Approved February 3, 1989
Date

MINUTES OF THE Senate COMMITTEE ON Agriculture.

The meeting was called to order by Senator Allen at
Chairperson

10:07 a.m./~~p.m.~~ on February 2, 19 89 in room 423-S of the Capitol.

All members were present ~~except~~

Committee staff present: Raney Gilliland, Legislative Research Department
Lynne Holt, Legislative Research Department
Jill Wolters, Revisor of Statutes Department

Conferees appearing before the committee: Dale Lambley, Director, Plant Health Division
State Board of Agriculture
Howard Tice, Kansas Association of Wheat Growers
Marc Anderson, Ecological Specialist, Plant Health
Division, State Board of Agriculture

Senator Allen called the committee to order and called on Dale Lambley to continue discussion of SB 2 as testimony was not completed during the committee meeting of February 1. (copy of Mr. Lambley's testimony is filed with February 1 minutes).

Mr. Lambley explained that the proposed penalties of SB 2, if passed, would make the chemigation laws the same as the pesticide laws. Mr. Lambley expressed support for SB 2 and requested the committee to consider the bill favorably.

During committee discussion, Mr. Lambley explained that the contamination problems with a well at Levant, Kansas, in Thomas County were not caused by chemigation.

The Chairman called on Howard Tice to testify.

Mr. Tice gave the committee copies of his testimony (attachment 1).

During further committee questions and discussion, Mr. Lambley explained that EPA will soon have new regulations and he requested that any legislation for Kansas should be so written that it will be compatible with the new upcoming EPA requirements. Mr. Lambley also stated that he felt even if the private sector helped with enforcement of chemigation laws that the Board of Agriculture should remain in charge. Mr. Lambley stated that some companies are interested in working with the chemigation enforcement but that they would want no liability held against them. Mr. Lambley explained that budget requests had been made to allow for two additional well inspectors. Staff explained that a water use report is required to be filed with the Department of Health and Environment and on that form one of the questions to be answered asks if that person is using chemigation. This, by cross checking with Health and Environment is a way to know how many are chemigating with their wells. Mr. Lambley called on Marc Anderson. Mr. Anderson showed the committee equipment used for chemigating with an irrigation well. Mr. Anderson explained that any chemigation legislation should be written so as to include all who chemigate through an irrigation system as it is now golf courses do not come under the chemigation law. Mr. Anderson gave copies of a diagram explaining installation of anti-pollution devices and a copy of chemigation regulations to the committee (attachment 2).

Senator Francisco gave the committee copies of information concerning farm facts for Sedgwick County (attachment 3).

CONTINUATION SHEET

MINUTES OF THE Senate COMMITTEE ON Agriculture,

room 423-S, Statehouse, at 10:07 a.m./~~p.m.~~ on February 2, 1989

Chris Wilson gave the committee corrected copies of her testimony of February 1 (attachment 4).

The Chairman called attention to committee minutes for action.

Senator Montgomery moved the committee minutes of February 1 be approved; seconded by Senator Daniels; motion carried.

The Chairman requested Mr. Lambley have amendments prepared and ready for the committee by February 13 to reflect the suggestions and requests of those who testified.

Senator Allen adjourned the committee at 11:00 a.m.

GUEST LIST

COMMITTEE: Senate Agriculture DATE: February 2, 1989

NAME	ADDRESS	ORGANIZATION
Alex Hawkins	Topeka	KSBA
Dale Lambley	Topeka	KSBA
Howard W. Tice	Hutchinson	KAWG
Ken Bahr	Topeka	NACA
MIKE BEAM	TOPEKA	Ks. LVSTK. ASSN.
Nancy Kindling	Topeka	Intern Sen. Francisco
Freeman E Biery	Topeka	—
David Johnson	Emporia	
Joe Lieber	Topeka	Ks. Co-op Council
Kenneth M. Wilke	Topeka	KSBA
Charlene Stinard	Topeka	Ks Natural Resource Council
John Peterson	Topeka	Nat'l Ag Chem Assn

Kansas Association Of Wheat Growers

"ONE STRONG VOICE FOR WHEAT"

TESTIMONY - SB 2

Senate Committee on Agriculture and Livestock
Chairman: Senator Jim Allen

Mr. Chairman, members of the committee, I am **Howard W. Tice, Executive Director** of the **Kansas Association of Wheat Growers.** I appreciate this opportunity to appear today in **support** of **SB 2.**

Protection of the state's water supply is a high priority of our organization, just as it is with other farm organizations and conservation groups. What many people forget is that farmers have to depend on ground water for drinking and cooking purposes, just like everyone else. To assume that a farmer is going to engage in a practice that endangers his own health, and the health of his family just doesn't make sense.

