

Approved February 18, 1988
Date

MINUTES OF THE HOUSE COMMITTEE ON ENERGY AND NATURAL RESOURCES

The meeting was called to order by Representative Dennis Spaniol at
Chairperson

3:30 ~~xxx~~ p.m. on February 10, 1988n room 526-S of the Capitol.

All members were present except:

Representative Barr (excused)

Committee staff present:

Laura Howard, Legislative Research
Raney Gilliland, Legislative Research
Theresa Kiernan, Revisor of Statutes' Office
Betty Ellison, Committee Secretary

Conferees appearing before the committee:

Clark Duffy, Assistant Director, Kansas Water Office
Chris Wilson, Director of Governmental Relations of Kansas Fertilizer
and Chemical Association and Kansas Grain and Feed Assoc.
Dale Lambley, Director, Division of Plant Health, State Board of
Agriculture

Chairman Dennis Spaniol called the meeting to order. He announced that he had several copies of a Landowner Deer Survey which was prepared by the Kansas Fish and Game Commission in 1985. Copies were available for interested committee members.

Clark Duffy represented the Kansas Water Office with testimony regarding non-point source pollution. He described programs of his office and the Department of Health and Environment which were being undertaken to meet requirements of the Environmental Protection Agency. (Attachment 1) Mr. Duffy provided the committee with copies of the Sub-section: Non-Point Source Pollution, Quality Section of the Kansas Water Plan. (Attachment 2) Mr. Duffy responded to a number of questions of the committee.

Chris Wilson, representing Kansas Fertilizer and Chemical Association and Kansas Grain and Feed Association, gave a presentation relative to groundwater protection and the impact of agricultural fertilizers and chemicals on groundwater quality. (Attachment 3) She presented committee members with a packet of related information. Lengthy committee discussion followed.

Dale Lambley represented the Plant Health Division of the State Board of Agriculture with testimony on chemigation safety law. (Attachment 4) He provided the committee with a Chemigation Newsletter which contained updated information on this subject. (Attachment 5)

During discussion, Representative Patrick requested that Mr. Lambley provide the committee with copies of the rules and regulations issued by his department relating to chemigation and Mr. Lambley agreed.

The Chairman requested Mr. Lambley to return on February 11 to continue the discussion on chemigation. Mr. Lambley agreed and offered to bring Alex Hawkins, Pesticide Use Law Administrator, to answer further questions on the law and enforcement of it.

Chairman Spaniol asked staff to provide a copy of the Mississippi law and an explanation of it for comparison purposes.

There were no objections to the minutes of January 28 and they were approved.

The meeting was adjourned at 5:05 p.m.

Unless specifically noted, the individual remarks recorded herein have not been transcribed verbatim. Individual remarks as reported herein have not been submitted to the individuals appearing before the committee for editing or corrections.

Testimony Before the
House Energy and Natural Resources Committee
by
Clark Duffy, Assistant Director
Kansas Water Office

February 10, 1988

Re: Non-point Source Pollution

Due to the comprehensiveness of the staff briefing given yesterday to the Committee, I will focus my comments on the current activities of the Kansas Department of Health and Environment and other agencies concerning implementation of the Non-Point Source Pollution Sub-section of the State Water Plan. This sub-section was approved by the Kansas Water Authority in September of 1986 after 12 public meetings, two public hearings and review by the 12 basin advisory committees.

As described yesterday by staff, in 1987, the U.S. Congress passed amendments to the Federal Clean Water Act. These amendments required the Environmental Protection Agency to direct the states to develop programs for clean-up of priority non-point source pollution problem areas. In Kansas, this federal approach had already been included as a major component of the program recommended in the State Water Plan. Therefore, the state will meet the major federal requirements by implementing the program as outlined in the State Water Plan. Implementation of this sub-section is now in progress.

Presently, the Kansas Department of Health and Environment with input from appropriate entities, is completing a draft non-

point source pollution assessment report. This draft report will include: 1) an update of the 1986 Water Quality Assessment, 2) identification of the priority problem areas in each basin and 3) best management practices for cleaning up the various pollutants. The Kansas Department of Health and Environment will discuss this draft at the State Water Plan public meetings in each basin in March. Once finalized, the Assessment Report will provide the basis for development of a state non-point source pollution management program by the Kansas Department of Health and Environment and the other entities.

The management program will provide a framework for the prevention and clean-up of non-point source pollution for each of the 12 river basins. The objectives of the program will be the coordination of 1) the identification of existing and potential problem areas affected by non-point source pollutants (See Attachment A), 2) the identification of existing programs available to address the problems (See Attachment B) and 3) development and implementation of a clean-up/protection plan to control non-point source pollution in the affected areas.

As stated in the State Water Plan, the program will focus on 1) encouraging participation at the local level, 2) education and training programs, 3) the maintenance and development of land treatment structures and 4) the collection of monitoring data and a program evaluation process. The Kansas Department of Health and Environment is scheduled to complete the development of this program by August 1988.

Major Nonpoint Source (NPS) Pollution Categories and Subcategories *

1 NONPOINT SOURCES10 Agriculture

- 11: Non-irrigated crop production
- 12: Irrigated crop production
- 13: Specialty crop production (e.g., truck farming and orchards)
- 14: Pasture land
- 15: Range land
- 16: Feedlots - all types
- 17: Aquaculture
- 18: Animal holding/management areas

20 Silviculture

- 21: Harvesting, reforestation, residue management
- 22: Forest management
- 23: Road construction/maintenance

30 Construction

- 31: Highway/road/bridge
- 32: Land development

40 Urban Runoff

- 41: Storm sewers (source control)
- 42: Combined sewers (source control)
- 43: Surface runoff

50 Resource Extraction/Exploration/Development

- 51: Surface mining
- 52: Subsurface mining
- 53: Placer mining
- 54: Dredge mining
- 55: Petroleum activities
- 56: Mill tailings
- 57: Mine tailings

60 Land Disposal (Runoff/Leachate From Permitted Areas)

- 61: Sludge
- 62: Wastewater
- 63: Landfills
- 64: Industrial land treatment
- 65: On-site wastewater systems (septic tanks, etc.)
- 66: Hazardous waste

70 Hydrologic/Habitat Modification

- 71: Channelization
- 72: Dredging
- 73: Dam construction
- 74: Flow regulation/modification
- 75: Bridge construction
- 76: Removal of riparian vegetation
- 77: Streambank modification/destabilization

80 Other

- 81: Atmospheric deposition
- 82: Waste storage/storage tank leaks
- 83: Highway maintenance and runoff
- 84: Spills
- 85: In-place contaminants
- 86: Natural

90 Source unknown

* Source: US EPA. Guidelines for the Preparation of the 1988 State Water Quality Assessment (305(b) Report), April 1, 1987, p. 19.

