livestock health officials and industry stakeholders. The major factors were 1) in 2000 all states were TB Free except Michigan and the El Paso milk shed of Texas but in 2002 Texas lost the Free status with California and New Mexico following in 2003; 2) the situation in Michigan with the wildlife reservoir of TB did not seem to be responding positively to increased manpower and funding but only maintaining the status quo; 3) a new case was discovered in a large dairy replacement operation in Arizona which also implicated a dairy calf operation in New Mexico, a development that seemed to support the hypothesis of some that the dairy female replacement pipeline was being infected at a continuously low level posing a risk to dairies and states that rely upon these sources for large numbers of replacements; 4) another large TB affected dairy was detected in Texas in FY2004; 5) a previously infected elk herd was again confirmed with infection in Kansas; 6) there were still 19 of some 40 major adult slaughter plants that were not sampling animals with TB suspicious lesions at or above the 1 per 2000 rate; 7) states were beginning to put entry test requirements on dairy cattle entering; 8) Mexican origin feeder cattle with TB continued to be discovered in U.S. slaughter plants, though at a much lower rate; 9) the goal of TB eradication by the end of 2003 had been missed; and 10) substantial numbers of newly affected herds continued to be disclosed annually.

In response to these concerns, the leadership of USAHA, National

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Assembly of State Animal Health Officials and the Animal Agriculture Coalition met with Dr. John Clifford and staff members in late January of 2004 and discussed the concerns detailed above. It was decided that a subcommittee of the Committee on Tuberculosis would be named to review, revise, update and expand the existing strategic plan in light of newer information, recent developments and trends and the apparent need to reassess the situation and make conscious, considered and informed decisions as to how to proceed to finalize control and eradication of TB. The new strategic plan has been prepared and Dr. Billy Johnson presented the plan to the Committee at this meeting. The outcomes of those deliberations are outlined below by the six strategies with estimates of requests for new funding. The 2004 Strategic Plan is included in these Proceedings.

1. Eradication (\$10.4 million)
 - a. Anticipate more false positives, pay depopulation expenses
 - b. Change from fair market to replacement value à mandatory depopulation
2. Wildlife management (\$2.55 million)
3. Laboratory and diagnostic support (\$5.3 million)
4. TB surveillance (\$5.6 million)
 - a. Improve granuloma submission frequency (AHT's in plants)
 - b. Increase # of accredited herds
 - c. Enhance reporting system
5. Information and education (\$2.04 million)
 - a. CE for accredited veterinarians
6. Risk mitigation (\$7.45 million)
 - a. Increase control of dairy collection premises (heifer raisers, backgrounders, feedlots, dealers). Test requirement on all non-slaughter dairy cattle moving interstate

In summary, the National TB program continues to face and overcome challenges as it progresses towards the goal of eradication. Our successes of the past should give us confidence for success in the future. One success has been the improvement in our slaughter surveillance system. The status of this system is discussed in Part III of this report.

Part II: Updates on States with Recent Infection

Michigan update:

Split State Status was granted to Michigan in April of 2004 and created two TB program status zones in Michigan: the TB endemic area remained at Modified Accredited (MA) status and the remainder of the state was upgraded to Modified Accredited Advanced (MAA) status. The MA zone includes the eleven counties in the NE portion of Michigan's Lower Peninsula plus the northern-most portions of two counties (Ogemaw and Iosco). The state's amended zoning order (rec-

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ognizing this change in status) was effective on June 1, 2004 and detailed testing requirements for both intra- and inter-zone cattle movements. The MA zone includes all cattle herds affected with TB to date as well as all positive wildlife identified with the exception of three wild deer (one deer located in Osceola, Mecosta and Roscommon counties each). To date, a total of 33 cattle herds (and one captive cervid herd) in MI have been determined to be TB infected; this includes three premises that were found to be re-infected following depopulation (and subsequent repopulation of the two beef herds) or completion of a test-and-remove program (one dairy herd). Annual surveillance (and movement) testing is conducted on the 1,100 herds located in the MA zone; a random surveillance plan currently tests approximately 900 herds in the MAA zone annually. Future MAA zone surveillance will be risk-based (targeted) program and focus on herds in closer proximity to the TB endemic area.

Wild deer numbers have been reduced in the MA zone with the apparent prevalence of TB decreasing in recent years (hunter-killed surveillance). Feeding/baiting in seven counties in the NE portion of Michigan's LP is banned to help reduce the spread of TB in deer. Several additional species of wildlife have been found to be TB infected in Michigan although the role these animals may play in disease transmission still remains unclear. APHIS, Wildlife Services has constructed fences surrounding feed storage areas on farms in the MA zone in order to mitigate risk of TB transmission from deer to cattle. Movement restrictions (and subsequent testing) should diminish the risk of TB spreading from the TB endemic area (MA zone) of Michigan to other parts of the state. Michigan will soon require official (state) identification for all cattle movement (including to slaughter) and the state has recently applied for TB Free status for the Upper Peninsula of Michigan.

California Update:

As previously reported to this Committee, California's TB status was downgraded to modified accredited advanced in April of 2003 as a result of 3 newly affected TB herds disclosed in 2002, all of which were dairies. Two of the herds were found as a result of slaughter surveillance and one resulted from epidemiological testing related to the first affected herd disclosed. California has been proactive in establishing and sustaining enhanced slaughter surveillance and credits that initiative for the early detection of TB in the State. Following initial discussions on the epidemiology of the new cases and the possibilities of regionalization of the small area, within which the 3 herds were located, it was decided to embark on a comprehensive area testing program of all the herds in the tricity area of Kings, Tulare and Fresno counties. In addition, there were epidemiologically linked herds in 10 additional counties that were tested with a small but effective and effi-

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cient "TB Task Force" that operated in the face of the END episode in California. At the time of completion of this effort 691 herds comprising 886,504 individual animals had been tested. More than 13,000 head of cattle were destroyed in the course of depopulation of the affected herds, and for diagnostic post mortems conducted on skin test suspects and/or reactors in non-affected herds. Early on, the State imposed entry testing requirements for TB on dairy replacement/breeding animals; an action that other States followed in the ensuing months and years. The epidemiological evidence collected during and since 2002 within California continues to point to imported cattle as the most likely source of the disease. The rapid and long distance movements of cattle intermingled from all areas of the U.S. and into California will remain a concern in the future. California will be eligible to apply for reinstatement into Accredited TB Free status in April of 2005.

New Mexico Update:

Also, as previously reported to this Committee 2 newly affected TB herds were disclosed in New Mexico during fiscal year (FY) 2003 resulting in the downgrade of TB status to Modified Accredited Advanced in July of 2003. Both herds were dairies and were disclosed as a result of slaughter surveillance. A significant component of adult slaughter animals from New Mexico are slaughtered in Texas and Arizona plants under good slaughter surveillance. These herds opted for a test and removal herd plan rather than depopulation extending any chance for reinstatement to Accredited Free status for New Mexico to at least 4-6 years in the future or to the 2006-2007 timeframe. For this reason New Mexico has submitted a request for split State status which, if approved, would result in a limited area of northeast New Mexico, where the two affected dairies are located, remaining in Modified Accredited Advanced status and the remainder of the State regaining accredited TB free status. In early 2004 a TB infected Holstein heifer was discovered in Arizona and a TB infected Holstein steer was traced from slaughter back to a small feedlot in Iowa. The epidemiology on both cases implicated a large dairy calf raising facility in the eastern part of the State. This facility was depopulated. A plan to test all dairies in eastern New Mexico, beef herds within a 3 mile radius of the affected premises, dairies with epidemiological links to the affected premises, and dairies that supplied a significant number of calves or that received any calves from the dairy calf raising facility was formulated and implemented in 2003 and 2004. By mid September of 2004, 65 dairies and all the targeted beef herds had been tested with approximately 110,000 head without disclosing additional affected herds. A goal to complete all the planned testing and pending epidemiological tracing and follow-up has been established at year's end [2004]. A mini task force approach to assist the New Mexico infrastructure is planned and staffed and working at this time.

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Texas Update:

Texas was downgraded to Modified Accredited Free status for TB in June of 2002. The loss of TB Accredited Free status for Texas, as well as for New Mexico and California, requires breeding cattle moving interstate, other than for slaughter, to have a negative TB test within 60 days of movement, a significant economic consideration for the cattle industries in the 3 States. As previously reported to this Committee, Texas adopted a TB eradication strategy in late 2002 that included 5 critical elements designed to enhance case finding surveillance and to mitigate the risk of continuing exposure from outside sources. By early October of 2004 Texas had tested all of their dairies; a total of 772 herds with 334,947 animals and 330 purebred beef herds with 31,852 animals for a total of 1102 herds and 366,799 cattle. The majority of this testing was accomplished by accredited veterinarians working on fee basis agreements after special training sessions on the TB program, application of the test and expected response rates. After a period of conducting the comparative cervical tuberculin test side by side with the interferon gamma test Texas relied to a great degree on the interferon gamma test for follow-up on caudal fold tuberculin test positive animals. The number of interferon gamma tests conducted totaled 8614 and the experience gained with logistics and day to day use of the technology was valuable. This testing disclosed one affected dairy herd of 1500 head, with a singleton infected animal, which has been depopulated. Slaughter surveillance continues to be a high priority in Texas where 7 of the major adult cattle slaughter facilities are located. Six of the seven are submitting granulomas for TB surveillance at or above the targeted level. If no additional infection is detected the State may apply for Accredited Free status in late 2006.

Part III: Surveillance in U.S. Livestock

Slaughter surveillance for bovine tuberculosis in the United States during Fiscal Year 2004 continued to identify new cases of TB in both adult and fed cattle. Thirty-five new cases of TB were found in cattle in U.S. slaughter plants during the year. Thirty-nine cases were reported last year. No cases of TB were detected in bison slaughtered under state or federal inspection either this year or last.

One of 35 TB cases (2.9%) involved an older, adult beef cow. Thirty-four cases (97.1%) were detected in fed steers or heifers.

Epidemiologic investigations related to the adult beef cow case resulted in tuberculin testing of possible source herds located in New Mexico and Arkansas. No likely herd of origin for this infection has been identified to date. An official eartag was collected from the cow at the time of slaughter; however, insufficient record-keeping by previous owners hindered further tracing efforts.

Investigations of 21 fed cattle cases completed to date showed that

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15 cases were identified with official Mexican eartags. Four of these tags originated from the Mexican state of Durango, 2 tags each came from Chihuahua, Coahuila, and Aguascalientes, and one tag each came from Nuevo Leon, Sonora, Tamaulipas, Colima, and Veracruz. Field investigations completed for 6 other cases without official identification clearly showed the origin of these cattle to be from Mexico also.

The case rate for TB cases found in Mexican-origin cattle imported into the United States for feeding and grazing continues to decline from previous years. During FY 2004, 0.22 cases of TB were detected for every 10,000 head of feeder cattle imported from Mexico. Case rates reported for the previous two years were 0.54 and 0.34 respectively.

The following table provides TB case rates for each Mexican state based on the numbers of cattle exported from that state. Individual state rates during FY 2004 ranged from 10.5 cases per 10,000 feeder cattle imported from Colima to 0.03 imported from Sonora.

	COL	NL	AGS	DUR	COAH
Rate	10.5	3.07	2.07	0.91	0.43
Imported	949	3,260	9,660	44,099	46,648
	VER	TAM	CHI	SON	
Rate	0.28	0.12	0.05	0.03	
Imported	35,723	82,419	414,327	305,251	

USDA is expecting that total numbers of TB cases and rates of TB in imported Mexican cattle will continue to decrease for all Mexican states in light of increased imports of feeder cattle now coming into the United States.

Investigations are in progress for the 13 remaining fed cattle TB cases. Two of these cases involve beef-type cattle, and 11 cases were detected in Holstein steers. In addition, tuberculin skin testing in a group of Holstein replacement heifers during December, 2003, disclosed active, pulmonary infection in a 10 month-old Holstein replacement heifer. This heifer was located in a large, calf growing facility in Arizona, and had previously resided at another large, calf raising facility in eastern New Mexico when it was a young calf.