On the other hand, farmers share another common characteristic. They aren't perfect - and they don't know everything there is to know about every farming practice they utilize. That's why they print vital information on the labels of the products applied through chemigation and other methods. That's why we have the **Cooperative Extension Service** to speed up the delivery of new information. And that's also why we need official guidelines and supervision by state agencies - to make sure that accidents don't occur, that would contaminate the water supply.

For that reason, we support the **Chemigation Safety Act,** and the improvements embodied in **SB 2.** However, we share the concerns expressed by our friends in the **Farm Bureau,** that the increase in fines to **$5,000** per violation, with the stipulation that a continuing violation could draw a fine of **$5,000 per day,** to be excessive. It might aptly be compared to using a sledge hammer to swat a fly.

If there had been any instances of wanton neglect, or instances that constituted a definite health hazard, our position might be different. Since the facts surrounding the chemigation issue support the contention that this, still new application method, is being practiced safely at this point, we cannot support the enactment of such stiff penalties.

The non-farm public's concern that contamination might occur as a result of chemigation is valid. That's another reason we support the **Chemigation Safety Law,** and **SB 2;** with the exception of the excessive penalties. That's why we also applaud the efforts of the chemical manufacturers, to supply farmers with products that can be applied in smaller amounts, such as one herbicide that is applied at just 1/10th ounce per acre. The direction of product research is also focused on more environmentally compatible, or degradable chemicals, and containers that can disposed of more safely. That certainly is a positive factor.

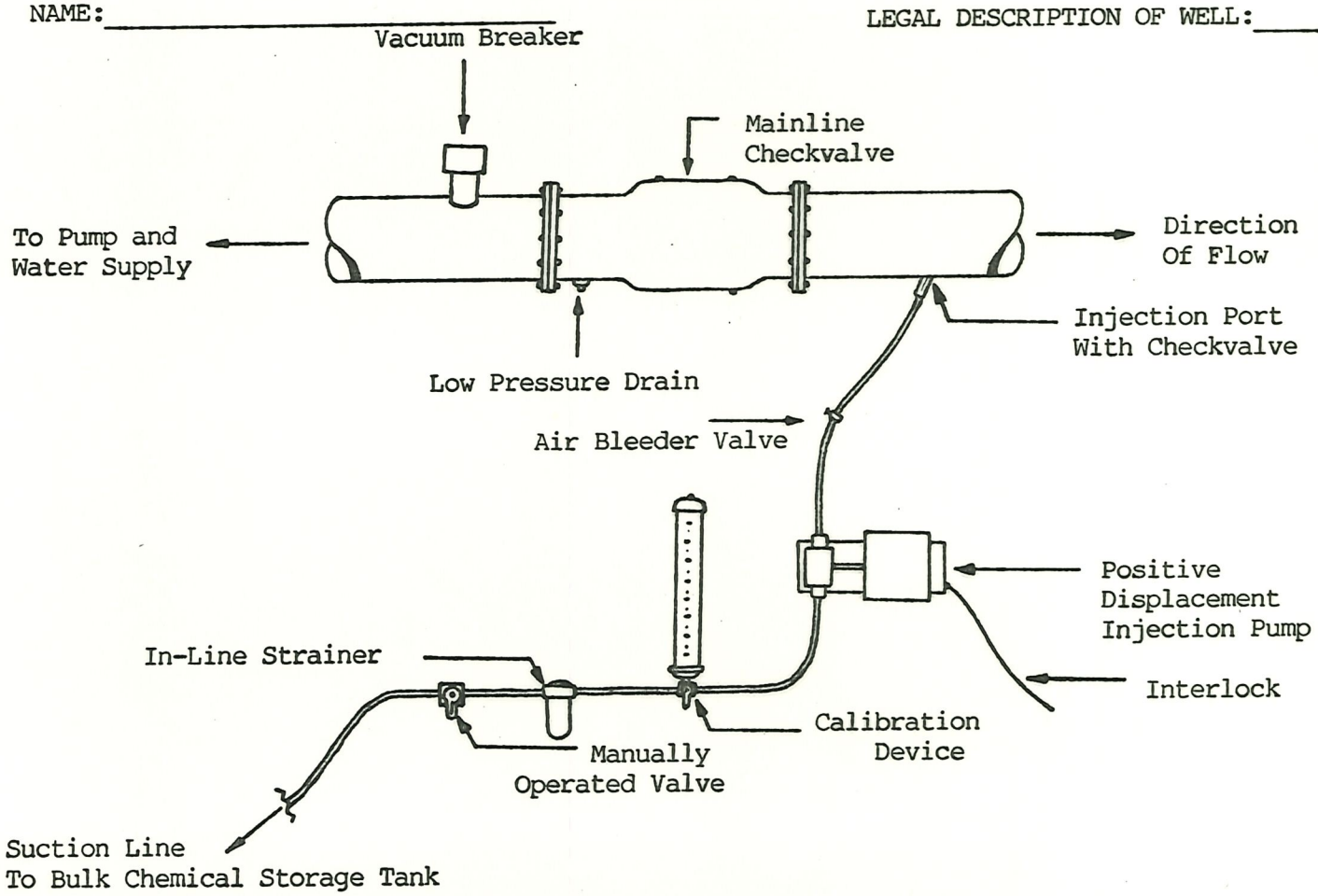
Finally, I should state that we would also be supportive of any necessary improvements in efforts to educate and certify operators of chemigation equipment, and the privitization of inspection efforts, as proposed in **HB 2130.**