State and Federal Agencies with Programs Addressing
Non-Point Source Pollution

	<u>Agency</u>	<u>Program</u>
1.	Cooperative Extension Service	- Research in Water Quality and Efficiency
2.	State Conservation Commission	- High Priority Cost-Share Program - Watershed Planning Assistance Program - Stream Rehabilitation Program - Riparian and Wetland Program
3.	Kansas Corporation Commission	- Mined Land Conservation and Reclamation Board
4.	Kansas Department of Health and Environment	- Water Quality Assessment - Environmental Remediation - Hazardous Waste Management - Solid Waste Management - Water Pollution Control
5.	Kansas Geological Survey	- Natural and Man-Made Groundwater Pollution Analysis
6.	Kansas Department of Wildlife and Parks	- Pollution and Fish Kill Investigations - Environmental Services
7.	Kansas Water Office	- Basin Planning and Basin Advisory Committees - Water Conservation Planning Program - Water Resource Planning Process - Research and Data Process
8.	Kansas Water Resources Research Institute	- Water Research
9.	Agricultural Stabilization and Conservation Service	- Agricultural Conservation Program (ACP) - Conservation Reserve Program (CRP) - Rural Clean Water Program

- 10. Environmental Protection Agency
 - Water Pollution Control
 - State Reolving Fund Program
 - Wellhead Protection Program
 - Critical Aquifer Protection Area
 - State Groundwater Strategy Grant Program
 - Sole Source Aquifer

- 11. Farmers Home Administration
 - Resource Conservation and Development Loans
 - Technical Assistance and Training Grants
 - Watershed Protection and Flood Prevention Loans

- 12. Soil Conservation Service
 - Resource Conservation and Development
 - Conservation Operations
 - Great Plains Conservation Program
 - P.L. 566 Watershed Planning and Operations

- 13. U.S. Fish and Wildlife Service
 - Environmental Contaminants

- 14. U.S. Geological Survey
 - Interpretive Studies in Water Quality

Kansas Water Plan

Quality Section

Sub-section: Non-Point Source Pollution

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FY 1988

***Approved
by the
Kansas Water Authority***

September 1986

NON-POINT SOURCE POLLUTION

INTRODUCTION

The Kansas Water Quality Management Plan was adopted by the 1979 Kansas Legislature. The Agricultural Runoff section of that plan identified non-point source pollution as a major contributor of contaminants to the state's water resources.

Since 1979, more attention has been focused on non-point source pollution. The 1985 revisions to the Kansas surface water quality standards state that when the Department of Health and Environment finds that non-point sources cause or may cause a violation of the water quality standards, suitable pollution control measures are required.¹ The proposed revisions to the Federal Clean Water Act would require states to develop non-point source pollution management programs that would call for the provision of corrective actions.²

It is the policy of the state to manage potential water pollution from rural land through a voluntary land conservation program, administered by the State Conservation Commission, county conservation districts and the United States Department of Agriculture. The program is intended to reduce soil loss and the movement of applied agricultural chemicals. Local participation is, and should continue to be, the foundation of the future national and state soil and water conservation program.

Non-point source is defined as "a diffuse source of water pollution including, but not limited to, runoff from agriculture, mining, construction activity, saltwater intrusion, deposition of residual waste and disposal of pollutants on land or in subsurface excavations."¹ In terms of volume, sediment is the major pollutant contributed by non-point sources. Other major concerns associated with non-point runoff are pollutants such as nutrients, pesticides, micro-organisms, dissolved salts and minerals, which may be associated with the sediment. In terms of estimated tonnages of pollutants entering the state's waterways, non-point source pollution contributes 99 percent of the annual load of suspended solids, 50 percent of the annual phosphorus load, 75 percent of the annual nitrogen load and 60 percent of the annual organic load.

The principal adverse effects of non-point source pollution are: (1) the aging of lakes, which act as a trap for the pollutants involved; (2) an increase in cost and difficulty of water treatment for municipal purposes and (3) potential adverse health effects on humans, fish and wildlife.

CONCEPTS

Kansas rural land is comprised of approximately 29.6 million acres of cropland, 16.5 million acres of rangeland and 1.5 million acres each of pasture and forest land. Over 50 percent of the state's nonfederal rural land needs additional treatment to be adequately protected from erosion.³

Conservation plans have been prepared on about 70 percent of the 47.6 million acres of rural land in the state. In addition, the 105 conservation districts have each prepared a Water Quality Management Plan as directed by the state. The Kansas Water Quality Management Plan recommended that cost-share money for land treatment practices be distributed according to priorities based on sediment yield to streams. (Figure 1)

In 1985, the Kansas Water Office established a Technical Advisory Committee on Surface Runoff composed of representatives from the State Conservation Commission, Department of Health and Environment, Fish and Game Commission, Division of Water Resources of the Kansas Board of Agriculture, Agricultural Stabilization and Conservation Service, Soil Conservation Service, Corps of Engineers and the Bureau of Reclamation. The committee reexamined the priority areas recommended by the 1979 Water Quality Management Plan based solely on sediment yield to streams and recommended the following additional criteria for identifying non-point source pollution problem areas: (a) areas defined by water quality standards violations as measured at some downstream water use point; (b) areas where the estimated annual erosion rate exceeds the tolerable erosion rate "T"; (c) the need to protect sensitive water resources such as lakes, high value fisheries, special aquatic life use streams and outstanding natural resource waters (the erosion rate in these areas should not exceed .75 T); (d) an identified need to prevent loss of reservoir storage volume so that actual reservoir sedimentation rates do not exceed the design rate and (e) the detection of pesticides in ground and surface water sources.

The Kansas Department of Health and Environment has adopted these criteria established by the Technical Advisory Committee to identify non-point source pollution problem areas.

POLICY ISSUES, OPTIONS AND RECOMMENDATIONS

Reduction of non-point source pollution is essential to minimize the associated adverse effects on lakes, rivers and streams. The attainment of water quality goals in some areas will require more intensive pollution control measures such as application of land conservation and erosion controls elimination of improper application of fertilizers and pesticides, reduction of land conversion and use of watershed structures, especially above large reservoirs. Management plans to target efforts and resources to priority areas need to be prepared.