Information developed to date regarding possible origins for these 12 Holstein TB cases can be summarized as follows:

1. Nine of the 12 Holstein cases circulated through one of two large calf raising facilities. Four cases (3 steers and 1 heifer) were grown as young calves in a facility (Facility 1) in eastern

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New Mexico prior to their being sold for further growing or feeding, and 5 other cases were grown in a facility (Facility 2) in west Texas. The remaining 3 cases are still being investigated as to their whereabouts when they were young calves.

2. Movement papers and other records suggest that the 9 Holstein cases investigated to date would have entered Facility 1 or Facility 2 as young calves in the time period December, 2002 thru April, 2003. This clustering in time might suggest that they may have been purchased at or about the same time from a common source.
3. Both Facility 1 and Facility 2 purchase thousands of Holstein bull and heifer calves from multiple sources annually. During the 5 month period that Facility 1 most likely received their 4 cases, 21,155 Holstein bull calves and 4,603 Holstein heifer calves were purchased from at least 27 large dairies, 83 smaller calf raisers and dealers, and 2 sale yards in New Mexico and Texas. Facility 1 had not implemented an identification system which would permit further tracing to a specific origin. At least 5 sources of calves were common to both facilities. Unfortunately, all 5 common sources were calf raisers or dealers themselves that do not use any type of identification or record-keeping system capable of trace back.
4. Testing of all possible source dairies in New Mexico is now in progress. Since January, 2004 more than 70,000 cows in 30 dairies located in eastern New Mexico have been evaluated. Testing of possible source dairies in Texas has largely been completed as part of the Texas-wide area test of all dairies in the state. No evidence of infection has been found in dairies located in Texas or New Mexico to date that would explain the origin for these 12 cases.
5. DNA fingerprinting of all 12 cases is now being conducted and compared to past TB cases to address questions as to possible origins for these infections. Do the individual case fingerprints suggest a common source, or do these cases possibly represent multiple origins?
6. At least 6,042 Holstein replacement heifers left Facility #1 during the period of greatest potential exposure. These heifers were sold to dairies, feed yards, and other calf growers and sale yards in other states, and have now dispersed. Fortunately, over 3,600 of these heifers were located and depopulated with federal indemnity paid. No further evidence of disease was detected.

Three hypotheses that may explain possible origins for these 12 Holstein cases should be further examined.

1. **Hypothesis 1: Are young Holstein calves being exposed**

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on U.S. dairies yet to be identified as TB-infected? Until all possible source dairies are tested, this hypothesis can not be discounted. However, over 400,000 dairy cows located in at least 800 dairies in Texas and eastern New Mexico have been tested over the past year. One infected herd was detected in Texas. However, the extremely low prevalence (< 0.05%) in adult cattle in this dairy and the lack of any evidence of TB in the herd's replacement heifers at the time of whole herd depopulation does not support this herd as the source for infection in any of the recent Holstein cases. Also, as more herds continue to be tested with negative results, this hypothesis becomes less likely.

2. **Hypothesis 2: Were these particular Holstein cattle exposed to potentially higher risk cattle (i.e. Mexican steers) as they moved through feeding channels?** The nine cases that have been investigated in more detail to date do not indicate that any exposure to higher risk cattle occurred as they were being grown.
3. **Hypothesis 3: Could these Holsteins have come from areas that historically have had TB (i.e. El Paso milkshed)?** Initial interviews with calf raisers and dealers who supplied Holstein calves to both Facility 1 and Facility 2 indicate that calves were acquired from other calf dealers in the El Paso, Texas area. A few health papers documenting movements of Holstein calves have also been identified in the records. More interviews and investigations are now in progress to confirm this information, and to better clarify possible origins for these movements.

In summary, investigation of these cases continues. However, identification of a definitive source is problematic and unlikely because of multiple movements of large numbers of unidentified Holstein bull and heifer calves throughout the dairy calf raising industry.

Results of efforts to enhance slaughter surveillance for bovine TB continued to show improvements during FY 2004. USDA's Food Safety Inspection Service (FSIS) reported a total of 36.1 million cattle under FSIS inspection during the year. Nearly 5.8 million of these cattle were adult cows or bulls. A total of 6,367 suspicious tissues from all classes of cattle were submitted for diagnosis during the past year which is a record high for total numbers of granulomas submitted, and represents a 519% increase in sample submissions since adopting the *Comprehensive Strategic Plan for the Eradication of Bovine Tuberculosis* in 2000. Of the 6,367 total samples, 5,326 (83.7%) came from 5.73 million adult cattle killed in 100 plants. These plants account for 99% of all adult cattle killed this past fiscal year. The national granuloma submission rate for adult cattle at the end of this year was 9.29

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submissions per 10,000 adult cattle killed. Once again, this represents a continued, significant improvement in submission rates from adult cattle over past years, and documents the good effort and commitment that most of our state and federal meat inspection professionals are making to improve TB surveillance.

However, a closer analysis of the adult granuloma submission rates by individual slaughter plant indicates that consistency and uniformity of sampling may still be "out of balance" in the sense that some adult cattle slaughter plants may be looking harder than others to find the last cases of TB.

During FY 2004, 40 plants located in only 19 states slaughtered 93.6% of all adult cattle. These plants play a critical role in all our national animal disease surveillance programs. TB granuloma submission rates per 10,000 adult cattle killed ranged from 24.71 to 0.05 among these 40 plants.

Twenty-one (53%) of these 40 plants were outstanding in their efforts to support the National Bovine TB Eradication Program by contributing 84.9% of all the granulomas submitted from adult cattle last year (4,525 submissions). Their combined granuloma submission rate was 14.1 submissions per 10,000 adult cattle killed or almost 3 times the target of 5 submissions per 10,000 adult cattle killed. Fifty-five percent of the total adult cattle killed last year were from these 21 plants.

Five (13%) of these 40 large plants made significant progress toward achieving the goal of 5.0 submissions for every 10,000 head of adult cattle killed by submitting at a combined rate of 4 per 10,000. These plants together submitted 2.5% of the total adult submissions (133 submissions), and killed only 5.8% of the adult cattle slaughter population.

Unfortunately, 14 (34%) of these large, adult cattle slaughter plants submitted at a combined rate of only 1.49 submissions per 10,000 adult cattle killed. These plants inspect 32.3% of the adult cattle killed annually, but submitted only 5.2% of the total adult submissions. Two of these 14 plants made only 1 submission each, but killed 347,388 adult cattle between them. Meat inspection personnel located in both plants have been visited repeatedly in the past, but these plants have yet to cooperate with the enhanced TB surveillance effort. It is recommended that more aggressive approaches be taken to resolve the sampling problem in these two plants.

Considering that 12 of the 14 lower-submitting plants are located in 12 Accredited-Free states, concerns continue to build regarding the adequacy of slaughter surveillance to effectively identify infection in these states. During FY05, the State-Federal Bovine Tuberculosis Eradication Program must work to enlist the support of management at all levels to correct the deficiencies represented most profoundly by the 14 slaughter plants. The revised TB Uniform Methods & Rules incor-

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porates performance standards for slaughter plants. A revised Memorandum of Understanding between Veterinary Services and FSIS reinforces these standards. We expect that these changes will provide and sustain the focus and resources needed to improve and correct the deficiencies.

On farm testing continues to be an important part of our national TB surveillance system. To assess the amount of testing for a full year, we examined the National Database for the interval between June 1, 2003 and June 30, 2004. Such a time interval was necessary because of delays in monthly status reports during FY2004, but this time interval also represented a substantial number of tests for cattle because it included substantial portions of the area tests in California, New Mexico and Texas.

During the annual period examined, there were 2,013,420 caudal fold tests reportedly conducted on cattle and bison. There were 27,037 responses (1.3%) reported among these caudal fold tests. On a regional basis, most (84%) caudal fold testing was conducted in the Western region during this time period (Table 1). The purpose of testing was also somewhat different between the regions. The most common purpose of testing in the Western region was noted as area testing while in the Eastern region the most commonly reported purpose was Accreditation. Given the large amount of area testing conducted in Texas, California and New Mexico the Western region results are not unexpected. The Eastern region results are partially explained by the large number of accredited herds in Pennsylvania and by the fact that the reasons given for Michigan's testing – which are substantial – are divided into area testing and an "other" category in the database. Epidemiology was another important reason for testing in the Western region and was likely a result of tracing activities in the States previously mentioned. Both regions had similar proportions of tests conducted for movement purposes. A smaller proportion of tests were conducted for milk ordinance reasons in both regions as well.

The fraction of responders reported by test reason and region were assessed (Figure 1). Substantial differences in these fractions between Eastern and Western regions are evident when the reason for testing was area or "other". These differences, to a large extent, are the result of the large number of dairy cattle in Michigan that respond on the caudal fold tuberculin test. When we examine testing done by regulatory veterinarians in Michigan we see a similar fraction of caudal fold responses. Despite the presence of TB in Michigan, most of these caudal fold responses in dairy cattle are false responses (based on subsequent diagnostic work-ups). In both regions, the fraction of responses reported on testing done for accreditation and movement purposes are similar and low. Such testing is typically conducted by accredited veterinarians. In contrast, the epidemiologically related cau-

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Table 1. Summary of caudal fold <u>tuberculin</u> testing of cattle and bison in the United States; June 01 2003 to June 30 2004.			
	Total tested	Responders	Fraction
U.S. Total	2,013,420	27,037	1.3%
Eastern Region	321,590	4,797	1.5%
Testing Reasons			
<i>Area</i>	32,719	1,140	3.5%
<i>Accreditation</i>	90,013	421	0.5%
<i>Movement</i>	88,871	262	0.3%
<i>Milk ordinance</i>	26,978	612	2.3%
<i>Import</i>	2,193	37	1.7%
<i>Epidemiology</i>	56	1	1.8%
<i>Other</i>	80,055	2,322	2.9%
Western Region	1,691,830	22,240	1.3%
Testing Reasons			
<i>Area</i>	648,797	13,495	2.1%
<i>Accreditation</i>	40,006	182	0.5%
<i>Movement</i>	457,072	706	0.2%
<i>Milk ordinance</i>	79,600	422	0.5%
<i>Import</i>	7,853	19	0.2%
<i>Epidemiology</i>	311,250	5,988	1.9%
<i>Other</i>	108,192	907	0.8%

dal fold testing is typically done by regulatory veterinarians and the response fraction for these tests is similar between regions and much higher. These results suggest the importance of the caudal fold tuberculin testing performance standard that is part of the revised UM&R for adult cattle and bison.

Comparative cervical tests are conducted by regulatory personnel on cattle that respond to the caudal fold tuberculin test. The intent of these tests is to rule out cattle as suspicious for TB. Of 26,130 comparative cervical tuberculin (CCT) tests reported (June 2003 – June 2004), there were 494 (1.9%) suspects or reactors found. In the Eastern region there were 4938 CCT tests run with 83 suspects or reactors

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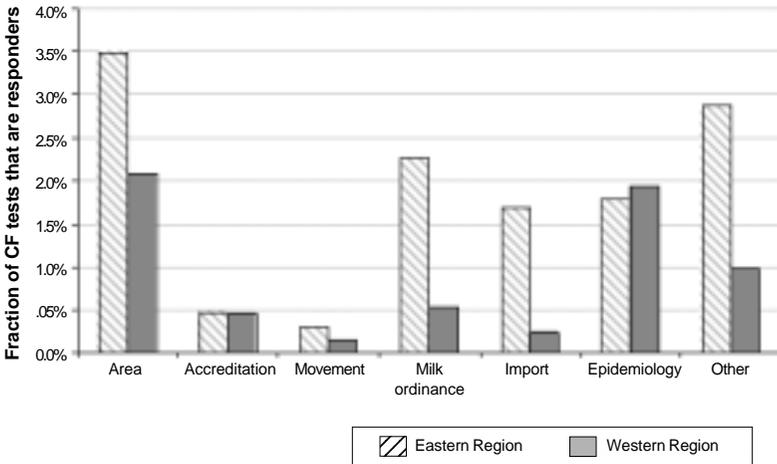


Figure 1. Summary of caudal fold response fractions by reason for test and U.S. region.

(1.7%) found. In the Western region there were 21,192 CCT tests run with 411 suspects or reactors (1.9%) found.