Senate agriculture
2-2-89
attachment 1

In order to obtain a permit, a PLAN FOR USING REQUIRED ANTI-POLLUTION DEVICES MUST BE SUBMITTED: The plan must include or apply to each wellhead and/or withdrawal point. The required anti-pollution devices are listed in the Chemigation Information Leaflet and on the attached sheet. The plan should include a written description and one or more diagrams showing how each chemigation unit is (or will be) set up and maintained. Indicate which anti-pollution devices are presently installed and which are to be installed at a later date. REMEMBER: All of the required anti-pollution devices must be installed before you can legally use the chemigation process.

-SAMPLE PLAN-
FOR USING ANTI-POLLUTION
DEVICES

NAME:_____ LEGAL DESCRIPTION OF WELL:_____



Senate agriculture
2-2-89
attachment 3

REQUIRED ANTI-POLLUTION DEVICES

DEVICE	LOCATION	FUNCTION
Water line checkvalve (Automatic, quick-closing)	In irrigation system between water source and chemical injection point	Prevents backflow of water-chemical mixture into the source of water supply during times of system failure or shutdown
Vacuum relief device	Between water source and water line checkvalve	Reduces the chance of chemical being drawn back into the water source after closure of water line checkvalve
Automatic low pressure drain	Between water source and water line checkvalve	Removes any fluid behind water line checkvalve; drains liquid to prevent freezing
Chemical line closure device	Between injector pump and irrigation water line injection fitting	Prevents liquid from flowing in either direction
Interlock system	Between the power system of the injection unit, the irrigation pumping plant and the pivot (if involved)	Shuts down the entire system in the event of malfunction
Positive Displacement Injector Pump		Assures consistent rate of application
Air Bleeder Valve	At the output side of the injection pump	Removes air trapped on the intake side or within the injector pump which would affect the rate of application
Calibration Device	On the intake side of the injector pump	Measures flow through the pump against the operating pressure of the system
In-line strainer	At input side of injection pump	Helps prevent malfunction of checkvalves in injection pump or other valves
Chemical supply tank with manually operated shut-off valve		Holds material to be injected during calibration, equipment changes or emergencies

100A
11/85

DIVISION OF PLANT HEALTH - KANSAS STATE BOARD OF AGRICULTURE

CHEMIGATION

KANSAS CHEMIGATION SAFETY LAW

INFORMATION AND REQUIREMENTS

This leaflet sets forth some of the requirements of the Kansas Chemigation Safety Law and the regulations promulgated for its administration, as they pertain to chemigation under full compliance. Copies of the Law and Regulations are available upon request from the Division of Plant Health.

I. Qualifying for a Permit

WHO IS REQUIRED TO HAVE A PERMIT?

1. A Chemigation User's Permit is required for all those who engage in chemigation. "Chemigation" means any process whereby pesticides, fertilizers, or other chemicals are added to irrigation water applied to land or crops, or both, through an irrigation distribution system.

2. On or before December 31, 1985, any user of the chemigation process shall register and obtain a Chemigation User's Permit before using the process. Any person chemigating on or after January 1, 1987 shall be in full compliance.

* * * *

HOW DOES ONE QUALIFY FOR A PERMIT?

1. Be 18 years of age or older by January 1 of year of permit issue
2. Submit a completed application for Chemigation User's Permit
3. Submit a plan for using required anti-pollution devices
4. Submit a plan for handling tailwater or accumulations of water
5. Pay required fees: Application fee = $50.00 per permit
6. Permits are only issued to individuals who own or operate the land on which chemigation is to be used. Only one permit may be issued to an individual. An individual having a chemigation user permit may supervise no more than 10 chemigation units (wells).

