F I N A L R E P O R T

AFLATOXIN STUDY COMMITTEE

January, 1989

The Aflatoxin Study Committee was established by Legislative Council to " review the extent of the aflatoxin problem in the state in order to assure that the appropriate responses are in place to meet the problem." Members serving on the Study Committee were:

Senator Berl E. Priebe, Co-chairperson
Representative David Osterberg, Co-chairperson
Senator Leonard Boswell
Senator John Peterson
Senator John Soorholtz
Senator Wilmer Rensink
Representative Dennis May
Representative Jane Svoboda
Representative Harold Van Maanen
Representative Dan Petersen

The Study Committee was granted one meeting day, and the Committee met on October 5, 1988 in Room 22 of the State Capitol.

BACKGROUND

As a result of the 1988 drought, there grew concern that the corn crop might contain higher than normal levels of the aflatoxins (mold-produced toxins referred to as "Aspergillus flavus") which is produced in soil, decaying vegetation, and in hay and grains undergoing microbiological deterioration. Its growth is mainly dependent upon a high moisture content and high temperature. Moisture content below 13% prevents invasion. Aflatoxin is inhibited at temperatures between 40 and 50 degrees. Corn with cracks or breaks in the pericarps or seed coats is more subject to invasion at storage. Aflatoxins are poisonous or deleterious substances which, depending upon their level in food or feed, may make the food or feed adulterated. The federal Food and Drug Administration sets "action levels" for aflatoxin which represent the levels of contamination which the FDA believes may be injurious, and which, according to the agency, justify steps to control its spread.

On October 5, 1988, the federal Food and Drug Administration declared its intention to increase the action levels for aflatoxin. According to the new standards, aflatoxin-contaminated corn shipped in interstate commerce may be subject to enforcement action if any of the following apply:

1. Corn containing in excess of 20 parts per billion of aflatoxin is destined for food use by humans, for feed use by immature animals (including immature poultry), by dairy animals, or if the destination of the corn is unknown.

2. Corn containing in excess of 100 parts per billion of aflatoxin is destined for breeding cattle, breeding swine, or mature poultry.

3. Corn containing in excess of 200 parts per billion of aflatoxin is destined for finishing swine.

4. Corn containing in excess of 300 parts per billion of aflatoxin is destined for finishing (i.e., feedlot) beef cattle.

The Food and Drug administration also announced an intention to exercise its enforcement discretion to refrain from objecting to the blending of aflatoxin-adulterated corn with nonadulterated corn to produce a blended mixture of corn below the above listed action levels for animal feed usage. The blending policy only applied to corn from the 1988 crop and was subject to the following conditions:

1. A technically feasible plan for blending is reviewed and found acceptable by the FDA regional office.

2. The aflatoxin-contaminated corn must not be shipped in interstate commerce before FDA review.

3. The blended corn must contain less than 20 parts per billion of aflatoxin if for use as a feed for all animals, but not for use as human food. The blended corn containing less than 100 parts per billion of aflatoxin is for use as feed for only breeding beef cattle, breeding swine, and mature poultry. The blended corn containing less than 200 parts per billion of aflatoxin is for use as feed for only finishing beef cattle or finishing swine. The blended corn containing less than 300 parts per billion of aflatoxins is used for only finishing beef cattle.

COMMITTEE TESTIMONY

The Committee was presented testimony from a number of persons testifying about a range of issues related to aflatoxin. In summary, the Committee was presented evidence that the extent of aflatoxin contamination is unknown, and that widespread adulteration could overwhelm regulatory efforts to control the fungus.

The Committee was presented with information from officials of the federal government, including Mr. Robert Furleigh, State Executive Director of the Agricultural Stabilization and Conservation Service (ASCS), United States Department of Agriculture, and Mr. Ron Metz, Field Office Manager of the Federal Grain Inspection Service.

Mr. Furleigh stated that the United States Department of Agriculture will indemnify farmers for damage to crops caused by aflatoxin contamination pursuant to federal drought assistance. Mr. Furleigh stated that the corn must be destroyed prior to payment.

Mr. Metz stated that as of October, 1988, there is no way to determine how much corn is contaminated with aflatoxin. He stated that FGIS tests for aflatoxin-contaminated grain bound for export. Mr. Metz stated that aflatoxin often appears in weak and broken kernels. He recommended that kernels be screened before samples are tested. It was emphasized that corn cannot be cleaned of aflatoxin contamination.

The Committee was presented with testimony from the Department of Agriculture and Land Stewardship. Ms. Donna Gwinn and Mr. Steve Mullene appeared to represent the Grain Warehouse Division. They commented that the Department does not know the extent of the contamination of corn in the state. Inspections of warehouses, according to Ms. Gwinn, do not test for aflatoxin. Discussion centered around audit shortages suffered by a warehouse due to aflatoxin quality shortages.