Surveillance of Cervidae is primarily a result of animal testing in the United States. For the same time period (June 2003 – June 2004), we examined the National Database to assess an annual amount of cervid testing. There were 29,230 single cervical tuberculin (SCT) tests reportedly conducted on Cervidae during this time period. There were 501 (1.7%) responses among these SCT tests. Testing was more common in the Eastern (69%) than Western (31%) region, but both regions reported similar fractions of responses. CCT testing for Cervidae totaled 634 tests with 93 (15%) suspects or reactors. A dramatic difference in the fraction of suspects or reactors in the Eastern region (20%) – compared to the Western region (6%) – was primarily a result of fallow deer testing in a Michigan zoological park. These results may suggest the need to examine the appropriateness of the comparative cervical scattergram for Cervidae when applied to fallow deer and possibly other species of Cervidae.

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BOVINE TUBERCULOSIS ERADICATION PROGRAM IN CANADA SEPTEMBER 30, 2004

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CATTLE AND FARMED BISON

Eradication:

Canada continues to near complete eradication of bovine TB from cattle and farmed bison. During the 6-year period from January 1998 through September 2004, *Mycobacterium bovis* was confirmed in 8 herds of cattle and farmed bison. Five of these 8 herds were in Manitoba: 1 in 2001; 3 in 2003 (first year of area testing); and 1 in 2004. The 5 infected herds in Manitoba are believed to have acquired TB from contact with diseased wild elk or deer in or around Riding Mountain National Park (RMNP). The other 3 infected herds were in: Saskatchewan (cattle-1999), Alberta (bison-2001), and Ontario (cattle-2002).

All 8 infected herds were depopulated; and 2 exposed herds were partially depopulated to remove exposed animals. All exposed susceptible animals were traced from the infected herds, investigated, tested, destroyed, and tissues collected for laboratory tests. Federal compensation is paid for all animals ordered destroyed up to maximum prescribed amounts. All potential sources of infection were investigated and tested. Other contact herds and all herds in a 10-kilometre perimeter zone were investigated and tested.

Surveillance:

General surveillance of cattle and farmed bison herds is based on routine inspection at slaughter and submission of granulomatous lesions for laboratory examination, with trace-back investigation of all histopathological diagnoses of mycobacteriosis. In 2003, 292 lesions were submitted from slaughter cattle and farmed bison, resulting in 10 diagnoses of mycobacteriosis. Culture of these lesions found: 3 due to *M. avium* complex; 1 due to *M. paratuberculosis*; and 6 lesions, of which 5 were mesenteric, were culture negative. In 2004 to date, one *M. bovis* infected cattle herd in Manitoba was detected as a result of routine slaughter surveillance submissions.

Targeted on-farm area testing is used to supplement slaughter surveillance. Area surveillance testing of cattle and farmed bison continued around Riding Mountain National Park in Manitoba in 2003/04, an area where 29 TB-infected wild cervids (25 elk & 4 white-tailed deer) have been found since 1997. The Riding Mountain TB Eradication Area (RMEA) consists of 2 provincial game hunting areas; encompasses approximately 50,000 breeding cattle on 650 farms; and represents approximately 10% of Manitoba's cattle herds and 1% of Ca-

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nadian cattle herds. Since 2002, all cattle and farmed bison herds in the RMEA are tested at 12 to 36 month intervals, with the interval based on an assessment of the risk of contact with infected wild cervids. Periodic testing in the RMEA will continue for as long as the risk of TB continues to exist in the area.

The test protocol involves screening all animals 12 months of age and older with the caudal fold tuberculin test, and testing all responders using the Bovigam assay and/or comparative cervical tuberculin (CCT) test. Any animal classified as positive on either ancillary test is ordered slaughtered and tissues are submitted for confirmatory lab tests. Animals classified as suspect on either ancillary test may be retested or slaughtered. If the owner elects to retest the animal and it retests negative, the herd is automatically scheduled for a herd test for the following year.

In 2003, approximately 57,000 cattle and farmed bison were tuberculin tested by federal inspectors across Canada as part of area surveillance testing, resulting in the detection of 3 infected beef cattle herds, all located in the RMEA. To date in 2004, no infected cattle or farmed bison herds have been detected through on-farm area surveillance testing.

FARMED CERVIDS

Eradication:

Canada continues to near complete eradication of bovine TB from farmed cervids, which consist mainly of elk, red deer, elk/red hybrids, fallow deer, and white-tailed deer. During the first 10 years (1989 - 1998) following extension of the National Bovine TB Eradication Program to farmed cervids, 35 infected herds were found in 5 provinces. During the last 6 years (1999 to September 2004), 2 infected herds were found in 1999 - one in Ontario and one in Quebec.

All 37 infected farmed cervid herds, except one, were completely depopulated of all exposed susceptible animal species. Compensation, quarantine, investigation, trace-outs, trace-ins, contacts, perimeter premises, cleaning and disinfection, and restocking were all carried out in the same manner as for infected cattle and farmed bison herds.

In the one exception, the primates and several endangered species in a zoological collection were quarantined indefinitely following the destruction of infected and exposed hoof stock, carnivores and other species. This quarantine was released 10 years later, in 2003, after a comprehensive review concluded that the risk of bovine TB in the collection was negligible. A 5-year management plan of on-going surveillance has been implemented.

Surveillance:

Because relatively few mature cervids are routinely slaughtered,

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surveillance for bovine TB in this sector is based on triennial testing of all cervid herds involved in the commercial trade of these species. In 2003, approximately 27,500 farmed cervids were tuberculin tested by federal inspectors under this program, and no infected herds were found. In 2004 to date, no infected herds have been detected through on-farm surveillance testing.

In 2003, lesions were submitted from 38 farmed cervids during routine slaughter surveillance, including 6 lesions associated with chronic wasting disease (CWD) surveillance programs. Four lesions were found to be histo-compatible with culture results: 1 due to *M. paratuberculosis* and 3 lesions, of which 2 were mesenteric, were culture negative. In 2004 to date, no infected farmed cervid herd has been detected through routine slaughter surveillance.

RESERVOIRS OF *M. bovis*

Wood Buffalo National Park Area:

Bovine TB and bovine brucellosis are endemic in a free-roaming herd of approximately 2,000 wood bison in and around Wood Buffalo National Park, which straddles the northern boundary between Alberta and the Northwest Territories. This herd poses its greatest threat to adjacent disease-free wild bison herds. A bison management plan is in place that includes no-bison buffer zones, the killing of stray bison, and other measures to minimize the risk of disease spreading to wild bison, farmed bison, or cattle.

Riding Mountain National Park Area:

Diseased wild cervids in and around Riding Mountain National Park (RMNP) in Manitoba are believed to be the source of bovine TB for the 5 infected cattle herds found in Manitoba in 2001, 2003 and 2004. The source of infection in these wild cervids was almost certainly contact with infected cattle at some time in the past. There are approximately 2,500 wild elk in the area.

Bovine TB has been confirmed in 13 wild cervids (9 elk and 4 white-tailed deer) outside RMNP through a hunter-harvest surveillance program that began in 1997.

Since early 2003, 16 wild elk inside RMNP have been confirmed with bovine TB: 14 through a capture, test and removal program; and 2 that were found dead in the park. Under the capture, test and removal program, adult wild elk are captured, blood samples are collected, and a radio-tracking collar is attached before the animal is released. Blood samples are tested by the lymphocyte stimulation test (LST) to detect a cell-mediated immune response, a fluorescent polarization assay (FPA) to detect a humoral (antibody) immune response, and a polymerase chain reaction (PCR) assay on the buffy coat to detect antigen. Any elk that is positive on one or more these tests is tracked using the radio-collar, humanely destroyed and necropsied,

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and tissues are collected for confirmatory testing.

To date, 63 of the 266 elk captured and tested under this program were positive on one or more of the blood tests, and were recaptured and destroyed. *M. bovis* was confirmed in 12 of these elk, all of which were located in the western part of the park.

To assess the sensitivity of the blood tests, 50 elk which had been negative on blood tests conducted in the spring of 2003, were re-captured, re-bled, destroyed and necropsied in December 2003, and tissues were collected. *M. bovis* was isolated from 2 of these 50 elk - one was now positive on the LST and one was still negative on all blood three blood tests. To assess the specificity of these blood tests, 150 elk from a known negative population in Elk Island National Park in Alberta were tested, all with negative results.

The 5 cattle herds in Manitoba in which bovine TB has occurred during the past 6 years (2001, 2003, 2004) were all located close to the park boundary, and 3 were located in areas where *M. bovis* has been confirmed in wild elk and deer.

A multi-agency Manitoba Bovine TB Management Program was developed and implemented to further define the disease problem, prevent spread of the infection to cattle and other farmed livestock, and eliminate the infection in the wild cervids. Encompassing the surveillance and eradication efforts of the CFIA in the livestock sector and those of Parks Canada (wildlife inside the park) and the government of Manitoba (wildlife outside the park), the major elements of the Program include:

- Routine area testing of cattle and farmed bison herds around the park as described above;
- On-going surveillance of wild cervids within and outside the park to determine the spatial and species distribution of the infection, and to further define prevalence;
- Separation of wild cervids from livestock through barrier fencing of forage/feed and cattle feeding yards. In 2003, 21 feed/forage yards were fenced bringing the total to date to 57 cattle producers with fenced forage/feed yards:
 - ◆ 29 of 39 farms located in the first mile from the park;
 - ◆ 22 of 78 farms located in the second mile from the park;
 - ◆ 5 of 89 farms located in the third mile from the park;
 - ◆ In 2004 to date, another 18 producers have receiving fencing, bring the total to 75.
- Separation of wild cervids from livestock through a prohibition on elk feeding, encouraging producers to remove hay from fields into fenced areas, and public awareness and education;
- Elk population management through increased hunting opportunities outside the park and habitat improvement inside

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the park (elk population reduced from over 3,000 animals to approximately 2,500);

- Research and field studies, including radio-collar studies of elk movements, improved population survey methods, and investigation of other possible TB vectors/reservoirs.

TB ACCREDITATION STATUS

Cattle & Farmed Bison:

All provinces in Canada except Manitoba are classified as TB-Free according to current Canadian standards for farmed bovines. Manitoba has a split status for bovine TB: the RMEA is classified as TB-accredited-advanced according to current Canadian standards; and the rest of Manitoba is classified as TB-free.

In conjunction with the Manitoba's split status, a movement permit, based on a negative herd test and/or individual animal testing, is required to remove farmed bovines from the RMEA into the rest of the province or other provinces.

Farmed Cervids:

All Canadian provinces except Ontario and Quebec are classified as TB-free areas according to current Canadian standards for farmed cervids. Ontario and Quebec are currently classified as TB-accredited-advanced areas.

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REPORT OF THE SCIENTIFIC ADVISORY SUBCOMMITTEE

Diana L. Whipple, National Animal Disease Center, Ames, IA

The Scientific Advisory Subcommittee (SAS) of the Committee on Tuberculosis met on Saturday, October 23, 2005. Because the SAS was not asked to review data or make recommendations to the Committee, the regularly scheduled meeting of the SAS at the USAHA Annual Meeting was used for scientific presentations and discussion, with approximately 50 attendees. A summary of the presentations follow.

Dr. Mitchell Palmer's gave a presentation entitled "Experimental Infection of Reindeer (*Rangifer tarandus*) with *Mycobacterium bovis*: Pathological and Immunological Findings." The objectives of the study were to describe the pathologic changes associated with *M. bovis* infection in reindeer and evaluate the effectiveness of intradermal tuberculin testing and an *in vitro* blood based assay for interferon- γ (IFN- γ) as means of diagnosis of TB in reindeer. Dr. Palmer's paper was presented in an American Association of Veterinary Laboratory Diagnosticians (AAVLD) Scientific Session and his complete paper is published in its entirety elsewhere in these proceedings. Discussion about the scattergram used for interpretation of the CCT for reindeer followed and resulted in a recommendation that United States Department of Agriculture (USDA) Animal Plant Health Inspection Service (APHIS) Veterinary Service (VS) to compile, analyze and present data on all skin testing done on reindeer in the United States. Data are to be presented to the SAS before the 2005 USAHA meeting to determine if the scattergram should be further modified to improve specificity of the CCT.

Chembio Diagnostic Systems, Inc. Dr. Konstantin Lyaschenko made a presentation entitled "Serological Based Assay for Detection of Tuberculosis in Multiple Species."