* * * *

PERMIT EFFECTIVE PERIOD, PERMIT RENEWAL

1. Full registrations submitted during 1986 shall be effective for 1987. A Chemigation User's Permit may be renewed each year upon making an application, payment of the application fee, and completing the report form providing information on each chemical used in chemigation the previous year.

2. The renewal report shall include:

   a. The name and address of the permit holder.

   b. The name and total quantity of each chemical applied by the chemigation process during the preceding year.

   c. The total number of acres treated by means of chemigation.

3. The chemigation permit holder shall report immediately to the secretary all spills, accidents, system malfunctions, or other situations involving actual or potential contamination of either ground water or surface water.

* * * *

COMPLETING APPLICATION FORM

1. Please supply all the information requested.
2. Follow the instructions printed on the back of the application.
3. Print or type your full name in the space provided.
4. Sign and date the application and return all four (4) copies.
5. Pay applicable fees. Make check or money order payable to Kansas State Board of Agriculture. Sending currency through the mail is discouraged.

* * * *

II. Responsibilities of Permit Holder

REPORT OF ADDRESS CHANGE - CHANGING LOCATION OF WELL HEADS

1. Anyone obtaining a Chemigation User's Permit shall be required to notify the Kansas State Board of Agriculture of:

   a. Any change in mailing address.
   b. Any change (from that submitted on the original application) in the location of the well heads involved in the chemigation process.

2. Such notification is to be made by the tenth of the month following the month during which the change occurred.

* * * *

ANTI-POLLUTION DEVICES

1. Anyone using the chemigation process shall be required to install anti-pollution devices on chemigation equipment being used in the process. "Anti-pollution devices" means mechanical equipment used to reduce hazard to the environment in cases of malfunction of the equipment during chemigation and includes, but is not limited to:

   a. Interlock -- An interlock system shall be used between the power system of the injection unit, the irrigation pumping plant and the pivot, if involved; the interlock shall function so that the entire system will be shut down simultaneously in the event of malfunction.

   b. Mainline checkvalve -- main water line checkvalves shall be automatic, quick closing devices capable of preventing the backflow of water-chemical mixtures into the source of water supply during times of system failure or equipment shutdown.

   c. Chemical line closure device -- A chemical line closure device shall be installed in the injection line; this device shall be capable of positive closure to prevent liquid flow from either direction.

   d. Vacuum relief device -- A functional vacuum relief device shall be provided to reduce the chance of chemical being back-siphoned into the water source.

ANTI-POLLUTION DEVICES

e. Automatic low pressure drain -- An automatic low pressure drain shall be installed between the water line checkvalve and the irrigation pump.

2. Anti-pollution devices shall be maintained in a functional state for any irrigation system used in the chemigation process.

* * * *

CHEMICAL INJECTION

1. Persons involved in the chemigation process shall use a separate chemical injection system. This system shall include:

   a. Chemical supply tank with manually operated valve;
   b. In-line strainer;
   c. Positive displacement injection pump;
   d. Air bleeder valve for injection pump; and
   e. Calibration device.

2. Any individual operating chemigation equipment under the Chemigation User's Permit shall be responsible for the safe operation of such chemigation equipment, any such equipment shall be functional and shall be considered to be under the direct supervision of the Chemigation User's Permit holder.

* * * *

SUPERVISION

1. Anyone obtaining a Chemigation User's Permit shall be responsible for supervision of the chemigation equipment to ensure its safe and accurate operation. "Supervision" means the attention given to the chemigation system during its operation when chemicals are being applied. "Direct supervision" means supervision with the ability to change the procedures.

2. No person having a Chemigation User's Permit shall supervise more than ten (10) operating chemigation units at one time.

3. Each person possessing a Chemigation User's Permit shall be responsible for insuring that those persons who work under his or her direct supervision and who handle pesticides:

   a. Are knowledgeable in the use of that pesticide
   b. Follow all directions on the pesticide's label
   c. Use all safety precautions pertaining to that pesticide.

* * * *

RECORDS AND REPORTS

1. Each person using a chemigation process shall keep records regarding each application of any chemical other than water. The records shall contain the following information:

RECORDS AND REPORTS

a. The type of chemical used
b. The amount of active ingredient used
c. The date of use
d. The legal description of the location of the water supply or the point of diversion of the water supply
e. The EPA registration number of each pesticide applied.

2. Records required under this section shall be retained by the holder of the Chemigation User's Permit for a period of not less than two years from the date of application.