Mr. Daryl Frey, Director of the Laboratory Division, Department of Agriculture and Land Stewardship, stated that new regulations promulgated by the federal Food and Drug Administration (see description of rules above) should provide substantial relief to farmers marketing corn contaminated with aflatoxin. He mentioned a concern that although blending of contaminated corn is permitted, the FDA may require some form of "supervision." Mr. Frey stated that the problem of aflatoxin affects the entire corn belt region and that it may overwhelm regulatory attempts to control it.

The Committee heard testimony from Dr. Daryl Nolan Hartwick, Dr. Roger Ginder, and Dr. Charles Herberg, professors at Iowa State University. According to the professors, problems resulting from aflatoxin contamination are centered at the country elevator where grain enters the market system from farms. The relaxation of standards should eliminate bottlenecks in marketing the 1988 crop. It was projected that, given the new regulations, half of the 4.4 billion bushels of 1988 crop falling within the 100-300 parts per billion range could be consumed by feed markets, and that three quarters of the 1988 crop falling within the 20-100 parts per billion range could be consumed by the livestock and poultry industry.

The Committee heard testimony from Mr. Larry Bean from the Department of Natural Resources. Mr. Bean addressed the possibility of using adulterated grain for purposes other than food or feed, including use in ethanol production, direct incineration by public utilities, and incineration in boilers at state universities or by the Archer Daniels Midland plant in Cedar Rapids. Mr. Bean testified that contaminated corn left in the fields could be used to sustain wildlife.

COMMITTEE FINDINGS

The Committee finds that marketing the 1988 corn crop may be hampered by the contamination with aflatoxin. The extent of the invasion of the fungus within the crop is uncertain. If the problem is widespread, aflatoxin has the potential to overwhelm efforts by regulatory agencies to control it. The Committee finds that more information about the extent of the contamination is needed.

The Committee finds that the federal government is acting to prevent potential hardships in marketing grain by relaxing actionable levels of aflatoxin contamination and by providing indemnification for losses of aflatoxin-adulterated crops. The Committee expresses concern about several aspects of federal policy. First, if blending of contaminated corn must be "supervised," the Committee is concerned that supervision be reasonable and not delay timely marketing of grain. Second, the Committee believes that in order to facilitate the free marketing of corn, it is important that corn harvested before 1988 be subject to action levels similar to those proposed for corn harvested in 1988. Third, the Committee is concerned that adulterated corn which could be used for purposes other than food or feed not be required to be destroyed as a condition for indemnification by the federal government under drought relief payments.

The Committee is concerned that alternative uses for corn contaminated by aflatoxin be developed in order to ensure marketability of the corn and to conserve resources which would otherwise be wasted.

The Committee is concerned that grain warehouses not be penalized if suffering an audit shortage due to aflatoxin quality shortages.

The Committee is concerned that information about aflatoxin, including scientific information, information relating to testing and storage of corn, the marketing of contaminated corn, the disposal of adulterated corn, and indemnification of adulterated corn by the federal government, is not being disseminated to farmers.

RECOMMENDATIONS

The Committee recommends that an aflatoxin hotline be established and staffed by persons familiar with issues related to aflatoxin in order to provide information to interested persons. The Committee suggests that the hotline may be established at Iowa State University as part of the Rural Concern Hotline or at the Department of Agriculture and Land Stewardship. The Committee recommends that the hotline be established at the earliest possible date and for a duration of at least 60 days.

The Committee recommends that the Grain Warehouse Division of the Department of Agriculture and Land Stewardship adopt emergency rules to extend the current twenty-four hour time limit to cure an audit shortage by a grain warehouse, if the shortage is due to shortages resulting from aflatoxin contamination. The Committee suggests that rules be flexible enough to allow curing of audit shortages within a time reasonable enough to permit orderly marketing of the grain.

CW 1167IC
da/dg/20

APPENDIX

Minutes of October 5, 1988

M I N U T E S

AFLATOXIN STUDY COMMITTEE

October 5, 1988

PRELIMINARY BUSINESS

The Aflatoxin Study Committee held its first and only authorized meeting on Wednesday, October 5, 1988, in Room 22, State House, Des Moines, Iowa. The meeting was called to order at 10:15 a.m. by temporary Co-chairperson Berl Priebe. Members present in addition to Temporary Co-chairperson Priebe were:

Representative David Osterberg, Temporary Co-chairperson
Senator Leonard Boswell
Senator John Peterson
Senator Jack Hester
Senator Wilmer Rensink
Representative Dennis May
Representative Jane Svoboda
Representative Harold Van Maanen
Representative Dan Petersen

Also present were:

Senator John Soorholtz
Doug Adkisson, Legal Counsel, Legislative Service Bureau
Daniel Pitts Winegarden, Legal Counsel,
Legislative Service Bureau
Mark Truesdell, Beving, Swanson, & Forest
Carol McDanolds Bradley, Iowa State University
Jerry Downin, Iowa Farm Bureau.
Robert Jolly, Iowa State University
Richard McLain, Iowa Farm Bureau
Lloyd Doane, Iowa Department of Health
Marshall Inman, Iowa Dairy Products Association
Ken Ludlow, Iowa Grain and Feed Association
Peter W. Reed, Agri Grain Marketing
Richard Jorgenson, Midland BioProducts Corp.
Dan Looker, Des Moines Register
Chuck Rutenbeck, Department of Justice
Katie Paulding, Iowa Institute of Cooperation
Jo Van Stein, Iowa Legislative News Service
Dave Braga, Tribune Radio Network
Pete Hamlin, Department of Natural Resources
Janet Kinney, Communicating for Iowa Agriculture

Larry Bean, Department of Natural Resources
Fred Tomlinson, Avon Grain Co.

In addition, members of the caucus staffs, Legislative Fiscal Bureau, other executive branch agencies staff persons, other representatives of the media, and other interested parties were in attendance.

Representative Dennis May nominated the temporary Co-chairpersons, Senator Berl Priebe and Representative David Osterberg, as permanent Co-chairpersons. The motion was seconded and unanimously adopted by the Committee. Representative Dan Petersen moved that the proposed rules be adopted by the Committee, and the Committee adopted the rules by a voice vote with no dissent. The rules are attached to these minutes and made a part hereof by reference.

Co-chairperson Priebe read the charge of the Legislative Council to the Committee: Review the extent of the aflatoxin problem in the state in order to assure that the appropriate responses are in place to meet the problem.

Co-chairperson Priebe proceeded to call the invited witnesses.

MR. ROBERT FURLEIGH, STATE EXECUTIVE DIRECTOR, AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)

Co-chairperson Priebe first called on Mr. Robert Furleigh, State Executive Director, of the Agricultural Stabilization and Conservation Service (ASCS). Mr. Furleigh related the ASCS's most recent rules concerning aflatoxin for two key parts of the federal government's farm program:

1. Commodity loan collateral treatment of aflatoxin contaminated corn.

2. Indemnity requirements under the Drought Assistance Act.

Mr. Furleigh related that the ASCS is prohibited under federal law from making commodity loans on corn exceeding .25 part per billion of aflatoxin in a representative sample. He explained that indemnity is available to the farmer if the corn crop has zero value due to alfatoxin contamination. The Drought Assistance Act aid formula treats destruction of the entire corn crop by aflatoxin contamination as having a zero harvest due to the drought. Mr. Furleigh stated that if indemnity is provided, the contaminated corn must be destroyed to make it unavailable to livestock or wildlife. Payments for drought relief are made in cash, rather than in kind or a mixture.

Co-chairperson Priebe inquired whether the ASCS would make regular tests to attempt to discover the extent of the aflatoxin problem. Mr. Furleigh responded, that no regular testing would be performed by ASCS, and that testing would only be conducted if there was reason to suspect a problem with aflatoxin. When a test is conducted by the ASCS, Mr. Furleigh stated the ASCS office would assume the cost of the testing.

Co-chairperson Priebe related that aflatoxin had been discovered in all 99 Iowa counties, but that it was difficult to tell if it was yet a serious problem statewide. The Co-chairperson then related a hypothetical question: What happens if a farmer seals corn without a test, later delivers the corn to ASCS in satisfaction of the commodity loan, but then discovers upon testing that the corn is contaminated? Mr. Furleigh answered that the loan then becomes a recourse loan, when previously it was a nonrecourse loan (the crop itself being the only security), because under federal law contaminated corn cannot be accepted by ASCS as a loan payment.

Co-chairperson Priebe continued by pointing out that the farmer cannot sell sealed corn and asked if ASCS could test those bins that have already been sealed for aflatoxin. Mr. Furleigh responded that ASCS would not go looking for the problem before it was discovered in the natural course of events, and further opined that aflatoxin contamination normally is not severe enough to substantially affect marketability since it is usually still usable for several livestock applications depending upon the extent of contamination.

Co-chairperson Priebe asked how farmers are to destroy contaminated corn. Mr. Furleigh answered that discing is permitted as is burning. He commented that a corn crop has zero value when it tests at 20 parts per billion. With a 100% loss the ASCS provides indemnity, with the last 25% of the loss paid at 90% of value, Mr. Furleigh said.

Senator Peterson observed there was no practical way to destroy corn and asked if utilities could burn contaminated corn, perhaps by having the government sell corn for fuel. Mr. Furleigh could not answer the practicalities of utilities burning corn for fuel, but recalled that corn has a lower BTU content than coal.