OPTIONS

1. Statewide Program. The Kansas Department of Health and Environment should develop a state-

Priority Areas Based on Sediment Load to Streams

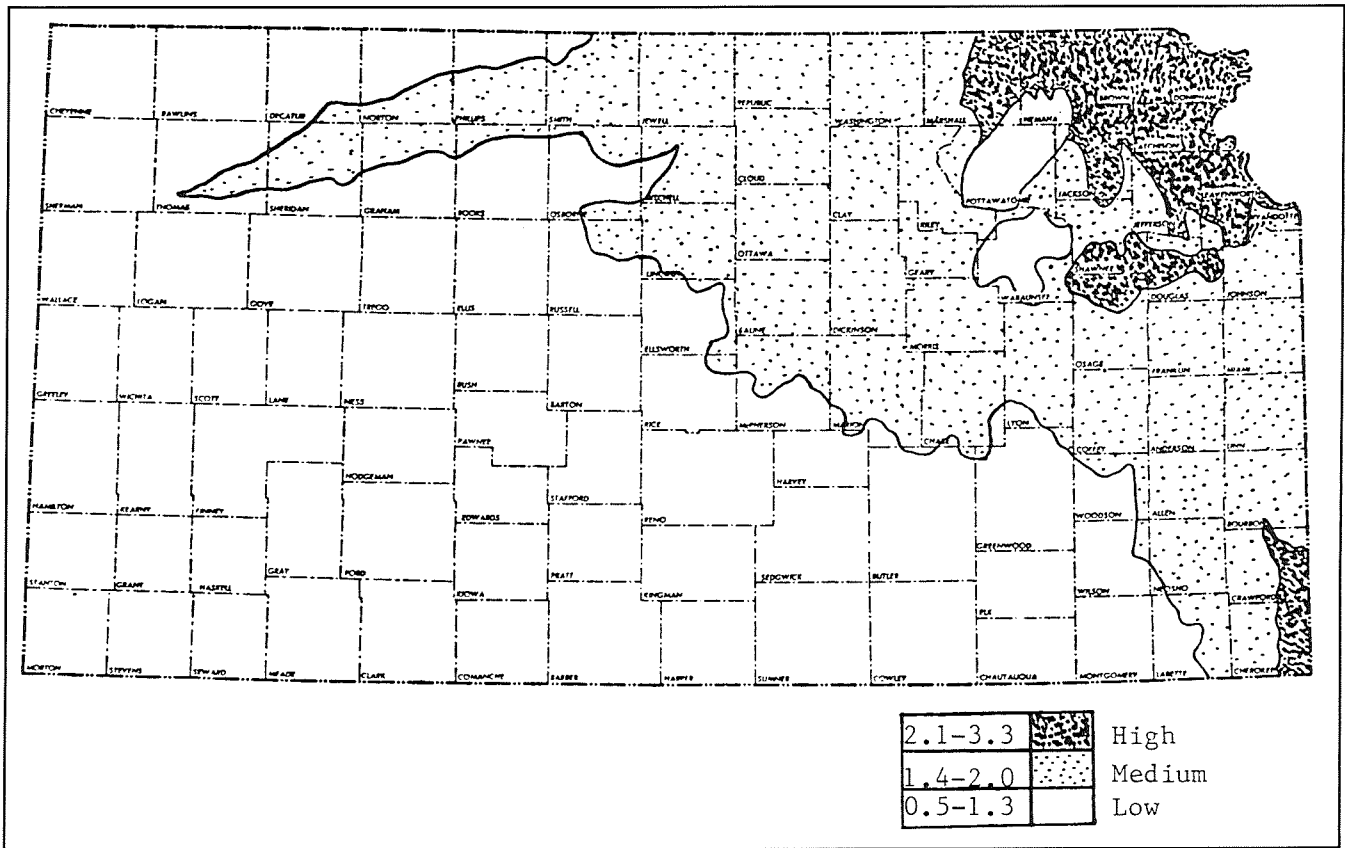


Figure 1

wide non-point source pollution control strategy and then prepare and implement statewide non-point source pollution management plans.

2. Statewide Strategy with Basin Implementation. The Kansas Department of Health and Environment should develop a statewide non-point source pollution control strategy and basin management programs. The Kansas Department of Health and Environment should coordinate management programs by hydrologic basin as identified in the Kansas Water Plan. Management plans should be prepared by appropriate entities, according to pollution type, to identify non-point source pollution control measures.

SUMMARY OF POLICY RECOMMENDATION

Option No. 2 is recommended. Widely varying geo-hydrologic conditions in the state indicate the necessity to administer the non-point source pollution control strategy in context with regional conditions.

The management programs would focus on encouragement of participation at the local level, education on the necessity of maintenance of land treatment structures, collection of monitoring data and evaluation of program progress.

PLAN IMPLEMENTATION

LEGISLATIVE ACTION

There are no statutory requirements.

ADMINISTRATIVE ACTION

Substantial improvement in water quality can be made by targeting resources, education and training programs to the land areas and activities that are the source of non-point source pollution problems. The plan for implementation includes:

1. Kansas Department of Health and Environment, with input from appropriate entities, will develop a statewide non-point source pollution control strategy consistent with federal guidelines.
2. Kansas Department of Health and Environment, with assistance from appropriate entities such as the State Conservation Commission, the Fish and Game Commission and the Soil Conservation Service, should identify areas in each river basin that exceed the criteria established for the identification of non-point source pollution problem areas. Each area should be rank-ordered by river basin according to the degree of exceedance of the criteria.
3. Kansas Department of Health and Environment, with input from appropriate entities, will identify the type of pollution and the pollution reduction goals.
4. Kansas Department of Health and Environment should coordinate the development of management programs for the reduction or elimination of the non-point source pollution in each problem area.
5. Management plans will be prepared by appro-

appropriate entities, according to the pollution source, i.e., individual conservation districts will prepare land treatment plans for erosion control in areas identified to have a sediment runoff problem. The minimum requirements for each non-point source management plan should consist of the following: (a) identification of type of pollution; (b) pollution reduction goals; (c) identification of state programs that are effective against the problems in each basin; (d) needed education and training programs; (e) a timeframe for implementation; (g) the need for new or amendatory legislation; and (h) procedures for developing and maintaining the non-point source management plan on a continuous basis so it can be used in developing program and budget plans for implementation.