* * * *

REFERENCE

KEEP THIS LEAFLET FOR YOUR REFERENCE PURPOSES

* * * *

PREPARED BY

KANSAS STATE BOARD OF AGRICULTURE
Division of Plant Health
109 SW 9th Street
Topeka, Kansas 66612-1281
Telephone: (913) 296-2263

MANAGEMENT AND SUPERVISION ARE THE KEY FACTORS TO SUCCESSFUL CHEMIGATION!

FARM FACTS

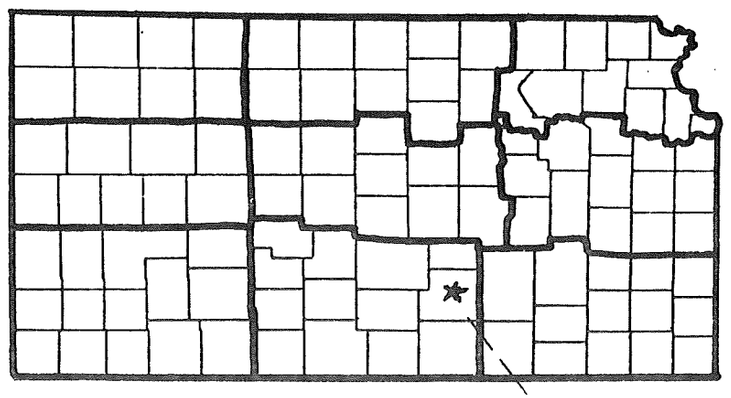
1987-88

National Agricultural Statistics Service
Fact Finding for Agriculture
KANSAS AGRICULTURAL STATISTICS
444 S.E. QUINCY, ROOM 290
TOPEKA, KANSAS 66683
PHONE: 913-295-2600

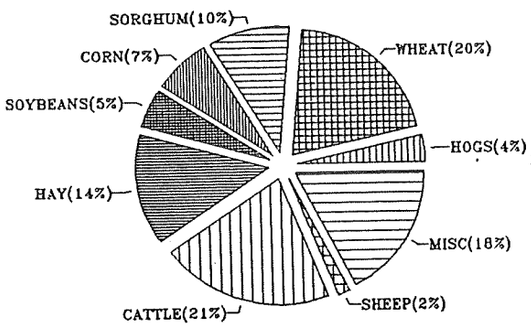
SEDGWICK

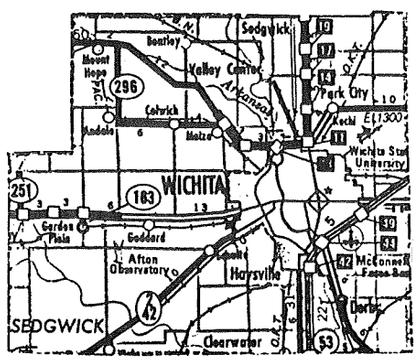
COUNTY

		RANK IN STATE
ALFALFA HAY 1987		
ACRES HARVESTED	25,900	3
YIELD - TONS/ACRE	4.1	25
PROD. - TONS	105,900	5
FARM VALUE	$7,878,400	5
ALL OTHER HAY 1987		
ACRES HARVESTED	27,000	21
YIELD - TONS/ACRE	2.4	28
PROD. - TONS	65,600	7
FARM VALUE	$3,135,300	12
ALL HAY 1987		
ACRES HARVESTED	52,900	2
YIELD - TONS/ACRE	3.2	32
PROD. - TONS	171,500	1
FARM VALUE	$11,013,700	2
PASTURE ACREAGE	91,000	83
LIVESTOCK INVENTORIES		
ALL CATTLE, JAN. 1, 1988	59,400	35
COWS THAT HAVE CALVED		
BEEF	13,200	60
MILK	8,250	1
OTHER CATTLE	37,950	41
CATTLE ON FEED-JAN. 1, 1988	900	64
CALVES BORN - 1987	19,500	17
HOGS - DEC. 1, 1987	15,300	38
ALL SHEEP AND LAMBS, JAN. 1, 1988	25,000	2
CHICKENS, DEC. 1, 1987	107,000	7
INVENTORY VALUES		
CATTLE AND CALVES-JAN. 1, 1988	$27,988,200	35
HOGS AND PIGS-DEC. 1, 1987	$1,078,700	38
SHEEP AND LAMBS-JAN. 1, 1988	$2,000,000	2
CHICKENS-DEC. 1, 1987	$133,700	7
MILK PROD - 1987 - LBS.	92,725,000	1
FARM VALUE	$11,590,600	1
EGGS PRODUCED-1987	17,453,000	10
FARM VALUE	$523,600	10