Co-chairperson Osterberg asked if any regulatory changes on the permissible levels of aflatoxin are expected. Mr. Furleigh answered that the federal Food and Drug Administration (FDA) is the key controller of acceptable levels of aflatoxin, and that no changes were expected from the FDA.

Co-chairperson Priebe offered his advice to the United States Department of Agriculture (USDA) by suggesting that all grain loaded for export in U.S. ports be inspected for aflatoxin to

assure that no aflatoxin contaminated grain is exported. He noted that aflatoxin cannot be permitted to hurt America's foreign grain markets.

Representative Svoboda asked if other states were experiencing aflatoxin problems to the same degree as Iowa. Mr. Furleigh responded that Illinois had worse problems, but that officials really did not know the scope of the problem in Iowa.

As an example of how little aflatoxin is required to cause a problem, Co-chairperson Priebe pointed out that one kernel in 625 bushels (if the entire kernel were aflatoxin) equals 6 parts per billion.

Representative Dan Petersen noted that in Eastern Iowa, results had ranged from 5 parts per billion to 650 parts per billion, with about 90% of the corn testing blacklight positive (the initial screening test) and about half testing card positive (the confirmation test). The 1987 crop year corn has been refused by elevators and the ASCS, Representative Petersen said. Additionally, he noted, elevators are concerned about whether state standards will be the same or more stringent than federally permitted levels.

Representative Svoboda asked how bad a crop has to be to have zero value. Mr. Furleigh responded that seven bushels per acre was the zero value level in recognition that there is a cost to harvesting.

MS. DONNA GWINN AND MR. STEVE MULLENE, GRAIN AND WAREHOUSE BUREAU, IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

The co-chairpersons next called Ms. Donna Gwinn and Mr. Steve Mullene of the Grain and Warehouse Bureau, Iowa Department of Agriculture and Land Stewardship. Ms. Gwinn explained the Bureau's procedure for inspection for aflatoxin contamination when examining an elevator or grain warehouse. She noted that no aflatoxin test would be performed in the course of routine inspections because the Bureau does not have the resources; however, if the Bureau becomes aware of the existence of contaminated grain in storage, it will test for quantity or quality shortages as required by law. Ms. Gwinn commented if aflatoxin contamination exceeds the limit of 20 ppb, the grain would constitute a quality shortage and constitute a violation of reserve requirements maintained to assure an elevator can meet its obligations to depositors.

Ms. Gwinn stated that a letter has been sent to licensed warehouses by the Bureau instructing them to segregate and identity preserve grain with higher levels to protect themselves

against quality shortages, and she commented that the restrictions do not necessarily mean that elevators cannot accept aflatoxin contaminated grain, it just requires it be held separately.

Ms. Gwinn concluded that if a quality shortage is found, the licensee is given 24 hours to cure or to post a letter of credit to secure the deficiency.

Co-chairperson Priebe warned that the results of enforcement against grain warehouses could be drastic since strict application could put many warehouses and elevators out of business. Mr. Mullene responded that the letter of credit required was only the amount to cover the deficiency and that the value of the contaminated grain is discounted, based upon prices available at the three sources where the elevator normally markets grain.

Senator Soorholtz asked the following three questions: How much 1987-1986 corn was contaminated, and what would happen if all required procedures were followed and grain was still contaminated? How will the Bureau become "aware" of problems? Was not the announcement that the Bureau would enforce quality shortages itself alarming and threatening to warehouses?

Co-chairperson Priebe noted that elevators will, in the future, invariably perform the black light test on all grain accepted.

Representative Svoboda related that she had heard that the Bureau was performing checks of 2-3 elevators in every county for a statewide survey of the problem. Ms. Gwinn responded that no testing or routine checks were being performed by the Bureau, and to illustrate the limitations on the Bureau to perform testing, noted that the Bureau had only one black light for 20 inspectors.

Senator Peterson inquired about the 24 hour period to cure rule, and suggested that the 24 hour limit be waived or extended if the deficiency is caused by aflatoxin contamination to permit the elevator additional time to find an alternative buyer for the best possible price. Senator Peterson did not think the Bureau should ignore the problem, as the testimony seemed to indicate to him was the current policy, but rather it should require the black light test, but relax the 24 hour period to cure rule. Mr. Mullene responded that the Bureau was, in fact, flexible about the time to cure, but that there is no flexibility over the fact that a cure must be performed since a warehouse receipt is a negotiable instrument.

Senator Peterson observed that the shortage was really no fault of the elevator, however, it was caused by the state and federal rules. Mr. Mullene explained that the discount applied to contaminated corn is based on three markets typically used by the elevator.

Co-chairperson Osterberg noted that unless there was in fact a problem with 1987 crops, concerns over elevator deficiencies were groundless because elevators could avoid problems with 1988 grain simply by testing and segregating. He characterized this as a "soluble" problem of unknown proportions.