6. The State Conservation Commission should use funds from the High Priority Cost-Share Program to attack and resolve priority basin non-point source pollution problems, as identified in the individual management plans.
7. Where appropriate, the Kansas Department of Health and Environment should establish Critical Water Quality Management Areas (K.A.R. 28-16-69 through 28-16-71) to assist with the implementation of the management plans.
8. Where education and training is necessary, utilize the effective delivery and outreach systems that are already in place such as the Cooperative Extension Service and Department of Agriculture.
9. A monitoring program should be coordinated by the Kansas Department of Health and Environment, with input from appropriate entities, in each non-point source pollution problem area, data from which would serve as performance measures to determine the effectiveness of state programs and other remedial measures.
10. In recognition of the potential pollution that could occur during the movement of applied chemicals into underlying groundwater, identification of the environmental fate of agricultural chemicals should be a research priority in basin areas where surface waters are in close communication with groundwater.

FINANCIAL REQUIREMENTS

There would be additional expenditures associated with the development and implementation of basin management programs for non-point source pollution. Expenditures will be on a case-by-case basis in context with the individual budget plans for each priority problem area.

Educational programs for non-point source pollution will be organized as Extension service personnel and resources permit. Full implementation will require the addition of a statewide non-point source program leader.

TIME SCHEDULE

Priority basins should be selected for program development based upon the sediment loading criteria which is an indication of the basin's susceptibility to non-point source pollution problems (Figure 1). Top priority should be given to the Missouri and Kansas-Lower Republican basins. The following time schedule is recommended:

- 1987—Kansas-Lower Republican
Missouri
- 1988—Marais des Cygnes
Neosho
Solomon
Smoky Hill-Saline
Lower Arkansas
- 1989—Cimarron
Upper Arkansas
Upper Republican
Walnut
Verdigris

REFERENCES

1. *State of Kansas*, Proposed Surface Water Quality Standards, Kansas Administrative Regulations 28-16-28b, Effective Date May 1, 1986.
2. *U.S. 99th Congress*, Proposed S. 1128, To amend the Clean Water Act, May 14, 1985.
3. *Kansas Water Office*, Background Paper No. 16, Watershed Development and Land Treatment, 1984.

STATEMENT OF THE
KANSAS FERTILIZER AND CHEMICAL ASSOCIATION
and the
KANSAS GRAIN AND FEED ASSOCIATION
to the
HOUSE ENERGY AND NATURAL RESOURCES COMMITTEE
REP. DENNIS SPANIOL, CHAIRMAN
REGARDING GROUNDWATER PROTECTION

FEBRUARY 10, 1988

Mr. Chairman and Members of the Committee, I am Chris Wilson, Director of Governmental Relations of the Kansas Fertilizer and Chemical Association (KFCA) and the Kansas Grain and Feed Association (KGFA). KFCA's 450 members represent the agricultural fertilizer and chemical industry and KGFA's over 1,100 member firms constitute the state's grain storage and handling industry. KFCA members are distributors or retailers of agricultural chemicals or others associated with the industry. Many KGFA member firms who are country elevators also market ag chemicals.

Both Associations appreciate the opportunity to offer some thoughts for your consideration in regard to groundwater protection and the impact of ag fertilizers and chemicals on groundwater quality. Our objectives today are to 1) provide you with additional information on the impact of agriculture fertilizer and chemicals on groundwater quality; 2) inform you as to what our industry is doing to protect groundwater; and 3) offer some action options for your consideration.

Before doing that, I would emphasize that the issue of groundwater protection is of the highest priority to us. Since most of us in Kansas, particularly in rural areas, rely upon groundwater as our source of drinking water, its quality is of critical importance to us and our families. For those of us in agriculture, both our lives and our livelihoods depend on the safe

and wise use of ag chemicals, in such a way as to pose no adverse effect on our environment. Groundwater is the lifeblood of agriculture. Ag chemical retailers are acutely aware that--while they always like to sell more product--it is far better to have precise applications with no adverse environmental impact than to have too much product applied, resulting in groundwater contamination. Farmers, too, have learned that more is not necessarily better as environmental concerns and sound economics have dictated that fertilizers and chemicals be properly applied. A great deal remains to be done, but we in agriculture have been very diligently working to do what is necessary to protect groundwater. I believe there is reason for us to be very optimistic about the future in terms of agriculture's effect on groundwater.

1. Agriculture's Impact on Groundwater Quality - One of the reasons this is such a challenging area is that developing technologies are continually allowing us to learn more about the movement of fertilizers and chemicals in soil, their degradation and their potential for reaching groundwater. Much research has been done, and is going on, yet much more is needed. Chemical manufacturers conduct extensive leachability studies, required before EPA approves a chemical for use, to determine that chemical's potential for reaching groundwater. We have gone from being able to test for parts per million (ppm) several years ago to being able to test for parts per quadrillion (ppq) today. To put that into perspective, a ppm is the size of a postage stamp in the infield of a major league baseball field. A ppq is equal to one postage stamp in an area the size of the land area of Michigan, Ohio, Indiana, Illinois and Wisconsin. While advances in analytical chemistry have allowed us to detect the presence of a chemical in groundwater, we still need to know more about whether that presence poses a health risk and if so, at what level.

When we speak about fertilizers, the one with documented health risks

is nitrogen. High levels of nitrates in drinking water can result in illness or death to infants, particularly within the first three months of life. This is known as methemoglobinemia or "blue baby", and cases of it are very rare. After 3-6 months, infants produce acidity in their stomachs and intestinal tracts, so that intake of nitrates no longer results in the reactions which produce methemoglobin.

When we speak of agricultural chemicals, we mean pesticides. Pesticides include herbicides, insecticides, fungicides and nematocides. According to an October 1987 report from the U.S. Department of Agriculture, "The Magnitude and Costs of Groundwater Contamination from Agricultural Chemicals", the relationship between pesticides, groundwater contamination and cancer is unknown. Based on a National Academy of Sciences (NAS) study done last year, the Council on Agricultural Science and Technology (CAST) and scientists at the University of California determined the possible lifetime cancer hazard from ingesting a list of 52 pesticides which EPA suspects as being carcinogens. They found that the possible total carcinogenic hazard associated with daily consumption of all 52 pesticides is equal to the hazard from consuming about 1.6 quarts of chlorinated tap water per day. This cancer hazard would be at 1.48 on an index system, zero being no risk. By comparison, eating one peanut butter sandwich per day is a 30 on the index and eating one half-ounce mushroom per day is 100. Further information from the CAST study is included in your packet. According to the same USDA report mentioned above, "While the actual risks from low-level exposure to agricultural pollutants are uncertain, the public perception appears to be that they are significant".

