IOWA
GROUNDWATER PROTECTION STRATEGY
1987

Environmental Protection Commission
Iowa Department of Natural Resources

Larry J. Wilson
Director

AND THE

IOWA
GROUNDWATER PROTECTION ACT
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for the

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The Environmental Protection Commission of the Department of Natural Resources, is pleased to submit this Iowa Groundwater Protection Strategy - 1987 to the General Assembly as required by the 1985 Acts of the General Assembly, Chapter 7, Section 3.

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FOREWORD

During the past several years Iowans have become increasingly concerned about Iowa's groundwater resources. Underground storage tanks, landfills, fertilizers and pesticides, and the present and past management of hazardous substances are all viewed as threats to the groundwater resources of the state. Iowans' concern for groundwater contamination is widespread and is based on the knowledge that groundwater is vital to their lives. Iowans recognize the problem and are demanding action. Significantly, they acknowledge their role in the problem and their responsibility to participate in the solutions.

In the face of increasing evidence of groundwater degradation, the Environmental Protection Commission is submitting the Iowa Groundwater Protection Strategy 1987 to the General Assembly. The Strategy contains twenty-seven recommendations that may be implemented over the next ten years. State and local agencies should begin at once to build upon the current level of interest and make a strong commitment to the ideas contained in this Strategy. Adequate long-term funding must be developed to assure implementation. The time is right to take bold steps in a direction for policies and programs that will protect Iowa's groundwater resources.

The Environmental Protection Commission has attempted to incorporate a reasonable approach to protection of the resource while allowing for activities that make use of best management practices and best available technologies to minimize environmental impacts. Further, the Strategy attempts to build an information base so that current practices can be improved upon and so that we can be assured of better resource protection. When viewed as a whole, the Strategy recognizes that the very presence of human activities has impacts upon the environment and the quality of groundwater. It also recognizes that we can do more to protect water quality and that society is demanding that we do more. The Strategy represents a blend of research, public education, legal sanctions, incentive programs and common sense. The proposals strike an appropriate balance between the needs of society today and the need to preserve and protect a very important natural resource for future generations.

The Strategy outlines a $230 million program spread through ten years. The Environmental Protection Commission recommends that $37 million from the Oil Overcharge Settlement Funds be applied to eligible, high-priority portions of the Strategy. Additional public and private financial resources should be identified as a part of program implementation. However, the ultimate responsibility for funding the Strategy rests with the State of Iowa.

The Environmental Protection Commission and the Iowa Department of Natural Resources share with the Governor, General Assembly, other agencies and the citizens of this state a common goal of protecting Iowa's groundwater. While no individual or group may support all of the recommendations of the Strategy, it is generally agreed that the Strategy is an important first step towards protecting Iowa's groundwater. The Strategy sets a direction. Each reader is encouraged to carefully consider how he or she may participate in supporting policies and programs that may help assure groundwater protection. The success of the Strategy ultimately requires the efforts of private citizens, corporations and government. We must move forward together.

EXECUTIVE SUMMARY

Iowans are heavily dependent on groundwater resources for much of the water they use in all aspects of their lives. Today, more than 80% of Iowa's citizens believe that their groundwater resources are threatened by contamination and that more should be done to protect them.

Iowans from all walks of life identified the widespread use of nitrogen fertilizer, herbicides, and insecticides on agricultural fields and threats from abandoned or uncontrolled waste disposal sites as the most serious threats to Iowa's groundwater. Underground storage tanks, landfills, and the storage, handling and transportation of hazardous substances also are viewed as serious threats to groundwater.

The Environmental Protection Commission makes twenty-seven specific recommendations on groundwater protection. Fourteen of these recommendations require legislative action by the General Assembly.

Iowa Groundwater Protection Strategy 1987 recommends that the General Assembly adopt a goal of nondegradation for Iowa's groundwater. Nondegradation is a concept which implies that there should be no deterioration beyond existing water quality conditions. For existing contaminated water, the concept also implies that there should be improvements in water quality back toward pre-contaminated quality. The most desirable method of achieving this goal is to prevent contamination before it occurs.

Iowa Groundwater Protection Strategy 1987 emphasizes public awareness of groundwater quality as a way of ensuring public confidence in Iowa's water. Such educational efforts also help Iowans make the personal and public decisions which can continue to improve our water.

The Strategy requires the collection of needed water quality and relevant health information.

It recommends more detailed evaluations of potential and suspected contamination sources to better determine their severity, extent and implications.