VALUE OF PRODUCTION





Senate Agriculture
2-2-89
attachment 3

		RANK IN STATE
POPULATION-1986-U.S. CENSUS EST.	391,100	1
NO. OF FARMS 1987	1,567	1
LAND IN FARMS 1987-ACRES	534,000	33
ACRES HARVESTED 1987	371,000	2
VALUE OF CROPS HARV. 1987	$44,485,500	3
VALUE OF LIVESTOCK PROD. 1987	$32,992,900	17
PRECIPITATION JAN.-DEC. 1987-IN.	39.01	26
PRECIPITATION LONGTIME AVERAGE-IN.	28.61	49
OFF FARM GRAIN STORAGE CAPACITY-BU.	89,172,000	1
WHEAT 1987		
ACRES SEEDED	216,000	8
ACRES HARVESTED	203,600	7
YIELD-BU./ACRE	30.7	77
PROD-BU.	6,256,500	11
FARM VALUE	$15,524,300	12
IRRIGATED ACRES HARV.	5,500	28
YIELD - BU./ACRE	35.1	50
PROD. - BU.	193,000	31
CONT. CROP DRYLAND ACRES HARV.	152,600	4
YIELD - BU./ACRE	29.9	74
PROD. - BU.	4,562,100	5
SUMMER FALLOW ACRES HARV.	45,500	52
YIELD - BU./ACRE	33.0	56
PROD. - BU.	1,501,400	56
CORN 1987		
ACRES PLANTED	24,000	16
ACRES HARVESTED	23,900	16
ACRES HARV. FOR GRAIN	22,000	16
YIELD - BU./ACRE	132.6	22
PROD. - BU.	2,916,500	15
FARM VALUE	$5,534,100	15
IRRIGATED ACRES HARV.	20,800	13
YIELD - BU./ACRE	136.7	25
PROD. - BU.	2,844,300	13
NON-IRRIGATED ACRES HARV.	1,200	51
YIELD - BU./ACRE	60.2	51
PROD. - BU.	72,200	51
ACRES HARV. FOR SILAGE	1,900	16
YIELD - TONS/ACRE	12.8	61
PROD. - TONS	24,400	23
FARM VALUE	$441,700	22

		RANK IN STATE
SORGHUMS 1987		
ACRES PLANTED	78,000	7
ACRES HARV. FOR GRAIN	72,200	7
YIELD - BU./ACRE	68.7	67
PROD. - BU.	4,961,600	10
FARM VALUE	$7,575,100	9
IRRIGATED ACRES HARV.	7,800	22
YIELD - BU./ACRE	87.1	67
PROD. - BU.	679,100	24
NON-IRRIGATED ACRES HARV.	64,400	7
YIELD - BU./ACRE	66.5	58
PROD. - BU.	4,282,500	11
ACRES HARV. FOR SILAGE	500	56
YIELD - TONS/ACRE	13.4	41
PROD. - TONS	6,700	60
FARM VALUE	$103,800	62
OATS 1987		
ACRES PLANTED	1,900	47
ACRES HARVESTED	200	87
YIELD - BU./ACRE	44.0	39
PROD. - BU.	8,800	89
FARM VALUE	$15,000	84
SOYBEANS 1987		
ACRES PLANTED	17,400	33
ACRES HARVESTED	17,100	33
YIELD - BU./ACRE	42.6	14
PROD. - BU.	729,300	31
FARM VALUE	$3,855,900	31
IRRIGATED ACRES HARV.	12,600	3
YIELD - BU./ACRE	49.9	9
PROD. - BU.	629,200	3
NON-IRRIGATED ACRES HARV.	4,500	49
YIELD - BU./ACRE	22.2	63
PROD. - BU.	100,100	50

KANSAS FERTILIZER AND CHEMICAL ASSOCIATION, INC.
Phone 913 234-0463
816 S.W. Tyler St., Topeka, KS 66612
[Mailing Address] P.O. Box 1517, Topeka, KS 66601-1517

February 1, 1989

TO: Senate Agriculture Committee Members

SUBJECT: Chemigation Background Paper

Enclosed is a copy of the chemigation paper attached to our February 1, 1989 statement regarding H.B. 2, which was inadvertently misstapled. I apologize for the inconvenience.

Sincerely,

Chris

Chris Wilson
Director of Governmental Relations

CW/jls

enc.