Senator Peterson agreed and cautioned elevator operators to test corn before mixing it with corn already in storage. Both Senator Peterson and Co-chairperson Osterberg asked for more information on 1987 corn and early purchased 1988 corn to determine the scope of the quality deficiency problem that might be encountered by elevators.

Co-chairperson Priebe observed another potential inequity by noting that there is variability in the price of corn statewide and, thus, there is a potential for unequal discounts for different elevators with the "same" problem.

Co-chairperson Osterberg asked about the state of the Grain Indemnity Fund. Ms. Gwinn answered that there is currently $6 million in the fund which would not be enough if quality deficiencies were in fact a major problem, but that the Fund could be refilled with another checkoff.

Senator Soorholtz observed that the Bureau needs to clearly and completely communicate the rules to the elevators and grain warehouses, noting if they know the rules they can follow them. Without a full and complete explanation, the Grain Indemnity Fund and Iowa's livestock industry are both endangered, he opined.

Ms. Gwinn observed that it would cost approximately $812,000 to analyze all corn in the state using a six-foot probe.

MR. DARYL FREY, DIRECTOR, LABORATORY DIVISION, IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

Mr. Frey from the Laboratory Division of the Iowa Department of Agriculture and Land Stewardship described the testing industry and its capacity and veracity to perform aflatoxin testing. He provided a list of labs capable of performing aflatoxin testing and explained the voluntary certification program for laboratories. He commented that the Department of Agriculture and Land Stewardship is provided notice from the United States Food and Drug Administration if aflatoxin is discovered in commerce. FDA does have limited embargo powers to block interstate transfer of aflatoxin contaminated products. Mr. Frey noted, however, that FDA had not yet complained about any aflatoxin contamination.

Co-chairperson Priebe asked if Mr. Frey had any opinion whether the FDA will change aflatoxin standards to provide some relief to

the livestock industry. In particular he expressed concern about requirements for supervision of blending grain, and precisely who has the authority and administrative capacity to perform the required "supervision".

Co-chairperson Osterberg continued the question, by observing that even if the FDA agrees that 100 ppb is acceptable, Iowa farmers must be concerned about acceptable levels in foreign grain importing countries.

Mr. Frey responded that he did not know the FDA's intentions, or who had the authority and capacity to perform the required blending supervision, but noted that he had a meeting scheduled with the FDA administrator in Kansas City the next week at which he hoped to obtain the answers.

Senator Peterson asked if the FDA was actively looking for aflatoxin in food and meat products. Mr. Frey responded that he did not know, but efforts are being focused by most regulators on areas where they most suspect problems, so results are not statistically random to provide guidance about the total situation.

Senator Soorholtz noted that the Sully Elevator Board had met the previous evening to try to "do what is right", but the fundamental problem is that no government agency could tell them exactly what to do. Mr. Frey observed that although the aflatoxin problem is real, the consequences are based on speculation about a worst case scenario for which there is as of yet, little evidence. In fact, Mr. Frey commented, if the problem is widespread, it is likely to overwhelm the regulatory agencies' ability to respond as well. Mr. Frey discounted the likelihood that the worst case scenario would come to pass.

Senator Soorholtz asked why this was not a big problem in the droughts of 1987 or 1983. Mr. Frey was not certain, but noted that the problem was not exclusive to Iowa this year.

Representative May asked if aflatoxin could be treated or removed in any way. Mr. Frey said that ammonization is a demonstrated technology from research conducted at Iowa State University, but that it was not FDA approved, and had practical problems since it would require treatment plants and was very capital intensive.

Representative Svoboda commented that she believes the early corn harvest was more infected than later harvested corn, and inquired about a product being sold to kill the aflatoxin mold, proponic acid. Mr. Frey doubted proponic acid's value, but admitted he did not know for sure if it would help or not.

DR. NOLAN HARTWICK, PROFESSOR-IN-CHARGE, DEPARTMENT OF VETERINARY MEDICINE, IOWA STATE UNIVERSITY

Dr. Nolan Hartwick explained that a Committee was formed about four weeks ago to coordinate Iowa State University's efforts regarding aflatoxin. He provided a handout prepared by the ISU Committee for reference, which is attached to these minutes and made a part hereof by reference. Other members of the ISU Aflatoxin Group include Professor Charles Herberg and Professor Roger Ginder, an economist.

Dr. Hartwick described the current FDA limits on aflatoxin, citing "actionable levels" as follows:

No more than 20 ppb in grain for dairy cattle and human consumption.

No more than .5 ppb in dairy products.

No more than 100 ppb in grain for breeding livestock and poultry.

No more than 200 ppb in grain for mature cattle and swine.

No more than 300 ppb in grain for finishing cattle.