While in no way do we want to underestimate agriculture's potential impact on groundwater, it is important to understand the problem potential as much as possible before we can best determine what actions are needed. The USDA report further helps put potential groundwater contamination

from agriculture in perspective by identifying all counties where potential for groundwater contamination from pesticide and nitrate use exists. There's good news and bad news for Kansas, as the following maps from the report illustrate. For our state, only one county is indicated as having contamination potential from pesticide use. This data was based on hydrogeologic characteristics and pesticide use. As you can see from the map, the greatest potential for groundwater contamination from pesticides is along the Eastern seaboard and the northern cornbelt. A second map shows numbers of pesticides found in groundwater caused by agricultural practices in 1986. That is the good news--and now for the not-so-good. The third map shows the potential for groundwater contamination from nitrogen fertilizers. No state has more potential for nitrate contamination than Kansas. A look at the fourth map helps explain why this is the case. This map shows nitrate-nitrogen distribution in groundwater in agricultural areas. Kansas has high levels of nitrates naturally occurring in the groundwater. In addition to natural causes, septic tanks and municipal sewage contribute to excess nitrate in groundwater. The fifth map combines data for hydrogeologic characteristics and nitrogen fertilizer use and shows only two counties in southwest Kansas which are high in both categories.

We should also keep in mind that fertilizers and chemicals are much more likely to end up in surface water, due to runoff, than in groundwater. According to Kansas State University, non-pointsource pollution has had a much greater effect on surface waters, while groundwater quality is more directly tied to point source contamination. In many cases, where pesticides are found in groundwater, they can be tied to sinkholes, abandoned wells or some other direct conduit from the ground surface to the water below. Soil type and conditions have a tremendous amount to do with whether chemicals will reach groundwater.

I believe that the research data to date indicates no cause for alarm,

but certainly reason to be doing all possible to prevent fertilizers and chemicals from ending up in groundwater.

2. What Agriculture is Doing to Protect Groundwater - Producer and agribusiness groups work at the federal, state and local levels with research institutions, the Cooperative Extension Service and the departments of agriculture to protect the groundwater. A number of publications have been provided to you with this statement for your review, which have been distributed to help producers in protecting groundwater. "Best management practices" (BMPs) have been designed to reduce erosion, control runoff and protect groundwater.

As you have seen, it is important for Kansas producers to accurately assess the amount of nitrogen their crops will need. K-State publishes optimum nitrogen rates, which are used by retailers to advise producers. We emphasize the importance of having soil tests taken to help determine how much nitrogen is needed and to be sure to include other sources of nitrogen besides commercial fertilizer in determining amounts to apply. Only 39% of available nitrogen is from commercial fertilizer. The rest comes from sources such as crops alfalfa, which fix nitrogen, or manure applied to the field. The table below gives an example of the diminishing crop production yields of additional nitrogen.

Table 2			
The increase in corn yield due to added N and the cost of N for the extra bushels. Eight-year average for a central-Illinois experiment.			
N, lb/A	Corn, bu/A	For each 30 lb/A of N	
		Extra corn, bu/A	Cost of N per extra bushel of corn
0	79	-	-
30	100	21	\$0.29
60	117	17	\$0.35
90	131	14	\$0.43
120	142	11	\$0.55
150	150	8	\$0.75
180	154	4	\$1.50
210	155	1	\$6.00
240	155	0	—

We also emphasize integrated pest management (IPM), combining chemical use with other production practices to control pests.

Education is extremely important and there are innumerable seminars and schools for dealers and farmers which continually emphasize BMPs. Of course, educational programs are largely voluntary. However, certification and training is required for anyone buying or applying restricted use pesticides.

In a sense, the conservation provisions of the 1985 Farm Bill (Food Security Act) constitute a mandatory nonpoint source pollution control program. In order to be eligible for farm program benefits, which has been critical in recent years, farmers will have to comply with conservation regulations. Conservation compliance and the Conservation Reserve Program (CRP), which is expected to take four million acres out of production in Kansas and devote them to conservation use, will have major effects on controlling nonpoint source pollution from agriculture.

While the Committee is focusing on nonpoint sources, I believe it is important to mention point source contamination from agricultural fertilizers and chemicals again here. Our industry has developed BMPs for fertilizer and chemical plants for groundwater protection, and some information is included in that regard. Insurance companies and chemical manufacturers have also set requirements for groundwater protection measures at plants.

Further, our two Associations have established a joint Groundwater Task Force, which is in the process of establishing a set of standards/guidelines for plants in Kansas. The Task Force is being assisted by personnel from KSU, the Board of Agriculture, Kansas Department of Health and Environment, and Environmental Protection Agency in designing the standards.

KFCA is committed to appropriate regulation of our industry and in fact was responsible for initiating the Chemigation Act. In that spirit, we

decided to establish groundwater protection guidelines, knowing that it would mean additional costs to members in upgrading facilities. They may not be able to afford to make the changes, but they really can't afford not to.

Now for what I consider to be the most exciting part of my report to you. Both government scientists and scientists at every major chemical manufacturing company in the country are hard at work on the development of a new generation of chemicals, which are made from natural sources and are totally biodegradable and environmentally safe. A USDA news release which explains a little about these chemicals is included in your packet. These chemicals will be very specific and require only a few grams as opposed to pounds per acre to do the job. Dr. Hank Cutler of the Agricultural Research Service predicts that these chemicals will be on the market in five to seven years. Some of these environmentally safe chemicals are already being used in Japan, where their small land area, large population and topography magnify anything in the environment.

3. Action Options - Groundwater contamination from agriculture results not so much, if at all, from proper field application of pesticides and fertilizer. Causes of contamination include:

- spills & leaks
- discharge through sinkholes or abandoned wells
- improper field application

These problems could be addressed in a variety of ways:

- KFCA's state guidelines for plants will minimize spills and leaks at points of concentration of agricultural fertilizers and chemicals.
- We commend the Kansas Water Well Association for their efforts to improve well quality. Today's well technology is vastly improved from 40-50 years ago when many now abandoned wells were installed. We understand they will be requesting legislation for more education for pump installers as well as drillers.
- Continued education for dealers and producers is important. A special

emphasis program could be carried out by the Cooperative Extension Service.