Senate agriculture
2-2-89
attachment 4

CHEMIGATION AND OUR ENVIRONMENT

BY
JERRY N. DOOP

Chemigation is the practice of combining an application of irrigation water and agricultural chemicals. These chemicals are the same type as those used around the home. The producer uses chemigation to create an environment conducive for growing food and fiber, much the same way people control the environment in and around their homes with chemicals. The majority of chemigation is done through sprinklers with fertilizer (primarily nitrogen, some potash, sulfur, and trace elements). A few producers also use chemigation with pesticides (insecticides and herbicides). Chemigation is a relatively new farming practice, starting in Kansas in the 1960's. The feasibility of chemigation came with the development of the sprinkler system and the even distribution of water.

Sprinkler systems allowed the producer to develop lower cost, marginal land into high producing land. Marginal land can best be described as having no stomach, no holding capacity, one inch of water can wet twelve inches of soil. Because the developed land was marginal, it became necessary to spoon feed the crop its major requirements of water and nitrogen fertilizer. This practice was so water efficient and labor saving that land which was irrigated by other methods (flood, ditch and pipe) was converted to sprinklers.. This allowed the producer to diversify his crops and make more efficient use of water, chemicals, labor and farm machinery.

The producer does not apply chemicals every time he irrigates. The quantity of water which is applied varies greatly. Sprinklers can be regulated for each revolution to apply as little as 1/8 inch or as much as 2 inches of water per acre. The crop grown, the weather, and outside pressure from weeds and insects all play a part in the decision to chemigate. The majority of chemigation in Kansas is done in the western third of the state. Because of the limited rain in that area, irrigation is necessary and the producer can plan his chemigation. The most intensely chemigated crop will be corn. The western Kansas corn producer may have as many as 35 revolutions of water with his sprinkler. This could include as many as five applications of fertilizer plus one for herbicide and two for insecticides. A less complete chemigation program for corn, and closer to the average, would include only two chemigations of fertilizer. A western Kansas irrigated wheat producer could have 16 revolutions of water which might include two or three revolutions with fertilizer. Hay in that part of the state would have approximately 30 revolutions and usually none would be chemigation. If there was an infestation of weevil he might have 2 or 3 revolutions with an insecticide. Grain sorghum in the west could have 20 revolutions of water, and again, most will not plan any chemigation.

The use of chemigation does not mean more chemicals are used to

grow a crop. Chemigation is merely a method of applying the chemicals in a timely, efficient, and economical manner. The University of Georgia has test results showing some pesticides applied through chemigation at rates below the manufacturers recommended rates have had as good or better results as those applied in a conventional manner. An example is a herbicide that requires water to be activated. When it is applied through chemigation, the herbicide goes to work immediately controlling weeds. Several universities have also shown that split applications of nitrogen are more efficient.

The largest quantity of any chemical used in agriculture is fertilizer. This is true of both the irrigated and the dry land producer. Fertilizer that is used for crop production is manufactured the same way as that used by the homeowner on his lawns. Fertilizer can have three major elements in it, nitrogen (N), phosphorus (P), and potash (K). The analysis will always be shown as a percentage of each in this order (N, P, K). There can be other secondary and trace elements in or added to fertilizer. These include sulfur, zinc, iron, manganese, magnesium, and copper. The secondary and trace elements are used in small quantities. Many of these elements can be found in vitamin pills taken by humans.

Of the three major elements in fertilizer, nitrogen is used in the largest quantity for crop production. Nitrogen is 70% of the 8- to 9- hundred thousand tons of the three major elements sold in Kansas. Nitrogen, in fertilizer, is produced from natural gas. Nitrogen produced by Mother Nature comes from thunderstorms and decomposing organic matter. Each crop and soil type will require different amounts of nitrogen for maximum crop production. Wheat will require between 40 - 100 pounds of actual nitrogen per acre. Grain sorghum will need between 80 and 150 pounds per acre. Hay and soybeans are legumes and require little or no nitrogen. Corn will require between 150 to 250 pounds of actual N per acre. One of the largest recommendations for nitrogen is for lawns. It is from 3 to 6 pounds per 1,000 square feet. This equates to 130 to 260 pounds of nitrogen per acre.

A great concern of the general public is the contamination of the ground water with chemicals. There are basically three ways agricultural chemicals can contaminate the ground water--water running off soil which has had a recent application of chemicals, chemicals leaching through the soil into subsurface water, and chemicals spilled directly into a water supply. Generally speaking, most agricultural chemicals will break down into basic elements and become inactive given enough time, heat, moisture, and soil bacterial action.