According to Dr. Hartwick, these are livable levels within the limits of current toxocological knowledge. He explained that so far ISU has been most concerned with dairy farm concerns because of the sizable dilution from feed to milk, of 1:400. Dr. Hartwick noted that grain screenings tend to test higher in toxins than the grain itself, but since processed feed uses screening, some care is required. Dr. Hartwick noted there is an additive being tested to neutralize the toxin, but it is in very preliminary stage of research. The compound mixed with corn, makes the toxin safe up to 3,000 ppb by preventing absorption. Additionally, Dr. Hartwick described an anti-caking compound licensed by FDA that many are using to prevent aflatoxin, but that is an unapproved use.

DR. ROGER GINDER, PROFESSOR, EXTENSION ECONOMIST, IOWA STATE UNIVERSITY

Dr. Roger Ginder, an extension economist, continued the ISU presentation. Dr. Ginder noted that because of the smaller than usual corn crop, also due to the drought, the aflatoxin contamination would not affect market prices as much as otherwise. He commented that a great deal of grain exceeding human consumption limits for aflatoxin would be used for livestock

feeding, and an absolute ban on exports of aflatoxin might not be wise since foreign livestock feeders might also be willing to buy substantial quantities of grain testing positive for aflatoxin, but at safe levels for livestock. Dr. Ginder opined that pricing premiums and discounts would move the year's grain to the right use for its condition and that in the end very little destruction of grain would be required.

PROFESSOR CHARLES HERBERG, IOWA STATE UNIVERSITY

Professor Charles Herberg continued the Iowa State presentation. Professor Herberg described the methods and reliability of aflatoxin testing methods. He described the local elevator as the market gateway and pressure point for testing. Terminals have sophisticated testing procedures which currently do not exist at the county elevators, so local elevators frequently simply accept or reject rather than attempt to determine "safe" levels of contamination, he said. Dr. Herberg explained that the sampling procedure requires a five pound sample for accuracy, which is four times the normal amount tested for other purposes like moisture content. He noted that because of the problems in testing, even those elevators which do test produce many false negatives; that is the testing fails to detect aflatoxin even when it is present.

Dr. Herberg described other problems faced by local elevators, including the general inability to identify preserve wet grain at harvest to keep aflatoxin tainted grain separate from clean grain. He commented that all grain is transferred into a single wet bin for drying, making storage management a big problem with aflatoxin grain.

Dr. Herberg stated that a survey developed by ISU could be off by a factor of three-four times because of the limited sample of the survey, but the survey indicated that the county-by-county average is not significant, but might be useful as a statewide mean or average. The survey results are included in the ISU handout. There probably is a higher risk in certain areas of the state, according to Dr. Herberg, who encourages more active testing to obtain better data on incidence, even if levels are not accurate.

Co-chairperson Priebe asked the ISU group if any other grain besides corn had tested positive. Dr. Ginder responded that soybeans could experience aflatoxin, but had not so far this year.

Representative Svoboda asked about the procedure used for the random sampling. Professor Herberg stated that the researchers knew the county, but not the specific elevator from which a sample had come. Professor Herberg continued by explaining that ISU has

tested poultry broilers for aflatoxin, but that eggs are generally tested by the FDA. He noted that because eggs concentrate aflatoxin, it is recommended not to eat substantial quantities of eggs from poultry which consumed aflatoxin tainted grain. Dr. Ginder predicted that much of the surplus 1987 crop would be consumed with the short crop and aflatoxin concerns of the 1988 crop. Representative Svoboda concluded that the real question may be whether the drought continues in 1989 and causes another short crop which could cause real problems.

Senator Rensink asked Dr. Hartwick what the consequences would be if cattle in confinement were fed grain for a week which exceeded the 300 ppb limit. Dr. Hartwick responded that the FDA established its actionable levels to leave a safety margin. He noted that aflatoxin does not accumulate in meat, but is metabolized. Dr. Hartwick said that acute toxicity is technically possible, but not very likely to occur. Dr. Hartwick concluded that a temporary overage was safe since there is a good safety margin for feeder cattle.

Representative Dan Peterson asked how local elevators can deal with four different levels of accepted aflatoxin contamination. Dr. Ginder admitted it is a practical problem for most elevators.

Representative Van Maanen asked if false positive problems were more serious than false negatives and suggested to Dr. Hartwick that the easiest solution is for farmers to know what they have and cure problems by blending.

Senator Hester asked about early corn problems. Dr. Hartwick responded that the worst corn was marketed first; that silage is a problem and requires testing as well. The black light test was described as useful for initial screening, while the quick card test detects preset levels, and is useful for own use, for instance a quick card test would be especially useful for a livestock producer.

Co-chairperson Osterberg asked when the survey would be completed. Professor Herberg answered it would be completed by mid-October.