Dr. Larry Judge, USDA-APHIS-VS, gave a presentation entitled "Gamma Interferon Testing Experiences in Michigan." Dr. Judge described testing in the Modified Accredited and Modified Accredited Advanced zones.

Dr. Dan Baca, USDA-APHIS-VS, gave a report on the use of the Bovigam α assay in Texas. The Texas Animal Health Commission (TAHC) implemented the Bovigam TM assay in Fiscal Year 2004 to support an aggressive TB surveillance initiative targeting the state's 815 dairy herds and 2,400 purebred and seedstock herds. Accredited veterinarians were required to attend an educational seminar in order to contract with TAHC to conduct fee-basis work at these operations.

Mr. Ed Corrigan, Diachemix LLC, gave an update on the Fluorescence Polarization Assay (FPA) for diagnosis of bovine TB. Several

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trials are underway to determine sensitivity and specificity of the FPA and results will be presented at a future date.

The SAS meeting concluded with a report from Dr. Bob Meyer, Western Region Tuberculosis and Brucellosis Epidemiologist, USDA-APHIS-VS, Ft. Collins, CO. He reported that an evaluation of the FPA is being conducted with collaborators in Mexico. Results from that study are still being collected and analyzed.

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THE COMPREHENSIVE STRATEGIC PLAN FOR THE ERADICA-
TION OF BOVINE TUBERCULOSIS
May, 2004

Billy Johnson, Conway, AR

EXECUTIVE SUMMARY

Background:

The program to control and eradicate Bovine Tuberculosis (TB) came into being in 1917. After 60 years of reasonable progress the effort began to languish from the mid 1980's thru the 1990's. As a result the initial strategic plan was finished in 2000 in concert with the declaration of an emergency (by the Secretary of Agriculture) on the final eradication of *M. bovis* from cattle, bison, and captive cervids. There were a total of 25 action items listed under 4 major strategies designed to improve the program and provide the best opportunity to realize a goal of year's end 2003 for eradication. The outcome of the initial plan was very positive with many of the action items being fully or largely completed, significant appropriated and emergency Commodity Credit Corporation funding increases resulted and the level of complacency was lowered with better case finding and resultant new cases. However, as 2003 ended and 2004 came, and looking back over the 3-4 years under the initial plan, there were a number of factors that were disconcerting for State-Federal livestock health officials and industry stakeholders.

The major factors were 1) In 2000 all states were TB Free except Michigan and the El Paso milk shed of Texas but in 2002 Texas lost the Free status with California and New Mexico following in 2003; 2) The situation in Michigan with the wildlife reservoir of TB did not seem to be responding positively to increased manpower and funding but only maintaining the status quo; 3) A new case was discovered in a large dairy replacement operation in Arizona and a small farmer feedlot in Iowa, both tied back to a dairy calf operation in New Mexico, that seemed to support the hypothesis of some that the dairy female replacement pipeline was being infected at a continuously low level posing a risk to dairies and states that rely upon these sources for large numbers of replacements; 4) A new case was detected in Texas involving an ~ 1800 head dairy; 5) A previously infected elk herd was again confirmed with infection in Kansas; 6) There were still 19 of some 40 major adult slaughter plants that were not sampling animals with TB suspicious lesions at or above the 1 per 2000 rate; 7) States were beginning to put entry test requirements on dairy cattle entering; 8) Mexican origin feeder cattle with TB continued to be discovered in U.S. slaughter plants, though at a much lower rate; 9) The goal of TB eradication by years end 2003 had been missed; and 10) Double digit numbers of newly affected herds continued to be disclosed annually.

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Response:

The leadership of USAHA, National Assembly of Chief Livestock Health Officials and the Animal Agriculture Coalition met with Dr. John Clifford and staff members in late January of 2004 and discussed the concerns detailed above. It was decided that a Subcommittee (SC) of the USAHA Committee on Tuberculosis would be named to review, revise, update and expand the existing strategic plan in light of newer information, recent developments and trends and the apparent need to reassess the situation and make conscious, considered and informed decisions as to how to proceed to finalize control and eradication of TB.

The Comprehensive Strategic Plan for the Eradication of Bovine Tuberculosis May 2004

Prepared by the Strategic Plan Subcommittee

Introduction:

The Strategic Plan for the Eradication of Bovine Tuberculosis – May 2004 contains six categories of Action Steps. They are: (A) Eradication Strategies; (B) Wildlife Management; (C) Laboratory and Diagnostic Support; (D) Surveillance; (E) Information and Education; and (F) Risk Mitigation. The latter two Action Steps (E and F) were added to the four Action Steps previously identified in the October 2000 Strategic Plan. Each Action Step contains a number of Action Items. Costs identified for each Action Item are for funding over and above current funding for the Tuberculosis Eradication Program.

Action Step – Eradication Strategies (A)

Action Item (A1):

Pay indemnity for reactors, suspects, and exposed livestock up to fair market value, less salvage.

Background:

The Bovine Tuberculosis Eradication Program has traditionally paid an indemnity for reactors and exposed animals. This indemnity compensated herd owners for the losses incurred by program activities. Initially, the indemnity limits were consistent with the relative market value of the animals.

Livestock entities also specialize in high value stock that far exceeds the limits of federal indemnity.

Action Required:

To keep up with the ever-changing livestock industry and to increase the speed at which high-risk animals are removed from the general livestock population, indemnity rates need to be flexible and compen-

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sate the owner for the appraised value of the reactor, suspect, or exposed animal. Indemnity should be granted at fair market value for all infected or exposed livestock and not just cattle, bison, and captive cervids.

The appraisal and indemnification process needs to be stream-lined so that reactors can be sacrificed within 15 days as required by the UM&R.

Costs (additional) for A1 (Indemnity for reactors, suspects, exposed)		
Cost Item	Calculations	Additional Costs
Indemnity for FY 03	FY03 (1,943,827.00) * 20%	\$388,765.40
Number of CCT reactors or suspects from tests on dairy replacements	Estimate testing 2 million cattle, 2% CFT responders, 2% taken as CCT suspect or reactors	1200
Cost for Dairy replacement reactors/ suspects	Indemnity + transportation+ destruction= 3,000/animal	\$3,600,000.00
Accreditation Testing-Bovine	5,000 herds * 40 head* .02(CFT response rate*.02 (CCT Reactors/Suspects*3,000)	\$240,000.00
Accreditation Testing-Cervids	2050 herds * 20 head * .05 SCT suspects * .05 CCT suspects *2,000	\$205,000.00
All CCT Testing Associated Costs	8Hr VMO time, mileage, shipping to NVSL= 350.00/ head (Movement testing 1200 +Accreditation Testing 80 Bovine and 103 cervids)	\$484,050.00
Estimated Costs (additional)		\$4,917,815.40

Action Item (A2):

Provide for depopulation of all currently known and newly affected cattle, bison, and captive cervid herds according to Uniform Methods and at replacement value plus costs associated with depopulation.

Background:

Currently in our national Bovine Tuberculosis Eradication Program, the producer has the option of herd depopulation with exposed animal indemnity or herd quarantine with a test and removal scheme. Experience over the past 15 years in herds electing a test and removal program has demonstrated the effectiveness of this option to be no more than 15% successful in eliminating infection. This low success rate is largely a result of persistent and recurrent infection in large dairies.

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Depopulation of *M. bovis*-infected herds is the most dependable method of eliminating the disease. However, herd depopulation for large dairies has not always been achievable. In some cases, owners' are not willing to depopulate because of concerns regarding loss of irreplaceable genetics often acquired over several generations of breeding management. But in other cases, the decision is made because of economic considerations such as when substantial differences occur between appraisals based on fair-market value of inventory and replacement value necessary to obtain equitable production levels. Other economic considerations related to depopulation include producer costs associated with required cleaning and disinfection of premises, downtime between liquidation and restocking, and ability to compensate and retain employees during the transition period.

Testing in these herds has been sufficient to remove infected dairy herds from quarantine, however, it has been unable to prevent these herds from becoming re-infected. In the past, this problem was evident in the El Paso milk shed of Texas. However, the inability to depopulate affected dairy herds in Michigan and New Mexico is currently of high concern. Herd depopulation gives a virtual certainty that a herd will not be a continued source of infection to the nation's livestock populations.

Action Required:

Depopulation of all known infected and high-risk herds (as determined by the Designated Tuberculosis Epidemiologist), would advance program goals faster than any other action. Continued mandatory depopulation of all currently known and newly infected herds would ensure that program timelines are met and that the risk of re-infecting the nation's livestock populations is minimized. Therefore, approval of state animal health authorities will be sought in order to change the Uniform Methods & Rules and start mandatory depopulation of tuberculosis-infected cattle, captive bison, and captive cervid herds.

Current methods for determining compensation for herd depopulation must be revised to include replacement value of livestock (to maintain current production levels) and other justifiable expenses related to depopulation and restocking.

Depopulated herds will be required to institute sound biosecurity and management practices designed to prevent re-infection before they can repopulate. Premises containing repopulated herds that become re-infected with tuberculosis (and therefore need to be depopulated again) will be placed under extended quarantine and repopulation with susceptible animals will not be allowed until tuberculosis risk level is determined to be minimal.

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Costs (additional) for A2 (Depopulation)		
Indemnity for FY 03	FY03 (19,967,670.00) * 20% (Inc final number by another 20% for change to replacement value and associated costs.)	\$4,792,240.80
Estimated Costs (additional)		\$4,792,240.80

Action Item (A3):

see Action Item (F3) under Action Step Risk Mitigation (F)

Action Item (A4):

Finalize the new status levels for cattle, bison, and captive cervids.

Background:

APHIS is committed to enhancing program standards and has developed new program status levels that more accurately reflect the relative risks of bovine tuberculosis infection.

Action Required:

Provide a tuberculosis staff position to finalize the new status levels to better understand the risks associated with tuberculosis transmission at each level of status.

Incorporate the new levels into the National Bovine Tuberculosis Eradication Program to aid in mitigating the risks of tuberculosis exposure from animals imported from foreign trading partners or from animals moved from domestic areas of high risk.

International trading partners will be able to apply for equivalency to our program based on valid risk levels.

Include the level of slaughterhouse surveillance as a factor when determining state status.

Monitor the tuberculin test response rates from accredited veterinarians.

Costs (additional) for A4 (TB Status Levels)		
One Staff GS 13 Position	Terry Beals Figure which includes salary benefits, support costs= 124,218.96	\$124,218.96
Estimated Costs (additional)		\$124,218.96

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Action Item (A5):

Conduct reviews and risk assessments for domestic and international regionalization requests.

Background:

The USDA-APHIS-VS Deputy Administrator approves domestic and international regionalization requests. Annual reviews are required.

Action Required:

Review regionalization requests annually to reflect progress toward eradication goals and ensure minimum program requirements. The review will also outline new goals and objectives that will be met during the next fiscal year. This review must document the performance measures that are included in the zoning agreement to maintain status.

Reviews may be performed more often as risk indicates. Exported cattle later found infected with tuberculosis might cause more frequent status reviews.

If bovine tuberculosis has been disclosed in free-ranging animals within a zone or region, then a tuberculosis management plan for wild-life must be approved to maintain status within the zone or region. The management plan is a separate document generated by the entity requesting zoning. It is aimed at showing the steps that will be taken to prevent transmission of disease from the endemic source to domestic livestock.

In many cases, where entire countries are requesting equivalency, an annual paperwork review may be all that is necessary for that country to maintain status. However, when a country wishes to regionalize or zone areas of differential disease status, then a site visit would be required to document the movement control and disease surveillance measures within that zone or region.

Costs (additional) for A5 (Conduct reviews for regionalization)		
Review Costs for FY 03	Estimated FY 03 increased by 50,000	\$50,000.00
Estimated Costs (additional)		\$50,000.00

Action Item (A6):

Institute a standard providing that over 75 percent of all feedlot cases must be traced beyond the feedlot to maintain status.

Background:

The majority of tuberculosis cases seen at slaughter originate from feedlots. In the past, a majority of these cases originated in Mexico. When Mexico instituted a national tuberculosis eradication program, and when the United States began restricting the importation of dairy

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animals from Mexico, the numbers and proportion of Mexican-origin feedlot cases declined. The majority of cases that are not attributable to Mexican origin are not usually traced beyond the feedlot due to lack of proper identification records.