One exception is nitrate. All forms of nitrogen will eventually become nitrate nitrogen in the soil. Nitrate is the form of nitrogen that growing plants can use. However, nitrate is very water soluble and easily moves with the soil moisture if not used by plants. There are several State and Federal agencies working on

regulations which will mandate application practices for agriculture. These types of regulations will deal with the amount of nitrogen that can be applied in a single application for each soil type. The regulations will be designed to reduce the amount of nitrates in the soil at any one time, thereby reducing the possibility of their leaching through the soil, especially in the marginal soils. Chemigation can help producers meet these regulations. The EPA's and Kansas' guidelines for nitrogen in drinking water is 10 PPM or less. Dr. Dennis Hardwick of the Fertilizer Manufacturers Association says, "There is no evidence to support claims that nitrates in the human body is carcinogenic or that nitrate by itself causes blue babies." Kansas being a natural grass land area causes us to have higher than normal naturally formed nitrogen levels in our ground water.

A real problem can be caused by chemicals applied to lawns. Water running off lawns goes directly into a concrete storm sewer system. This excess water has little chance of coming in contact with or being retained by other soil which might utilize the chemicals. Water from storm sewer systems is usually dumped directly into a body of surface water. This water will carry any nonabsorbed lawn chemicals with it. The soil where crops are grown is prepared to hold moisture, thereby creating less chance of water runoff. The majority of fields have other soil around them where any runoff is retained. This is not to say that chemical runoff from a field cannot happen, however, it is less likely than lawn chemicals to get into water supplies.

*David S. Powlson, UK agronomist, in answer to a question concerning the nitrate leaching associated with organic farming, cited an interesting study. Nitrate derived from organic manure is not safe from leaching. We recently monitored the nitrate content of soils that have received either farmyard manure or inorganic fertilizers since 1852. During the winter of 1986/87, 90 lbs/acre of nitrate-N was leached from the farmyard manure plot--twice the loss from the inorganic plot. Pointing to a second study involving plowed in clover and winter wheat, Powlson noted last year 180 lbs/acre of nitrate-N was leached during the winter from a sandy loan soil after the clover was plowed in. Farmers Weekly, April 1988.

With the concern about ground water, it is easy to see why chemigation is suspect. Therefore, let's examine the mechanics of chemigation. First, the producer must register each well he will use for chemigation. When he registers, he declares the safety equipment, required by a 1986 Kansas law, is in place. All of the equipment is subject to State Inspection. The injection equipment, which includes the required safety equipment, can be separated into two groups--the permanent equipment on the water well's discharge pipe, and the portable equipment used for injection.

*SOLUTIONS, July/August 1988, p. 11

CHEMIGATION AND OUR ENVIRONMENT

The equipment on the well consists of five items. They are designed to keep any water and chemicals from draining back down the well when the well shuts down. The flapper valve, located on the discharge pipe, is closed by gravity when the water pressure is no longer exerted against it. The vacuum breaker is placed between the flapper valve and the water well. A vacuum is created by the water in the well falling back into the well when the pump is shut down. The vacuum breaker allows the vacuum pressure to be released. When the vacuum is released, the low pressure drain, which is also placed between the well and the flapper valve, will drain any water in the discharge pipe. The fourth item is on the discharge pipe beyond the flapper valve. It is a fitting where the chemicals are injected into the water flow. This fitting has a check valve on it to stop a gravity flow of chemical into the discharge pipe. The last item on the well is a pump interlock. It ties the injection pump and water pump together. When the water pump shuts down, the injection pump shuts off simultaneously. Each of these mechanical devices are designed to keep chemicals out of the water in the well and together they give multi protection.

The second group of equipment used in chemigation is chemical pumping units. There are basically two types. One group is used for pesticides and the other is used for fertilizer. The equipment is similar, except the pesticide equipment is smaller. The pesticide pump is designed to accurately put out lesser quantities of chemicals, and consequently, the storage tank for the pesticides is smaller. Both fertilizer and pesticide equipment consists of a positive displacement chemical pump interlocked with the water well, a storage tank with a mechanical shut off valve, and a calibrated tube for determining the correct pump setting. With the exception of the fertilizer storage tank, this equipment is portable and is normally at the well site only when it is being used. This equipment is designed to accurately meter the very expensive chemicals into the system when the water well is in operation.

This total chemigation system is used to apply chemicals evenly to the crop at a time when the crop can utilize and benefit from the application. This means the chemicals applied through chemigation have less exposure to runoff and leaching. The equipment used in the chemigation process gives the producer protection from chemicals being sucked into the water supply, thus the producers are able to grow crops in a controlled environment and be mechanically assured his and our water supply is protected. Chemigation is man in harmony with his environment for the best production of food and fiber for all.