- There are many research needs. A list identified by CAST is attached. More resources could be provided to KSU for research on nitrogen, and is particularly needed for nitrogen mineralization and leaching research.
- The Committee could consider legislation to provide for action when a chemical is detected in groundwater. The Iowa law focuses on research and education, but does not set standards or provide for action. Enclosed in your packet is information on groundwater laws in Wisconsin, California, Nebraska, Florida, and Arizona. Another law, passed last year in Mississippi, is being considered in Montana, Minnesota, Oregon and Ohio. That law requires the state authority to determine which chemicals are most likely to leach to groundwater and then set standards for those. If the chemicals are detected in groundwater, then the state can restrict their use, for instance, on certain soil types or under certain conditions, which have contributed to their leaching to groundwater. This is a concept which EPA has promoted.

One last item in your packet is some information on the importance of pesticides and fertilizers. Whatever their shortcomings, they have enabled agriculture to produce a more abundant, safer, and more wholesome food supply and to make dramatic contributions to the total economy. Over 20% of all U.S. jobs depend on agriculture.

Thank you for this opportunity to offer input to you on this important topic. I'd be happy to try to answer any question you may have.

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CHEMIGATION SAFETY LAW
ENFORCEMENT PROGRAM

The Plant Health Division of the Kansas State Board of Agriculture is responsible for administration of the Chemigation Safety Law (K.S.A. 2-3301 et. seq.). This statute, enacted by the 1985 Session of the Kansas Legislature as Senate Bill 330, required the registration of all Kansas chemigators, installation of anti-pollution devices, or chemigation equipment and maintenance of records of chemicals (i.e., pesticides, fertilizers) applied through irrigation systems. Requirements that chemigation units in use must be supervised were also established.

In basic terms, a Chemigation Users Permit is required of all those who engage in the process whereby pesticides, fertilizers or other chemicals are added to irrigation water for application through an irrigation distribution system. Chemigation users were required to register and obtain a permit on or before December 31, 1985. Chemigation users are also required to install anti-pollution devices and systems. Chemigators were to have anti-pollution devices installed and be in full compliance with the law by December 31, 1987.

The chemigation program currently has emphasis in 4 major activity areas. These are as follows:

1. Grower information

Prior to passage of the Chemigation Safety Law, it was estimated that as many as 1,200 persons and 9,000 wells might be utilizing the chemigation process, but the identity of these people was not known. As a result, early emphasis was placed on informing the public about the new law. Over forty meetings were conducted in conjunction with the K.S.U. Cooperative Extension Service and the Groundwater Management Districts during 1985 in an attempt to inform the citizens of the state

about the requirements of the law. In spite of this effort, only 13 irrigators applied for permits in calendar year 1985. In the spring of 1986, another 156 applications for Chemigation User's Permits were received, bringing the total for FY86 to 169, only 14% of the original projection. This brings us to the 2nd major activity area.

2. Detection and Control of Non-Registered Chemigators

Since voluntary compliance was limited, emphasis was shifted to identifying individual chemigators and bringing them into compliance. Most field crop irrigation within Kansas occurs in the western and southcentral portions of the state. Primary devices utilized to effect irrigation are rotating overhead sprinkler devices known as center pivot systems. Despite the fact that these systems are large and cover substantial acreages, they are nonetheless highly difficult to detect from the ground without incurring substantial expenses in the form of travel and field staff man hours. As a consequence, an alternative was sought. In July, 1986 (FY87), the first set of aerial surveys were initiated to identify irrigation systems that were being used for chemical application. Most of these sites have bulk tanks which are visible from low altitudes. Furthermore, I am fortunate to have three licensed pilots on the division staff. This has proven to be an excellent method of identifying unpermitted wells. For example, in the first series of flights we located a total of 2,071 chemigation wells in a 25 county area of S.W. Kansas. Only 964 were permitted. This remains an ongoing activity. Once chemigation units are located, we can use the legal descriptions to query the water data base. In this way, the name and addresses of the

responsible parties are obtained for contact by the division. Initial contact is by letter complete with necessary forms which are to be completed and returned to our office. To date, there are no known instances of persons failing to obtain the necessary permit, once contacted.

3. Chemigation Well Water Monitoring Program

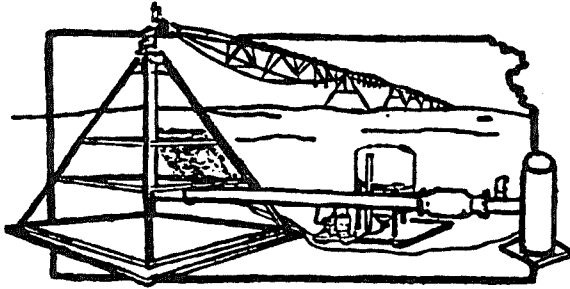
The staff provided an excellent outline of the water monitoring program conducted by the division. Also, I would like to refer you to a copy of the Chemigation Newsletter which has been handed out. This provides information as to well site selection and a number of other details. To date, the sample screening has been completed but we have not yet made a public release of the findings. Our first step upon receiving the results was to start notification of the well owners. In brief, pesticides were found in 2 of the 80 wells. In both instances, the pesticide involved was atrazine in the 1 to 2 p.p.b. level.

4. Chemigation Well Inspection Program

This is a program of inspection of chemigation wells to insure that the wells are permitted, and that anti-pollution devices are installed and functioning. Actual onsite inspections are a joint effort between the Plant Health Division, the Division of Water Resources and the various Groundwater Management Districts within the state. This team effort allowed the inspection of approximately 2,000 wells during FY1987. When wells are found which need to be permitted or have problems relative to anti-pollution devices, the Plant Health Division specialist does the follow-up.

STATE BOARD OF AGRICULTURE

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CHEMIGATION NEWSLETTER

Plant Health Division
Pesticide Use Section
109 S.W. 9th Street
Topeka, KS 66612
(913) 296-5192

NOVEMBER 1987

NON-COMPLIANCE

Inspections performed on chemigation systems during the summer of 1987 indicate that many chemigators have not equipped their systems with all of the required anti-pollution devices. Systems frequently lack the following two devices:

1. Air Bleeder Valve - Should be located on the output side of the injection pump. This device removes trapped air on the intake side or within the injector pump which could affect calibration and the rate of application.
2. Calibration Device - Should be located on the intake side of the injector pump. This device measures flow through the pump against the operating pressure of the irrigation system. This device should not be confused with the dials used to adjust the injection pump. It is a separate item.

Remember, if you are chemigating without all of the required chemigation equipment, you are violating the law. Your permit may be revoked, and you may face legal action and a possible fine.