Action Required:

Approximately 20 percent of feedlot-origin tuberculosis cases have an unknown origin due to lack of proper identification. The feedlot and the state need to be held accountable for these unknown cases in terms of feedlot certification and tuberculosis state status. A 75 percent success rate of tracing a case beyond the feedlot is a reasonable goal.

Because tuberculosis is a slow moving disease that may not be discovered until years after transactions have taken place that disseminated the disease, require cattle dealers and feedlots to maintain records for a minimum of 5 years to facilitate tracing.

Require annual inspection of records to maintain certification.

Require cattle entering and leaving a feedlot to have permanent individual identification allowing tracing to herd of origin. Missing identification will be promptly replaced upon discovery of loss. Adoption of a national cattle identification system will assist with meeting this goal.

Costs (additional) Associated with A6 (Feedlot Tracing)

No Known Additional Costs

Action Item (A7):

Enhance use and collection of identification from dairy animals.

Background:

Ability to trace infected dairy cattle back to herds of origin is adversely affected by lack of a modern identification system. This is a serious drawback to conducting proper epidemiological investigations and impedes efforts to eliminate foci of infection. Official identification is not replaced when lost. Furthermore, easily accessible computerized records linking ID to farms of origin are not available. Also, it is often not possible to link ID to sequential premises of ownership, even if the ID is retained in the animal. Finally, proper collection of ID in association with the correct carcass and samples at time of slaughter is not always achieved. Enhanced utilization of ID and its proper collection would improve traceability and aid in epidemiological investigations.

Action Required:

Implement a national animal and premises identification system as soon as possible. All cattle will be required to have permanent individual identification allowing tracing to herd of origin within 48 hours.

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Records linking each bovine to all premises where it has resided should be computerized and easily accessible to the proper authorities. Identification, including its links to all pertinent information, will be promptly replaced when it is lost.

As an interim procedure until the national animal identification system is in place, all cattle will be required to bear permanent individual eartag identification, allowing for tracing to herd of origin, before leaving the premises where they reside.

Facilitate animal tracking by providing funding for all 50 states to participate in an electronic permit/health certificate program.

Require collection of all individual identification at slaughter. Ensure that it is correlated to the appropriate carcass and samples.

Costs (additional) Associated with A7 (Use and Collection of Identification)		
Cost for Identification of all Dairy Animals	9 Million dairy cows have one calf per year to tag, Tag Cost \$0.03, Add Administrative costs \$0.02	\$450,000.00
Fund electronic permits and CVIs in 50 states	Estimate provided to USDA on 4/12/04 by Global VetLink	\$7.5 million
Estimated Costs (additional)		\$7,950,000.00

Action Item (A8):

Monitor human cases of *M. bovis* in the United States.

Background:

While it is probable that most human cases of *Mycobacterium bovis* in the United States are imported or date back to infection occurring decades ago, it is, nevertheless, important to gain an understanding of the nature and epidemiology of these infections when they are identified. On the rare occasion, a confirmed human case of *M. bovis* could be the sentinel drawing attention to a previously unidentified focus of livestock infection. Conversely, a human case of *M. bovis* could potentially be of risk to livestock under the right circumstances. Therefore, we should take advantage of all the epidemiological information we are fortunate to have.

Action Required:

Confirmed human cases of *Mycobacterium bovis* documented by

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state public health officials should be provided annually to the state veterinarian. This report should include age and geographic location of each case, as well as epidemiological findings that indicate probable mode of infection and whether the case is likely to have been imported. This information should be included as part of the each state's annual TB program report.

The state veterinarian will notify appropriate state public health officials of the location and occurrence of laboratory-confirmed cases of *Mycobacterium bovis* in livestock.

Costs (additional) Associated with A8 (Monitor human cases)

No Costs Associated

Action Step: Wildlife Management and Tuberculosis in Non-regulated Species (B)

Action Item (B1): Assist state wildlife agencies in the eradication of tuberculosis from wildlife

Background:

Eradicating tuberculosis among free-ranging wildlife is more problematic than among domestic animals because management tools are fewer in number, labor-intensive, expensive, and unproven. Consequently, prevention of the introduction, establishment, and maintenance of tuberculosis is the most efficient technique for dealing with tuberculosis in wildlife.

Tuberculosis eradication from wildlife requires a cooperative effort minimally involving state and federal wildlife management and animal health agencies, public health agencies, and multiple interest groups. The state wildlife management agency has authority and responsibility for free-ranging wild animals and must play a central role in tuberculosis eradication efforts directed at wildlife.

Disease eradication strategies should be initiated when tuberculosis is identified among wildlife in order to protect domestic animals, wildlife resources, and humans. An adaptive management strategy should be employed that is modified as new techniques and information become available regarding tuberculosis epidemiology and management.

Action Required (B1.1):

Promotion of measures to prevent introduction, establishment, and maintenance of tuberculosis in wildlife.

Transmission of tuberculosis between wildlife and livestock is a two-way street and barriers should be erected or enhanced to preclude

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transmission. Wild animals, due to natural dispersion, are less likely to maintain diseases such as tuberculosis and activities that unnaturally inflate populations or artificially congregate wildlife, especially supplemental feeding and baiting of cervids, should be prohibited or minimized to reduce the likelihood of disease transmission and maintenance among wild animals. (see Action Item (E6) for activities to enhance)

Action Required (B1.2):

Surveillance to enhance early detection and eradication of tuberculosis in wildlife:

Early detection increases the likelihood of success in eradicating tuberculosis from wildlife. Passive surveillance for tuberculosis should be enhanced by providing informational material, including publication of lesion photos, in brochures provided to hunters. Active tuberculosis surveillance should be incorporated into chronic wasting disease surveillance activities being conducted by state wildlife management agencies under annual Cooperative Agreements with APHIS-Veterinary Services. Tuberculosis surveillance should be prioritized by state and region according to risk factors including cervid population densities, artificial management activities that promote disease transmission, historical incidence of tuberculosis among traditional and alternative livestock, etc. (see Action Items E6 for activities to enhance passive surveillance for TB by developing and disseminating educational materials to hunters, wildlife managers, deer and elk processors and others working with hunter-killed cervids).

Action Required (B1.3):

Early, aggressive, and sustained management intervention to eradicate tuberculosis in wildlife:

Expanded wildlife and livestock surveillance is warranted to define the scope of the problem when tuberculosis or suspect lesions are found in one or more wild animals, as well as to monitor progress of eradication efforts. When a focus of tuberculosis is found in wild animals, control measures minimally should include immediate cessation of activities that increase disease risks, particularly supplemental feeding and baiting, as well as population density reduction to the level at which tuberculosis is no longer maintained. The goal of population reduction and the area in which this is to occur must be based on surveillance results and the local biology of the affected wildlife species. State wildlife management and collaborating agencies must identify, promote, evaluate, and appropriately modify the methods under which population reduction is to be effected. Funding and other assistance from APHIS should be provided under Cooperative Agreements that clearly define agency responsibilities, as well as management strategies, methods, and goals.

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Action Item (B2): Promote measures to prevent tuberculosis transmission between wildlife and livestock.

Background:

Eradication of tuberculosis that has become established in free-ranging wildlife is difficult and likely will require a sustained effort over a long period of time. However, measures can be taken to prevent infection of livestock, as well as other wildlife, as eradication activities continue. Mitigation of the risks of transmission from wildlife to domestic animals may allow “compartmentalization” of tuberculosis to only the wildlife population currently infected.

Action Required (B2.1):

Develop and disseminate information, as well as educate producers, veterinarians and agriculture extension agents, regarding risk factors associated with transmission of tuberculosis between wildlife and livestock. (see Action Item E6)

Action Required (B2.2):

Wildlife damage management agents should conduct field visits and consultations to producers providing biosecurity recommendations to reduce exposure of livestock to infected wildlife or to materials contaminated by infected wildlife.

Financial assistance, provision of materials and/or labor should be made available to producers in affected areas to enhance on-farm biosecurity.

Herd management plans must include adequate biosecurity measures for repopulated premises on which herds have been depopulated and for which the owner has received indemnity. Note: full indemnification for repopulated herds may not provide sufficient incentive to practice appropriate biosecurity.

Cost \$1.00 million

Action Item (B3): Promote research into the epidemiology and management of tuberculosis among wildlife

Background:

Limited numbers of tools are available for eradicating tuberculosis from free-ranging wildlife. Methods currently available primarily comprise population density reduction and prohibition of activities that enhance tuberculosis transmission. Unfortunately, there is no guarantee that these strategies will be successful. Thorough knowledge of the epidemiology of tuberculosis in wildlife and livestock may identify additional or alternative eradication methods. Additionally, the efficacy of current and future management actions must be continuously evaluated to identify the best strategies and methods for tuberculosis eradication.

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Action Required (B3.1):

Research should continue into the epidemiology of tuberculosis in wildlife and livestock in order to identify key control points at which transmission among wild animals and transmission between wildlife and livestock can be precluded. *(Funding for disease aspects of this research should be contained with the budget for ARS-NADC, which conducts most of this work. Estimate - \$500,000.*

Action Required (B3.2):

Thorough understanding of the epidemiology requires complete information regarding the behavior and other biological aspects of the affected wildlife species. Research also should be directed at the effects of eradication measures on the biology of the wild animals, as well as on the prevalence of tuberculosis in wildlife. *(Funding should be provided through a Cooperative Agreement, as described under Action Item B1, between APHIS and the state wildlife management agency.)*

Action Required (B3.3):

Additional research is necessary to identify techniques to enhance livestock biosecurity, including physical or other barriers between wildlife and livestock, to prevent tuberculosis transmission. *(Funding should be provided to APHIS-Wildlife Services for this research -\$200,000 .)*

Action Required (B3.4):

Research should be directed toward additional eradication measures including vaccination of wildlife and/or domestic livestock, diagnostic techniques including blood tests for deer and elk, removal of infected and exposed wild animals from infected populations, and other techniques. *(Funding should be provided to the state wildlife management agency through a Cooperative Agreement with APHIS, as described in Action Item B1, for development and evaluation of eradication techniques, and to ARS-NADC for vaccine research. ARS estimates for vaccine research are \$500,000)*

Action Item (B4):

Establish task force against TB that combines zoo and non-program species groups, as well as state and federal animal health officials.

Action Item (B5):

Develop TB testing protocols for zoo and non-program species. Provide comparative cervical test training to zoo vets and provide for procedural and test data collection, analysis, and information dissemination.

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Action Item (B6):

Implement an exotic animal facility and herd classification system for TB.

Action Step - Laboratory and Diagnostic Support (C)

Action Item (C1):

Revise policy concerning laboratory submission procedures (whole herd, zoos, wildlife, captive cervids).

In order to support the revised Strategic Plan, the TB submission policy table must be revised. Revision will depend on the new NVSL laboratory including size, personnel, equipment and desired turnaround time.

Action Required:

Remove the TB submission table in the year 2000 Strategic Plan.

Expand the histopathology service for slaughter cattle. Use the expanded service of NVSL pathology service and the California Lab service as a model to place other State Laboratories into service required to give 24 to 48 hour service.

Figure the fee for service to Program at \$25 per specimen read by a pathologist at a State Laboratory (24-48 hr turn around time). Shipping costs are estimated at \$40 per sample for overnight delivery.

Costs (additional) Associated with C1 (Expanded sample handling to other laboratories)		
Histopathology	10,000 additional samples per year performed at other laboratories	\$250,000.00
Shipping costs	10,000 additional samples	\$400,000.00
Estimated Costs (additional)		\$650,000.00

Action Item (C2):

Evaluate new technologies for the detection of the organism or disease.

Continue new test evaluation when new tests become available.

Provide Bovigam test for widespread use in infected herds. This will require the use of State laboratories to give over night access to the field staff to submit samples. This will require the NVSL or manufacturer to provide training, funding for kits and increased personnel in state laboratories for running the test.

Action Required:

It is estimated that a total of 10,000 samples per year for Bovigam

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testing will be required if interstate testing of all dairy animals is instituted along with infected herds and suspect cattle on tracebacks. Each test would cost \$30 for kit, tech and data processing plus \$40 per sample to ship.