Representative Soorholtz asked what Dr. Hartwick's worst case scenario was. Dr. Hartwick responded that high grain contamination problems would make the livestock producers' lives difficult, with higher levels of contamination, performance and rate of gain decline, every other animal health problem will be worse, but there would be little or no impact on genetic reproduction.

Senator Peterson asked why the limit was so much lower for poultry. Dr. Hartwick responded that poultry are more susceptible and observed that research indicates human and animal

health is adequately protected. As for aflatoxin's continued threat, Dr. Hartwick described it as a naturally occurring microtoxin found in small quantities in the soil every year, but which is only a serious problem when weather conditions are ideal. Dr. Hartwick stated that research indicates it is safe to disc aflatoxin tainted corn into the ground without affecting the likelihood of aflatoxin in the next year since aflatoxin is short lived in dispersed quantities. Dr. Hartwick recommended against burying concentrated amounts of aflatoxin in one place.

Representative Svoboda asked about the effect of aflatoxin on sheep and goats which the FDA apparently did not address. Dr. Hartwick noted that because sheep are ruminents they are not very susceptible to problems, but since aflatoxin concentrates in milk, he recommended against drinking untested goat milk. Dr. Hartwick also described the problem of aflatoxin in silage consumed by dairy cattle. He noted that it only takes a few hours for aflatoxin to appear in milk, though it typically disappears in three-four days once aflatoxin is removed from the diet. Dr. Hartwick indicated that FDA would be testing for aflatoxin at milk plants, but that there had never been documented cases of human health problems from aflatoxin, although if there were health problems, it would be with the liver. Dr. Hartwick indicated that no experiments could be done on human beings to know what level is truly dangerous so the policy is to exclude it from the milk supply entirely with a very low limit (.5 ppb), so there is no safety problem currently with milk.

Representative Osterberg asked Dr. Hartwick if ISU could participate in an aflatoxin hotline arrangement by providing a trained expert or ISU graduate student to answer questions Iowans have about aflatoxin. Dr. Hartwick responded in the affirmative.

Senator Rensink asked if alcohol production removes aflatoxin, and Dr. Herberg indicated that aflatoxin is concentrated in the resulting mash, so grain alcohol production is probably not a preferred use of aflatoxin contaminated grain.

LARRY BEAN, ADMINISTRATOR, ENERGY AND GEOLOGICAL DIVISION, DEPARTMENT OF NATURAL RESOURCES

Larry Bean of the Department of Natural Resources discussed alternative uses, and continued the discussion of ethanol production from contaminated corn. Mr. Bean indicated that the side products of ethanol, syrup, mash and distiller dried grains would still be contaminated, and at higher levels of concentration than the original grain.

Mr. Bean described a survey conducted by the Iowa Corn Promotion Board regarding major corn consuming Iowa producers'

intent to buy aflatoxin contaminated grain. None of the surveyed companies indicated an affirmative interest in purchasing aflatoxin grain, and 5 indicated their intent to reject it.

Mr. Bean indicated that it is feasible to burn contaminated corn in a fluidized bed incinerator, alone or mixed with coal. He commented that Iowa utilities were a likely target, but they were likely to experience more emissions from corn than coal, a bad side effect. The fluidized bed boilers at ISU and UI would be the best places to burn corn without negative impact on the atmosphere, Mr. Bean said.

Mr. Bean related DNR's recommendations:

1. Field discing is acceptable, but there is concern about runoff into streams since any aflatoxin content can kill fish and fish are particularly vulnerable.

2. Do not concentrate contaminated grain in any one place where wildlife could consume it. This could be an especially difficult problem for wild birds.

3. Landfilling could be used if necessary as an alternative to incineration in a controlled manner. No open burning will be permitted because incomplete combustion would carry aflatoxin on the air to breath.

Representative Van Maanen asked if Mr. Bean was aware that Cargill plants were refusing aflatoxin infested corn. Mr. Bean indicated that DNR was concerned with the possibility that there might exist large quantities of unwanted grain, but that to date he was unaware that users were turning down aflatoxin corn.

Representative Osterberg noted that since aflatoxin was a side effect of the summer's drought, Iowa might experience it again, and asked Mr. Bean if there was any research he would like to see performed to be better prepared and informed in the future. Mr. Bean suggested combustion and emission tests in fluidized bed boilers and conventional boilers. He noted that there are only a few fluidized bed boilers, the highest technological level, in the state: ADM plants at Clinton and Cedar Rapids, and all three State Board of Regents' universities have or will have fluidized bed boilers.