EPA LABEL IMPROVEMENT PROGRAM

While a lot has been said about the Environmental Protection Agency's new Label Improvement Program (LIP) concerning endangered species, very little has been heard about the part of the program pertaining to chemigation.

This program, aimed at updating all pesticide labeling to include chemigation information, was approved in the spring of 1987. The label improvement program requires the manufacturers of pesticide products to revise labeling for each product to either prohibit use in chemigation systems or to include use directions for chemigation and various other statements. The LIP states that: No end-use pesticide product labeled for agricultural, nursery, turf farm, golf course or greenhouse uses may be released for shipment after April 30, 1988 unless the product bears a label which complies with the LIP.

The LIP not only encompasses equipment and supervisory requirements as outlined by the Kansas Chemigation Safety law but goes one step further! It

requires the installation of two additional anti-pollution devices before chemigators can legally apply pesticides (insecticides, herbicides, etc.) through their irrigation systems. All new pesticide labeling which allows chemigation will include the following statements:

1. The pesticide injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected with the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
2. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.

In addition, Toxicity Category I pesticide products (those with the signal word "Danger") which allow use in chemigation systems will bear the following instructions:

Posting of areas to be chemigated is required when 1.) any part of a treated area is within 300 feet of sensitive areas such as residential areas, labor camps, businesses, day care centers, hospitals, in-patient clinics, nursing homes or any public areas such as schools, parks, playgrounds or other public facilities, not including public roads, or 2. when the chemigated area is open to the public, such as golf courses or retail greenhouses.

In a nutshell, anyone applying pesticides bearing the improved label without first installing the additional required anti-pollution devices and following other label requirements will be in direct violation of the Kansas Pesticide Law and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

Quite honestly, these new pesticide label requirements will not only make it more difficult and costly for the producer; they will also make it more difficult for state regulatory personnel who are now obligated to enforce them. Remember: the solenoid valve and pressure switch are only required when pesticides are applied, not for fertilizer.

Should you have any questions or require more information on the label improvement program, please contact Marc Anderson, Ecological Specialist in Scott City, (316) 872-7372 or Alex Hawkins, Administrator of the Pesticide Use Section, at (913) 296-5192.

CHEMICAL USE IN 1986

As required by the Kansas Chemigation Safety Law, all producers must fill out and return a chemical application report for each chemigation system listed

on their permit in order to renew the permit for next year.

In 1987, we received chemical application records for 1986 from 101 chemigators. Records received indicated that over 4 million pounds of fertilizer were applied to 44,400 acres. Pesticide application records have also been totaled. Some of the more popular pesticides used included Lorsban, representing 41% of the pesticide applications reported, Pydrin 13%, Treflan 9%, Comite 8%, and Atrazine representing 7%. The following pesticides were chemigated during 1986:

Atrazine	Lorsban
Comite	Milogard
Cygon	Penncap M
Dipel ES	Pounce
Dual	Pydrin
Eradicane	Sutan +
Lasso	Treflan

CHEMIGATION WATER SAMPLING PROGRAM - 1987

In the United States, where approximately 96% of our fresh water resources come from groundwater, the major source of drinking water for half of our population, the practice of applying agricultural chemicals through irrigation systems has become an increasingly popular method of application. In most instances, fertilizers, herbicides, and insecticides are injected into the irrigation pipeline not more than a few feet away from the irrigation well.

As a part of the regulatory practices of the Board of Agriculture's Chemigation Program, the Pesticide Use Section of the Division of Plant Health initiated a groundwater monitoring program for selected chemigation sites throughout the state. Several factors led to the development of the chemigation water sampling program.

The agency wanted to establish a baseline for water quality at selected chemigation sites to determine if chemigation safety requirements (anti-pollution devices, supervision, etc.) as outlined by the Chemigation Safety Law are sufficient to prevent the contamination of our groundwater. And, as a long term goal, we wanted to determine the efficacy of chemigation as a method of agri-chemical application relative to environmental issues. Using records and reports submitted by chemigation users, we hope to determine if there is any correlation between agri-chemical practices near a well site and groundwater quality. Also, the state's Groundwater Quality Protection Strategy developed by the Kansas Department of Health and Environment (KDHE) required the Board of Agriculture to initiate a monitoring program for chemigation wells in cooperation with KDHE.

The first step in establishing the chemigation water sampling program was to determine the number of wells that could be sampled. In order to do this, we had to determine the chemicals to be monitored for. We also had to determine how we could most efficiently analyze samples for the different constituents, and who would do the analysis. Finally, we had to select the chemigation sites to be monitored.

The chemicals to be analyzed for were chosen based on the following criteria:

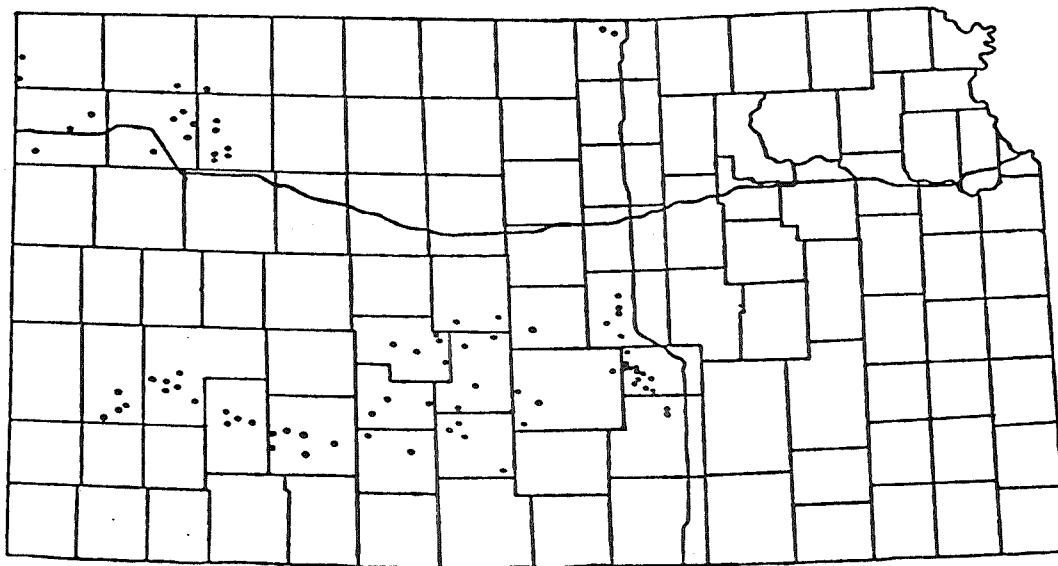
1. Popularity
2. Toxicity
3. Water solubility
4. Persistence in the environment

Taking these criteria into consideration, the agri-chemicals shown in Table 1 (page 5) were chosen for the ground water monitoring program. The chemicals are shown along with their respective water solubilities, half-lives and KDHE Health Guidance levels (KNL & KAL). Some of the inorganic compounds were chosen primarily for aesthetic or crop production reasons.