Action Item (C3):

Transfer Polymerase Chain Reaction (PCR) technology to NVSL.

PCR has been transferred to the NVSL from the NADC. Personnel have been hired to perform the test, but need funding for personnel, supplies and equipment to continue to support technology transfer now that the NADC no longer provides the service to APHIS. NVSL has hired a GS-13 Pathologist and a GS-8 lab tech to perform the tests.

Action Required:

PCR is currently being performed on all compatible Mycobacteriosis cases. Specific funding support for personnel in the NVSL Pathobiology Lab (PL) should be provided. Current personnel supporting the PCR testing includes 1 GS 13 Pathologist and 1 GS 8 Lab tech.

Action Item (C4):

Transfer DNA fingerprinting technology to NVSL

Restriction Fragment Length Polymorphism (RFLP) technology has been transferred from the NADC to the NVSL. Personnel have been hired to perform the test, but need funding for personnel, supplies and equipment to continue to support technology transfer now that the NADC no longer provides the service to APHIS. RFLP has been requested on all *M. bovis* cases and has increased with the newly diagnosed herds in NM, AZ, CA, TX and MI. The NVSL has hired 1 GS-13 molecular microbiologist, 1 GS-8 lab tech and 1 GS-7 lab tech to perform the necessary tests.

Action Required:

DNA fingerprinting techniques need to be harmonized with Canada and Mexico so that new isolates can be compared properly. New molecular diagnostic techniques (AFLP & spoligotyping) need to be validated for *M. bovis* isolates and implemented into the NVSL.

Personnel for the NVSL DBL-Mycobacteria Lab includes 1 GS 13 Microbiologist and 1 GS 8 lab tech and 1 GS 7 lab tech – Salary, benefits and support costs = \$248,466 per year; supplies and equipment = \$200,000.

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Costs (additional) Associated with C2 (Increased use of Bovigam and evaluation of new technologies), C3 (PCR testing), and C4 (DNA fingerprinting)		
Expansion of use of Bovigam	10,000 samples at \$30 for each kit, tech time and data processing plus \$40 for shipping costs	\$700,000.00
Cost for PCR testing	Personnel plus support costs (1-GS 13 and 1 GS 8)	\$188,578.00
Cost for PCR testing	PCR supplies and equipment	\$100,000.00
Cost for DNA fingerprinting	Personnel plus support costs (1 GS 13, 1 GS 8 and 1 GS 7)	\$248,466.00
Cost for DNA fingerprinting	Equipment and supplies	\$200,000.00
Estimated Costs		\$1,450,000.00

Action Item (C5):

Increase laboratory capacity at NVSL for testing 10,000 samples.

Capacity at the NVSL has increased while funding has decreased. Current TB budget at the NVSL for FY04 is \$363,147. It was \$365,809 in FY03 and \$394,216 in FY02.

The NVSL has hired the necessary personnel to handle 5,000 samples per year at the Pathobiology Lab. This consists of 2 GS-13 full-time pathologists and 2 full-time GS-7 lab techs.

The salary, benefits and support costs = \$366,214 per year; supplies and equipment = \$100,000 per year. Shipping costs are estimated at \$40 per sample. 5000 samples = \$200,000. TB kit includes sample for histopathology and culture.

Total funds needed = \$666,214.

The NVSL has hired the necessary personnel to process 3600 samples per year. Samples are first screened using histopathology and those samples with definitive diagnoses such as tumors and systemic fungus are not processed which is approximately one third of the samples submitted. This consists of 3 GS-12 microbiologists and 3 GS-7 lab techs. The salary, benefits and support costs = \$490,036; supplies and equipment = \$200,000 per year.

Total funds needed = \$690,036

Total funds needed for processing 5,000 samples per year (histopathology and culture) = \$1,356,250 per year.

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Costs (additional) Associated with C5 (double NVSL Pathobiology Lab capacity to 10,000 samples per year)	
Estimated Costs	\$2,712,500.00

Action Item (C6):

Evaluate tests for diagnosis of tuberculosis in captive cervids

Research and validation of new diagnostic tests for elk and white-tailed deer is needed. The Cervigam and other serological tests need to be validated for new cervid species.

Action required:

ARS-NADC currently research proposals on new diagnostic tests for elk and white-tailed deer should be funded. Costs for those proposals are estimated at \$450,000 per year for 3-5 years.

Costs (additional) Associated with C6 (ARS research)	
Total annual cost	\$450,000.00

Action Step – Surveillance (D)

Action Item (D1):

Review all state programs and regulations for bovine tuberculosis reporting.

Action required:

Coordinate and integrate the monitoring and surveillance activities of the state/federal animal health and public health sectors. Establish administrative arrangements between all sectors to facilitate immediate cross notification of cases or outbreaks.

Promote monitoring, surveillance and control programs in high-risk production areas for cattle bison, and captive cervids. All animal health sectors must ensure that contact tracing is carried out, area outbreaks are recognized, and epidemiology is monitored.

Require accredited veterinarians to be trained and approved as “designated accredited veterinarians” for conducting TB testing in each species as they currently are for cervids. This will ensure they are current on the TB testing technique and reporting criteria.

Resource Requirements:

Utilize current personnel

Action Item (D2):

Review the memorandum of understanding between FSIS and APHIS for bovine tuberculosis tissue collection at slaughter to improve routine surveillance at slaughter plants.

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Action required:

Update the memorandum of understanding between FSIS and APHIS for bovine tuberculosis tissue collection at slaughter.

Utilize the local AVIC, state veterinarian and their respective field personnel to convey the expected granuloma submission rate of 1 per 2000 adult cattle slaughtered (as specified in the TB UM&R) and provide routine feed back to plant personnel.

Resource Requirements:

Utilize current personnel.

Action Item (D3):

Increase Point Concentration Monitoring using inspection and collection of tissue samples from cattle, bison, and captive cervids at slaughter.

Action required:

Continue to closely monitor major slaughter plants most critical to the tuberculosis surveillance program. Prioritize collection of tissue samples at plants that slaughter adult cattle. The expected rate and number of granuloma submissions needs to be identified by plant and state and effectively communicated to meat inspection personnel, plant management and program officials. The minimum expected granuloma submission rate for adult cattle is specified in the UM&R as one per 2000 animals slaughtered.

Develop and implement efforts with state meat inspection agencies to ensure that surveillance for TB becomes a priority in facilities under their jurisdiction, as well. Develop an incentive awards program for state meat inspection personnel for identifying cases that result in detection of affected herds, similar to awards currently available to FSIS personnel.

Assure that all individual animal identification is routinely collected and accurately correlated to each carcass throughout the inspection process. All such identification devices are to be retained and submitted with specimens when suspicious lesions are detected.

Include surveillance of ante-mortem condemned carcasses.

Use the Secretary's office, if necessary, to assure adequate collection by FSIS inspectors. If this is still not successful, then place APHIS personnel in the plants with in adequate TB sample submissions.

Resource Requirements:

Assume that one-half of the forty (40) major plants will need to have an APHIS personnel assigned in order to obtain adequate TB surveillance. (Twenty APHIS Animal Health Technicians)

Incentive awards for state meat inspection personnel.

Assume 5 submissions per year result in a confirmed case of TB that successfully results in the finding of a new TB affected cervid, cattle, or other livestock herd.

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Assume that each of those submissions made by a lay inspector at a plant with an equal award paid to the inspector and veterinarian.

Costs (additional) Associated with D3 (increase sampling at slaughter)	
20 AHT's in cow-kill slaughter plants	\$1,200,000.00
Estimated incentive award cost for state meat inspection personnel (5 confirmed submissions at \$3,750 each for lay inspector and veterinarian submitter)	\$37,500.00
Total (additional) cost (rounded)	\$1,250,000.00

Action Item (D4):

Monitor Cervid slaughter at specialty plants not inspected by FSIS or State meat inspection.

Action Items:

Establish a voluntary inspection program for the slaughter of captive cervids at specialty plants. Providing such service would enable tuberculosis surveillance for species not currently inspected.

Establish a cervid TB slaughter surveillance program with definitive criteria and goals. The program should define submission targets based on the number of cervid slaughtered in the state. Additionally, the program should be monitored to verify compliance with inspection, tissue submission rates and validate the surveillance based on the numbers of samples submitted.

Encourage FSIS to re-classify cervids (and exotic hoof stock) as "amenable species" in order to provide inspection services without user fees.

Resource Requirements:

Thirty-one states have state meat inspection agencies (28) or otherwise require inspection of non-amenable species (3). Utilize AVIC and state veterinarian to develop relationships with those entities to ensure surveillance objectives are accomplished. Utilize existing state/federal field personnel to develop relationships with individual plants.

Employ an APHIS AHT, or through cooperative agreements a state AHT, in each of the remaining 17 states that allow captive cervid farms or ranches to develop a TB surveillance program in plants that slaughter cervids. (17 APHIS Animal Health Technicians)

Action Item (D5):

Monitor wild cervids killed during hunting season

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Costs Associated with D5 (slaughter surveillance of captive cervids)	
17 AHT's @ \$60,000 per year	\$1,000,000.00
Total cost	\$1,000,000.00

Actions Required:

Start a voluntary TB inspection program with all cooperating states, during hunting seasons, or during periods of select culling, by state or federal wildlife agencies. Collect and submit tissues from lymph nodes of the head and viscera, if available. A veterinary medical officer or wildlife veterinarian on a part time basis, depending on the scope of the survey, can do this. If necessary, lay staff could be trained to collect the samples possibly increasing the size of the survey. Providing such service would enable tuberculosis surveillance for populations not currently inspected.

Provide training and financial support, as needed, to allow wildlife agencies to incorporate TB surveillance into ongoing CWD surveillance programs.

Resource Requirements:

Utilize existing state and federal wildlife biologists and technicians. Costs for laboratory evaluation of specimens, see Action Item (D9).

Action Item (D6):

Maintain aggressive levels of surveillance testing of livestock herds in Michigan.

Action Required:

Maintain surveillance testing in all areas of the state, at levels that will complement surveillance at slaughter, and will enable detection of TB infection at low prevalence rates on a herd basis.

Action Item (D7):

Increase the number of herds under disease free certification in each state to a pre-determined level to ensure adequate disease monitoring (sentinel surveillance) for respective geographic regions.

Action Required:

Provide special recognition to states that enroll a high percentage of their cattle and bison herds in an accreditation program and to conduct annual testing for TB.

Provide fee basis payments to veterinary practitioners to enroll cattle and bison herds in herd status programs in all states.

Provide fee basis payments to veterinarians to enroll captive cervid herd owners in a TB accredited or qualified herd status program and to conduct herd testing for TB.

Extend annual herd testing requirement for accredited free herds

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to two or three years to maintain free herd status in Modified Accredited Advanced and Accredited Free states.

Provide monetary incentives to producers to enroll herds in the TB certification programs by subsidizing the costs of testing by designated accredited veterinarians.

Resource Requirements:

Assumptions for accreditation tests of cattle herds:

- 1 million herds in US
- 5% characterized as purebred or seed stock producers (NASS expert)
- 10% would participate if costs subsidized
- Average herd size: 40 adult cattle
- Stop fee \$80 per herd
- Test fee \$8 per head

Annual estimated expense for cattle \$2,000,000.00

Assumptions for Accreditation tests of cervid herds:

- 8200 herds in US (2003 APHIS survey)
- 25% would participate if costs subsidized
- Avg herd size 20 head (adjusted from 2003 APHIS survey)
- Stop fee \$80 per herd
- Test fee \$8 per head

Annual estimated expense for cervids \$500,000.00

Resource Requirements:

Indemnity costs for Post-mortem of CCT/gIFN Reactors (assuming TB negative population):

Cattle-5000 herds X 40 head X .02 CFT test suspects X .02 CCT test reactors X \$3000 indemnity = \$240,000

Cervids-2050 herds X 20 head X .05 SCT test suspects X .05 CCT test reactors X \$2000 indemnity = \$205,000

Resource Requirements:

Costs for confirmatory testing of CFT test suspects:

CCT test-assume current state/federal veterinarian staffing can do this work

GIFN assay-Cattle: assume half of CFT test suspects would be tested by gIFN rather than CCT test-4000 CFT suspects X .5 gIFN X \$30 lab (kit plus personnel) = \$60,000 testing plus shipping-5000 herds X .8 suspect/herd X .5 use gIFN X \$40 shipping = \$80,000 freight

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Costs Associated with D7 (increasing number of Accredited Free herds)	
Cattle herds	\$1,000,000.00
Cervid herds	\$500,000.00
CCT/gIFN testing of CFT suspects found during herd tests	\$1,350,000.00
Total cost	\$2,850,000.00

Action Item (D8):

Enhance Veterinary Services standard reporting procedures for tuberculosis surveillance activities at all levels of the epidemiological delivery system.