RON METZ, FEDERAL GRAIN INSPECTION SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

Ron Metz, the Cedar Rapids office manager of the Federal Grain Inspection Service described his office's policies. He stated that federal grain standards are governed under two Acts of

Congress, the U.S. Grain Standards Act and the Agricultural Marketing Act. He commented that aflatoxin testing for the Cedar Rapids office is sent to Mobile, Alabama, and exports have been tested for the last eighteen months. Mr. Metz said there is a $44 fee for thin layer chromotography testing (TLC) which produces a parts per billion result and takes approximately four hours, while an easier test, called the "minicolumn" test costs $5.50, simply provides a positive or negative reading, and only takes one hour. Mr. Metz indicated that his office was mainly testing grain which had been rejected by elevators, and was discovering results in the 20-125 ppb range usually. He indicated that 75% of the corn rejected by elevators was in fact testing positive, and indicated that a grain seller can require a TLC be performed if grain is rejected. Mr. Metz stated that the turnaround time to deliver the sample to Alabama, run the test, and receive the results using overnight delivery is two days, but it has taken longer than that.

MR. FRED TOMLINSON, AVON GRAIN COMPANY AND KEN LUDLOW, EXECUTIVE DIRECTOR, IOWA GRAIN AND FEED ASSOCIATION

Fred Tomlinson of the Avon Grain Company and Ken Ludlow of the Iowa Grain and Feed Association related their problems and experiences with aflatoxin. They described the problems of the local elevators which were advised to screen grain as closely as possible in light of the danger of quality shortages in the future. They commented that most elevators rely upon Smith-Kline's quick card testing, which is something like a litmus type test for aflatoxin. Mr. Tomlinson admitted that quick card's major problem was inaccuracy, mostly related to obtaining a representative sample. He indicated elevators rarely use the Federal Grain Inspection Service because of cost, since thin line chromotography is available from private labs more conveniently for between $20-100. Mr. Ludlow described the cost of testing as a tremendous burden, noting that quick cards are $20 per card. Mr. Tomlinson indicated that little aflatoxin corn was on the market yet, but that his company had tested some corn out to 29 ppb. He stated that the major concern is finding buyers that will accept aflatoxin tainted grain. Another problem described was that the FDA only accepts TLC, and not quick card. Mr. Ludlow stated that the requirement that blending be "supervised" is unclear. Elevators were described by Messrs. Tomlinson and Ludlow as most vulnerable on the blending requirements since 40% of the crop was already in elevators.

MR. JIM HANSEN, AINSWORTH COOPERATIVE, IOWA INSTITUTE OF COOPERATION

Mr. Hansen reiterated that the quick card test is not totally reliable, but stated that his cooperative was not accepting any corn which tested positive. He commented that in order to stop the further growth of the aflatoxin, it is necessary to dry it out immediately.

Representative Van Maanen asked what could be done to help grain elevators. Mr. Hansen indicated it would help if the state would accept quick card tests in place of the more expensive and time consuming TLC tests.

MR. MAURICE KEEKER, BUSINESS MANAGER, SPECTROCHROM LIMITED, INC.

Mr. Maurice Keeker described his company as a part of ISU's Ames Incubator, the Iowa State Innovation System, seeking to transfer biotechnology from the lab to the marketplace. Spectrochrom's product is a do-it-yourself thin line chromotography test kit for the full range of micotoxins, not just the single variety of micotoxins, called aflatoxin. He stated that the kit provides results in one hour from a large tackle box containing a grinder and heating block to concentrate the sample and reduce false negatives and false positives; the plate is then developed something like an x-ray or other photograph, which it is, to interpret the results. He commented there is space for four samples on each plate, and all five micotoxins are tested on the same plate. Mr. Keeker said it costs $8.00 per kit, but some initial hardware is required which costs about $400. He commented that if all Iowa elevators wanted a kit tomorrow, the company could not supply them that fast.

RECOMMENDATION

Co-chairperson Priebe next directed the Committee to consider its recommendations to the Legislative Council. The primary item discussed was the provision of an Aflatoxin Hotline to answer questions and provide reliable information, with the Iowa Department of Agriculture and Land Stewardship and Iowa State University providing staff and cooperating with the FDA and USDA. The Committee recommended funding the program for not more than 60 days, renewable at the Legislative Council's discretion in light of the then current need, and with supplemental funding to be provided to the Department of Agriculture after January 1, 1989.

Noting that this recommendation did not bind the Legislative Council, and advising that the proposal also be submitted to the Fiscal Committee together with cost estimates, the proposal passed by a unanimous vote of those present. The Committee approved two other resolutions which are attached hereto and made a part hereof by reference, by the same margin.

Also attached is information later provided to the Committee at the request of Co-chairperson Representative Osterberg by the University of Iowa Institute of Agricultural Medicine and Occupational Health concerning the threat to grain handlers of exposure to aflatoxin contaminated grain.

Respectfully submitted,

DANIEL PITTS WINEGARDEN
Legal Counsel

Afla,1093ic
dw/dg/20