Sampling sites were chosen using the following criteria:

1. Chemigation utilized as a method of chemical application;
2. Proximity of chemigation wells to public or domestic drinking water supply wells;
3. Depth to water;
4. Soil type; and
5. Availability of historical water quality data.

The diagram below indicates the locations of the 89 sample sites.



Once the sample sites were chosen, the sampling procedure began. Sampling started around the first of July, 1987, and continued until early September. At the time of sampling, an inspection of the chemigation system was conducted and a diagram of the site was drawn. Should we find contamination in the water from a given well, the diagram will show what the site looked like, and the inspection will indicate whether or not the required anti-pollution devices were installed at the time of sampling.

Inorganic results have been completed for all of the samples. In several instances we have found "high" concentrations of sulfate and nitrate. Sulfate

TABLE 1

CHEMICAL	TRADE NAME	UNITS	KNL	KAL	SOIL PERSISTENCE	WATER SOLUBILITY
Alachlor	Lasso	ppb	1.50	15.0	N	242 ppm
Atrazine	Aatrex	ppb	15.00	88.0	M	3 ppm
Butylate	Sutan +	ppb	4.67	46.7	N	45 ppm
Carbaryl	Sevin	ppb	57.40	574.0	M	120 ppm
Carbofuran	Furadan	ppb	5.00	50.0	M	700 ppm
Chlorpyrifos	Lorsban	ppb	2.10	21.0	M	2 ppm
Cyanazine	Bladex	ppb	4.20	42.0	N	171 ppm
Dimethoate	Cygon	ppb	14.00	140.0	N	3900 ppm
Disulfoton	Di-Syston	ppb	0.03	0.3	N	25 ppm
EPTC	Eradicane	ppb	14.00	140.0	N	375 ppm
Fenvalerate	Pydrin	ppb	87.50	875.0	N	1 ppm
Methyl Parathion	Penncap M	ppb	3.00	30.0	M	55-60 ppm
Metolachlor	Dual	ppb	1.75	17.5	M	530 ppm
Metribuzin	Sencor	ppb	17.50	175.0	N	1200 ppm
Oryzalin	Surflan	ppb	6.58	65.8	N	2.4 ppm
Permethrin	Pounce	ppb	35.00	350.0	N	.2 ppm
Propachlor	Ramrod	ppb	70.00	700.0	N	613 ppm
Propargite	Comite	ppb	157.50	1575.0	N	.5 ppm
Propazine	Milogard	ppb	32.50	325.0	P	5 ppm
Simazine	Princep	ppb	3.50	35.0	P	5 ppm
Trifluralin	Treflan	ppb	0.17	1.7	M	1 ppm
Nitrate (AS N)		ppm	---	10.0		
Phosphate (AS P)		ppm	---	5.0		
Sulfate		ppm	---	250.0		
Potassium		ppm	---	---		
Ammonia		ppm	---	---		
Sodium		ppm	---	100.0		
Calcium		ppm	---	---		
Magnesium		ppm	---	---		

ppm = parts per million
 ppb = parts per billion

KNL = Kansas Notification Level. Administrative level confirming that groundwater contamination does exist.

KAL = Kansas Action Level. The level at which longterm exposure to contaminant concentrations is unacceptable.

Chronic health effects may occur after longterm consumption of water containing a pesticide at 10 to 100 times the health advisory level (KAL).

N = Non-persistent (less than 30 day half-life).

M = Moderately persistent (30 to 99 day half-life).

P = Persistent (greater than 100 day half-life).

readings ranged from 4.7 ppm to 1710 ppm and nitrate nitrogen readings ranged from less than 0.1 ppm to 24 ppm. In at least one instance, high levels of both nitrate nitrogen and ammonia may indicate the actual back-siphoning of nitrogen-based fertilizer.

To date, all samples have been screened for the presence of the following pesticides; alachlor, atrazine, butylate, chlorpyrifos, disulfoton, metolachlor, propachlor, propazine and trifluralin. Screening for the remaining nine pesticides will be performed as time and analytical methodology allow. The results of this study will be reported at a later date.

In the event that a chemigation well site is found to be contaminated, the following response program has been developed:

1. Kansas State Board of Agriculture will notify the well owner and the respective groundwater management district of the preliminary findings and indicate that the well will be resampled to confirm the initial findings. A copy of the KDHE Notification and Action levels will be included with the notice.
2. KDHE will be notified of the sample results.*

*In the event that the contaminated well site is adjacent to a public water supply well field or also functions as a domestic water supply, KDHE will be notified upon receipt of the initial sample results, and a follow-up sampling of potable water wells and well fields will be done by KDHE with full cooperation of KSBA enforcement personnel.

3. The Kansas State Board Agriculture will identify adjacent up- and down-gradient well sites.
4. Resampling of the original site and the nearest well sites up- and down-gradient will take place.
5. A pesticide use investigation will be done to determine if chemigation anti-pollution devices are functional. Chemical application records will be reviewed; chemical storage will be investigated; and an interview with the chemigator will determine past pesticide use in the area.

In the future, routine monitoring of all chemigation water sample wells will be conducted in three year cycles.

We would like to extend a special thanks to all of those who participated in the chemigation water sampling program this summer. Your assistance has helped to make the chemigation program more meaningful.

CALIBRATION IS A NECESSITY

As reported by "The Aquifer", The Journal of the Nebraska Groundwater Foundation, chemigation safety can be improved by paying more attention to application rates and the calibration of chemigation equipment.

A Nebraska study found that 60 percent of the applicators surveyed had

missed their targeted application rate by more than 10 percent. Nearly one-third over-applied or under-applied by more than 10 percent, with an average error of 30 percent. Losses due to poor application are estimated at \$1 billion per year nationwide.

In today's difficult economic times, can you afford to pour money down the drain? Perhaps more importantly, how long can our environment withstand the impact of over-application? Please take the time to properly calibrate your system before each chemical application. A whole society's way of life, as well as your own, may depend on it.

INFORMATION

For more information pertaining to chemigation in Kansas, please contact:

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