Actions Required:

Develop standards and certification training for accredited veterinarians performing TB tests.

Insist that FSIS include in its data the number of adult and feeder cattle killed at slaughter. Also, request FSIS include suspicious pathology sent to FSIS laboratory.

Encourage NASS to routinely survey and report census estimates for the cervid industry on the same frequency as reports in other livestock.

Include documentation of conformance with slaughter surveillance goals and provide information back to FSIS and plants.

Require TB inspection on carcasses condemned at ante mortem inspection.

Evaluate the rate of submissions of suspected tissue samples for adult and feeder cattle.

Monitor the distribution of the diseases in animals and detect outbreaks in animal species at the area and field levels and evaluate the impact of prevention, control, and eradication measures and activities on defined animal populations. Require field units to monitor and carry out contact tracing and conduct full epidemiological investigations in recognized area outbreaks.

At the regional level, epidemiologists will monitor and report epidemiological findings in the states, and monitor and report on the performance of control and eradication programs.

At the national level, epidemiologists for Animal Health Programs will monitor and report on:

1. Tuberculosis epidemiology findings in the United States;
2. The performance of control and eradication programs; and
3. The planning of program activities (e.g., funding, regulations, and Uniform Methods & Rules updates).

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National program epidemiologists will examine international trends for tuberculosis over time and make regional comparisons with the intent of revising import protocols as necessary and coordinating control efforts across international borders (e.g., Mexico).

Require all livestock species susceptible to bovine TB be identified with individual unique identification devices that can be traced back to the farm of origin.

Resource Requirements:

Epidemiology and program management:

2 additional positions on AHP staff, 1 additional position on each regional staff

Costs Associated with D8 (Add Veterinarian Support Staff for Program Management)	
2 AHP staff veterinarians	\$220,000.00
2 regional epidemiologists	\$180,000.00
Total cost	\$400,000.00

Action Item (D9):

Incorporate TB surveillance and tissue collection on animals being evaluated for other disease programs (On farm or renderer collections for BSE).

Action Required:

- Develop protocols to collect tissues from animals being presented for other surveillance programs (i.e. BSE and CWD).

Resources:

Utilize positions funded by BSE and CWD surveillance programs.

Additional costs for histopathology at regional contract labs that support BSE surveillance program:

- 260,000 non-ambulatory cattle surveillance
- 120,000 wild deer surveillance
- 25,000 captive cervid surveillance (assumes 10% annual mortality)

405,000 total examined

- Assume submissions at rate of 1% (any head or thoracic lymph node, or pulmonary pathology)
- $405,000 \times .01 = 4050$ submissions
- Estimated expenses if histopathology done at regional lab 4050 submissions \times \$20 = \$81,000

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Costs Associated with D9 (Enhance TB surveillance during BSE sampling program)	
Laboratory diagnostics for additional sampling	\$100,000.00

Action Step - Information and Education (E)

Action Item (E1):

Develop and distribute new informational brochures or other media that clearly identifies specific risk factors and risk practices that potentiate the risk of acquiring bovine TB.

Actions required:

Identify and prioritize specific audiences to target for I&E.

Identify/assess suitability of existing TB literature and related references for potential I&E use.

Determine costs/identify cooperative funding sources to subsidize development of outreach materials through an extension service or equivalent.

Develop/distribute outreach materials as necessary to accommodate action item needs.

Establish measures to gauge effectiveness of outreach efforts.

Resource Requirements:

Brochures - Design and print 3, 4-color brochures, 100,000 copies each

Design: \$4,500.00

Printing (100,000 copies, ea.): \$21,000.00

Subtotal: \$25,500.00

Fact Sheets - Design and print 3, 1-color fact sheets, 100,000 copies each

Design: \$450.00

Printing (100,000 copies): \$9,000.00

Subtotal: \$9,450.00

PowerPoint Presentation:

Design: \$1,500.00

Duplication (100 CDs with insert cards/jewel cases): \$750.00

Subtotal: \$2,250.00

Web site (gateway of TB information):

Design: \$5,000.00

Production (programming, HTML coding, 508-compliance): \$15,000.00

Subtotal: \$20,000.00

Travel:

Meeting/conference attendance: \$11,800.00

Subtotal: \$11,800.00

Educational Technology Specialist (GS-13):

Salary and Benefits – 75% time: \$80,000.00

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Subtotal: \$80,000.00

Temporary Clerical Help - Fill materials requests, prepare paperwork for travel and procurement, compile and manage mailing lists

Salary: \$21,000.00

Subtotal: \$21,000.00

LPA Assistance (GS-11):

Salary and Benefits – 50% time

Subtotal: \$60,000.00

Supplies - Computer equipment, peripherals, general office supplies, photocopying, video/photo duplications

Subtotal: \$20,000.00

E1 TOTAL: \$250,000.00

Action Item (E2):

Conduct a descriptive analysis of the dairy heifer-raising industry.

Background:

The growth of the dairy industry over the past 20 years in the United States has required that sufficient replacement dairy heifers be raised and marketed efficiently to replace adult, milking cattle frequently culled from the large, commercial dairy herds throughout the United States. Heifer-raising operations often numbering in the thousands of heifers have developed in many States. These operations usually gather and group heifers from a multitude of sources, and may specialize in raising them to various ages and weights before they move to another facility.

Documentation and geographic mapping of existing dairy heifer-raising facilities nationally, and a descriptive analysis of the numbers and types of heifers they contain is lacking. Having such information is critical if education efforts regarding risk factors and practices that promote spread of bovine tuberculosis and other diseases are to be focused toward this segment of the industry.

Actions required:

Identify and fund a resource to conduct and document a descriptive, epidemiologic survey of the dairy heifer-raising industry in the United States that includes the trend in movements of dairy heifers, and a geographic information system analysis.

Provide results of the descriptive analysis in a format that will allow educational information related to risk factors and practices that promote spread of TB to be shared with the dairy heifer-raising industry.

Resource Requirements:

VMO/Epidemiologist (GS-13)

Salary and Benefits: \$124,300.00

Administrative Support (GS-6)

Salary and Benefits: \$65,000.00

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Supplies - Computer equipment, peripherals, general office supplies, photocopying, video/photo duplications: \$10,700.00

E2 TOTAL: \$200,000.00

Action Item (E3):

Develop and deliver continuing educational program for professional accredited veterinarians that clearly outlines the expectations industry and regulatory officials have of them when performing TB program activities.

Background:

Past successes in the TB eradication program have resulted in complacency in some segments of the veterinary community. Renewed efforts are necessary to inform and re-educate accredited veterinarians on their critical role in the TB eradication program.

Action required (E3.1):

Obtain funding and other resources to manage, develop, and deliver continuing educational programs for accredited veterinarians and other targeted veterinary populations, as specified in the actions below.

Resource Requirements (E3.1):

VS/PDS Training Specialist (GS-13)

Salary and Benefits: \$100,000

Veterinary Medical Officer (GS-13)

Salary and Benefits: \$124,300

Training Technician (GS-6)

Salary and Benefits: \$65,000

Supplies - Computer equipment, peripherals, general office supplies, photocopying, video/photo duplications: \$30,000.00

E3.1 Subtotal: \$319,300.00

Action Required (E3.2):

Develop a continuing education CD-ROM with printed supplemental material that will include the following topics as a minimum:

- Current status and challenges related to bovine TB eradication in the US;
- Proper administration and reading of the intradermal tuberculin test;
- Use of the various tests used in the TB eradication program and the efficacy of each; and
- Requirements and responsibilities related to the reporting of tests completed and responses found.

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Resource Requirements (E3.2.1):

Prepare a level 2 interactive CD-ROM for Producers, Federal and State veterinarians, and other stakeholders targeting TB current status and changes.

Design: \$35,000.00

Contractor Cost: \$7,000.00

Maintenance and Changes: \$25,000.00

E3.2.1 Subtotal: \$67,000.00.00

Action Required (E3.2.2):

Produce and mail Sample Handling & Submission CD-ROMs.

Resource Requirements (E3.2.2):

Duplication (1000 CDs with insert cards/jewel cases): \$1,500.00

Postage & Handling: \$8,500.00

E3.2.2 Subtotal: \$10,000.00

E3.2 Subtotal: \$77,000.00

Action Required (E3.3.1):

Initiate continuing educational outreach activities to State Veterinarians, state veterinary medical associations, and other veterinary organizations using products developed in second action.

Resource Requirements (E3.3.1):

(Labor is split between this Action Required and Action Required in E3.3.2 below)

VMO/Epidemiologist (GS-13) – 50% time

Salary and Benefits: \$60,000.00

Administrative Support (GS-6) – 50% time

Salary and Benefits: \$30,000.00

Supplies - General office supplies, photocopying, video/photo duplications: \$10,000.00

E3.3.1 Subtotal: \$100,000

Action Required (E3.3.2):

In cooperation with State Veterinarians and AVIC's, initiate effort to identify and contact accredited veterinarians with below average record of reporting TB suspects. Individually contact and meet with these veterinarians to reacquaint them on the proper reading of intradermal TB test.

Resource Requirements (E3.3.2):

(Labor is split between this Action Required and Action Required in E3.3.1 above)

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VMO/Epidemiologist (GS-13) – 50% time

Salary and Benefits: \$60,000.00

Administrative Support (GS-6) – 50% time

Salary and Benefits: \$30,000.00

Supplies - General office supplies, photocopying, video/photo duplications: \$10,000.00

E3.3.2 Subtotal: \$100,000

Action Required (E.3.3.3):

Reserve a place on the agenda of the accreditation orientation session for all fourth year veterinary students to discuss the current re-emergence of TB in the US. Implement a requirement as a condition of accreditation that all fourth year veterinary students attend a wet lab on the proper administration and reading of an intradermal TB test.

Resource Requirements (E.3.3.3):

(Cost absorbed between Actions Required in E3.3.1 and E3.3.2 above)

E3.3.3 Subtotal: \$0.00

Action Required (E3.3.4):

Initiate outreach activities to consultants (non-accredited veterinarians, nutritionists, cooperative extension veterinarians and other animal husbandry professionals).

Resource Requirements:

VMO/Epidemiologist – 50% time

Salary and Benefits: \$60,000.00

VS/PDS Training Specialist (GS-13) – 25% time

Salary and Benefits: \$25,000.00

Administrative Support (GS-6) – 50% time

Salary and Benefits: \$30,000.00

Supplies - General office supplies, photocopying, video/photo duplications: \$5,000.00

E3.3.4 Subtotal: \$120,000.00

Action Required (E3.3.5):

Provide TB information to the training organizations at PDS, NVSL, and CEAH for distribution/dissemination at major learning events.

Resource Requirements:

(Cost absorbed between Actions Required #3 and #4 above)

E3.3.5 Subtotal: \$0.00

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Action Required (E3.3.6):

Develop and distribute a Veterinary Services Notice or Memorandum that establishes the policy and requirement that only designated accredited veterinarians who have received special training (as described in Action 8) in the application and reading of the tuberculin test will be approved to conduct TB testing in cattle or bison. Veterinarians currently accredited by USDA who want to continue to be approved to conduct tuberculin testing in cattle and bison without interruption must receive this special training within one year of the date of the VS Notice or Memorandum.

Resource Requirements:

None

E3.3.6 Subtotal: \$0.00

Action Required (E3.3.7):

Continuing education requirement for designated accredited veterinarians: All designated accredited veterinarians must attend a TB program update every three years that will include a session on the practical application of the intradermal test, and the use and efficacy of all tests used in the TB eradication program. These sessions will be taught by state/federal veterinarians. (This requirement should be consistent with provisions of the proposed changes in the veterinary accreditation program).

Resource Requirements:

Veterinary Medical Officer (GS-13)

Salary and Benefits: \$124,300.00

VS/PDS Training Specialist (GS-13)

Salary and Benefits: \$100,000.00

Training Technician (GS-6) – 50% time

Salary and Benefits: \$35,000.00

Supplies - General office supplies, photocopying, video/photo duplications: \$15,000.00]

E3.3.7 Subtotal: \$274,300.00

Action Required (E3.3.8):

Incorporate into the standards for USDA veterinary accreditation the following education requirement for all veterinarians applying for accreditation to perform any regulatory activity related to food animal health certification:

New Educational Requirement: Complete at least one "wet lab" tuberculin test application seminar prior to graduation from an accredited veterinary school, or one TB program update seminar that

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includes instruction on proper application of the tuberculin test and expected response rates before accreditation privileges to perform specific bovine tuberculosis eradication program activities is granted.

Resource Requirements:

None

E3.3.8 Subtotal: \$0.00

E3 TOTAL: \$990,600.00

Action Item (E4):

Assist industry officials in delivering information about specific risk practices for acquiring bovine TB by presenting talks and seminars at local, state and national industry gatherings.

Action required (E4.1):

Develop educational materials specifically targeting this audience (CD-ROM, PowerPoint, video, etc).

(Materials developed under Action Item E1 will be used.)

E4.1. Subtotal: \$0.00

Action required (E4.2):

Enlist assistance of state and federal veterinarians in delivering presentations at industry meetings.

Resource Requirements:

Veterinary Medical Officer (GS-13) – 25% time

Salary and Benefits: \$31,100.00

Administrative Support (GS-6) – 50% time

Salary and Benefits: \$35,000.00

E4.2 Subtotal: \$66,100.00

E4 TOTAL: \$66,100.00

Action Item (E5):

Develop a training program that will prepare animal health and /or APHIS contract personnel to conduct blood and tissue sampling for bovine tuberculosis in cooperating slaughter plants and rendering facilities.

Background:

The recent finalization of the Blood and Tissue Sampling regulation in 9 CFR may provide APHIS with a tool which could enhance surveillance for bovine tuberculosis at slaughtering establishments and ren-

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dering facilities. This regulation allows APHIS to conduct blood and tissue sampling in certain facilities as needed in order to increase surveillance for specific diseases using contract or APHIS-employed personnel. These personnel would need to be specially trained in many aspects of gross pathology recognition, sampling techniques, identification collection, reporting, and slaughter plant protocol and procedures before being placed in such positions to conduct these activities.

Resource Requirements:

Veterinary Medical Officer (GS-13) – 50% time

Salary and Benefits: \$60,000.00

VS/PDS Training Specialist (GS-13) – 50% time

Salary and Benefits: \$50,000.00

Training Technician (GS-6) – 50% time

Salary and Benefits: \$30,000.00

Supplies - General office supplies, photocopying, video/photo duplications: \$30,000.00

E5 TOTAL: \$170,000.00

Action Item (E6):

Provide funds to all state wildlife agencies to assist them in promoting measures, through information and education programs, to prevent tuberculosis transmission between wildlife and livestock in their respective states. This action item is linked to Strategy 2, Wildlife Management and Tuberculosis.

Resource Requirements:

No additional labor costs are involved

State funds: \$5,000 x 50 states = \$250,000.00

E6 TOTAL: \$250,000.00

Action Item (E7):

Conduct information and education activities to assist Mexican officials in eradicating tuberculosis from all Mexican states that border the United States. This action item is linked to Strategy 6, Risk Mitigation, with respect to targeting the risk of TB exposure or infection of Mexican feeder cattle.

Resource Requirements:

Specific allocation TBD.

E7 TOTAL: \$100,000.00

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ACTION STEP SUMMARY - INFORMATION AND EDUCATION (E)	
E1. Develop and distribute new informational brochures or other media that clearly identifies specific risk factors and risk practices that potentiate the risk of acquiring bovine TB.	\$250,000.00
E2. Conduct a descriptive analysis of the dairy heifer-raising industry.	\$200,000.00
E3. Develop and deliver continuing educational program for professional accredited veterinarians that clearly outlines the expectations industry and regulatory officials have of them when performing TB program activities.	\$990,600.00
E4. Assist industry officials in delivering information about specific risk practices for acquiring bovine TB by presenting talks and seminars at local, state and national industry gatherings.	\$66,100.00
E5. Develop a training program that will prepare animal health and /or APHIS contract personnel to conduct blood and tissue sampling for bovine tuberculosis in cooperating slaughter plants and rendering facilities.	\$170,000.00
E6. Provide funds to all state wildlife agencies to subsidize their efforts to stop transmission of information and education activities to of tuberculosis from wildlife in their respective states. This action item is linked to Strategy 2, Wildlife Management and Tuberculosis.	\$250,000.00
E7. Conduct information and education activities to assist Mexican officials in eradicating tuberculosis from all Mexican states that border the United States. This action item is linked to Strategy 6, Risk Mitigation, with respect to targeting the risk of TB exposure or infection of Mexican feeder cattle.	\$100,000.00
TOTAL	\$2,026,700.00

Action Step - Risk Mitigation (F)

Action Item (F1):

Reduce the risk of spreading tuberculosis by changing management practices and TB testing at dairy collection premises, and by TB testing dairy breeding cattle moving interstate from regions of risk.

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Background:

Many industry practices potentially expose susceptible cattle to higher risk animals. Examples include mixing replacement heifers with terminal feeder cattle (including Mexican-origin steers and spayed heifers), and re-use on other farms of cull dairy cows from sale yards.

Action Required:

Provide personnel to annually certify all “moderate to large” premises where dairy calves and heifers are commingled from more than one source prior to freshening. Certification should require:

- Preventing fence-line contact of all dairy replacement or breeding cattle from all cattle maintained for non-breeding purposes;
- Keeping standardized records for a minimum of 5 years;
- Requiring permanent individual identification, allowing tracing to herd of origin, on all cattle entering and leaving premises;
- Requiring a negative official tuberculosis test within 60 days of movement out of the premises, in either interstate or intrastate commerce, regardless of status of state of origin, on all breeding cattle 6 months of age or older; and
- Quarantining breeding cattle less than 6 months of age at the time of movement upon arrival at their destination, and require an official tuberculosis test when they are 6 months of age.

Require a negative official tuberculosis test on all breeding dairy cattle 6 months of age or older moving interstate from “regions of unacceptable risk”. Dairy cattle less than 6 months of age at the time of movement shall be quarantined upon arrival in the state of destination and require a negative official tuberculosis test when they are 6 months of age. Cattle from TB certified free herds are exempt from this interstate testing requirement.

Costs Associated with F1 (Management practices of dairy collection premises)		
Certification Costs	Estimate need about 40 GS-7 positions across US	\$51,139.44X40 = \$2,045,577.60
CCT or Gamma Testing Costs	Number of Animals CCT= 2% of Number CFT Tests (2M*1.5 tests)	60,000 animals
	Cost of CCT (Gamma \$60 or CCT \$100= Avg. \$80 per test) Number of tests (60,000) * \$80	\$4,800,000.00
Estimated Costs		\$6,845,577.60

TUBERCULOSIS

Action Item (F2):

Reduce risk of spread of tuberculosis from Mexican cattle.

Background:

Although the numbers of infected Mexican steers and spayed heifers found at slaughter in U.S. plants has decreased in recent years, the level at which they continue to be found indicates that the U.S. is still importing infected cattle from Mexico. Therefore, cattle fed or pastured with these imported cattle are also at risk for being exposed to tuberculosis.

In addition, there is concern that states are not able to track the movements of imported cattle from Mexico. Prior notification of state of destination on cattle lots imported directly from Mexico is not consistent although required by USDA, APHIS, VS policy. Further, in many cases, cattle are diverted from their stated destination without sufficient follow-up by federal personnel.

Action Required:

Encourage states to require permits for all cattle moving into their state that originate from Mexico. Ensure the individual identification, premises of origin, port of entry, Mexican state of origin, and destination are recorded. Facilitate this by funding an electronic permit/health certificate program for all 50 states (costs included in A7).

USDA, APHIS, VS should consistently implement the November 2002 policy requiring notification of the state of destination when cattle are imported from Mexico - this requires no additional resources.

Provide oversight of Mexican cattle at cattle sorting facilities, and require a new Certificate of Veterinary Inspection, listing individual identification, to be issued before cattle leave the facility - may require personnel resources.

Investigate and follow-up on reported diversion of cattle from the destination listed on the import health certificate - may require personnel resources.

Require a 60-90 day quarantine period after entry into the United States, followed by an official tuberculosis test for any breeding cattle from Mexican states with lower status than modified accredited advanced. All such cattle must be physically separated by barrier from all other non-quarantined cattle during this period, including dairy cattle, breeding cattle, and other cattle.

Pre-import requirements for exhibition cattle, including roping steers, from Mexico will be the same as the requirements for breeding cattle. Upon entry into the U.S.A., exhibition cattle from Mexican states with lower status than modified accredited advanced will either be subjected to a 60-90 day quarantine period followed by an official tuberculosis test, or they will be subjected to testing by an official tuberculosis test on an annual basis prior to participation in exhibitions or events. All Mexican cattle participating in exhibitions or events must be accompa-

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nied by documentation the state of origin, date of import, and a certification of having passed the required post-entry quarantine and retest or, alternatively, certification of passing the annual test for the current exhibition year.

Maintain the ban on importing Mexican cattle that are genetically 40% or more Holstein until Mexican dairy cattle are no longer considered to be a tuberculosis risk for the United States.

Costs Associated with F2 (Reduce risk from Mexican cattle)		
Electronic Permits	Cost included in A7	
CCT or Gamma Testing Costs	Number of Animals CCT= 2% of Number CFT Tested (50,000)	1,000
	Cost of CCT (Gamma \$60 or CCT \$100= Avg. \$80 per test) Number of tests (1,000) * \$80	\$80,000.00
Estimated Costs	\$80,000.00	

Action Item (F3):

Assist Mexican officials in eradicating tuberculosis from all Mexican states that border the United States or that export cattle to the United States.

Background:

In the last couple years, herds infected with bovine tuberculosis have been newly discovered in all 4 southwestern Border States. In the past, an epidemiologic review of the tuberculosis problem centering in the El Paso, Texas area revealed that a U.S. herd had the greatest risk of becoming infected with bovine tuberculosis if it was in close proximity to known infected herds in Juarez, Mexico. The Mexican Government has limited funding for eradication activities and relies heavily on local cattlemen to contribute to program activities. Therefore, many dairies in Mexico continue to operate with a very high prevalence of bovine tuberculosis.

If bovine tuberculosis could be eradicated from Mexican states on the U.S. border and states that export cattle to the U.S., then the risk of introducing infection into the United States could be reduced. Mexico would require monetary assistance in a cooperative effort to eradicate bovine tuberculosis from the Mexican Border States and states exporting cattle to the United States.

Action Required:

TUBERCULOSIS

The United States will assist Mexico by providing personnel to consult with Mexican officials, and assist with laboratory diagnosis; and epidemiological evaluation of bovine tuberculosis transmission. To facilitate this, USDA APHIS will fund 3 positions to assist the Mexican tuberculosis campaign. The positions will focus on laboratory support, improving animal health infrastructure, and epidemiological mentoring.

A team comprised of several individuals will be formed to provide ongoing mentoring of Mexican officials in the above areas through continuing interaction with particular Mexican states.

Cooperative tuberculosis research between the U.S.A. and Mexico will be promoted by encouraging U.S. researchers to develop collaborative agreements with Mexican researchers. The U.S. researchers with such collaborative agreements will be able to apply for USDA funds to support application of new technologies for combating bovine tuberculosis in the Mexican states, including field validation of experimental blood tests for cattle.

ADDITIONAL Costs for (F3) (Assist Mexico)		
3 GS 12/13 positions	Terry Beals Figure which includes salary benefits, support costs= 104,457.44 per person	\$313,372.32
Travel Costs for 3 individuals	Travel for 1st year of the program	\$100,000.00
Mentoring Team Travel	For Groups traveling to Mexico	\$100,000.00
Grant Money	For Field Test Validation	\$200,000.00
Estimated Additional Costs		\$513,372.32