The development and passage into law legislation specifically directed toward groundwater protection is recommended. For the first time, the importance of groundwater would be specifically recognized in statute. Responsibility for protecting it should be assigned to every person throughout all the activities of society. The legislation should give state agencies needed authority to protect groundwater from activities and practices which currently threaten it.

The Strategy requires $230 million over ten years to implement. It proposes $37 million from Oil Overcharge Rebate Funds for implementation of the highest priority portions of the plan. However, significant additional financial commitments are required if full implementation is to be achieved.

The Iowa Groundwater Protection Strategy 1987 is the first in a projected series of comprehensive plans which will develop and refine Iowa's groundwater policies and programs. It sets a positive direction which can protect and improve our water resources for use in the future.

ACKNOWLEDGEMENTS

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INTRODUCTION

Authorization

In January, 1985, the General Assembly passed water allocation legislation proposed by the Water, Air and Waste Management Commission as part of the report, State Water Plan 1985. The legislation concentrated on water quantity issues but contained language requiring development of a plan to protect groundwater quality.

1985 Acts of the General Assembly, Chapter 7, Section 3, Regulation of Water Use and Allocation, amended Section 455B of the Code of Iowa in 1985 to read:

> 1. The commission shall deliver to the general assembly by January 15, 1987, a plan embodying a general protection strategy for this state which considers the effects of potential sources of groundwater contamination on groundwater quality. The plan shall evaluate the ability of existing laws and programs to protect groundwater quality and recommend any necessary additional or alternative laws and programs. The department shall develop the plan with the assistance of and in consultation with representatives of agriculture, industry, and public and other interests. The commission shall report to the general assembly on the status and implementation of the plan on a biennial basis. This section does not preclude the implementation of existing or new laws or programs which may protect groundwater quality.

Thus the legislation required the Environmental Protection Commission (as it became known after reorganization) to evaluate sources of contamination, consider alternatives for groundwater protection, and make recommendations to the General Assembly.

It is, perhaps, most instructive to note that the legislation sets forth a planning process. The groundwater protection strategy is to be reviewed biannually. This represents a foresighted policy because it recognizes the imperfection of our knowledge and allows for flexibility, growth and change. The proposed Iowa Groundwater Protection Strategy 1987 represents only the first report in the planning process. It proposes policy with our 1987 understandings. The agenda it proposes is designed to set a policy direction for the present. It must be reviewed biannually and may be altered to reflect new data, new understandings, future conditions and changes in public perceptions. Much of the thrust of this proposed Strategy is designed to enhance Iowan's understanding through research and data collecting activities as well as through public education, so that an informed public may assist in shaping an evolving policy. The strategy also proposes contaminant concerns which should be addressed and general approaches for protecting Iowa's groundwater.

Public Awareness

Groundwater contamination has received national attention during the past decade. Investigations have revealed industrial solvents, toxic metals, pesticides, and other hazardous substances finding their way into water supplies. Nationally, attention has generally focused on investigations of disposal sites, either as landfills or lagoons, and many of these sites are on the National Priority List. These have become known as "Superfund" sites. Iowa has thirteen such sites on the National Priority List. Widespread concern for groundwater has lead Congress to propose groundwater Amendments to legislation such as the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and the Clean Water Act, and to pass groundwater amendments to the Safe Drinking Water Act.

The Iowa General Assembly also has entertained groundwater legislation. Legislation has been passed to establish a prototype home-hazardous waste collection program, to phase-out most county landfilling, to test-municipal water supplies for synthetic organic compounds and to develop rules for underground storage tanks. Further, the Groundwater Fund and the Hazardous Waste Fund were established as a means to begin paying for needed programs. Such legislative initiatives have been prompted by national concerns, specific local water-supply problems, and significant research results developed here in Iowa.

The "non-point" contamination issues have received the most attention in Iowa. Ongoing research on diffuse, agricultural sources of groundwater contamination at Big Spring is widely recognized as providing compelling documentation of contamination. Conclusions developed from Big Spring's research, as well as from several other Iowa locations, have been widely presented to various agricultural groups through public presentations, meetings and trade magazines as well as to the public through television, radio and newspapers. But local problems such as superfund sites at Charles City, Des Moines, Council Bluffs and elsewhere have also raised Iowans' concerns.

Financial Support

The U.S. Environmental Protection Agency provided funds to support much of the planning activities represented in this Strategy.

Scope of Work

The goal of the Iowa Groundwater Protection Strategy 1987 is the development of an appropriate coherent assemblage of policies and programs, derived from the best information currently available, which can help protect Iowa's groundwater resource. Emphasis is placed upon protection of groundwater from contamination, rather than management of problems or management of resources. The Strategy addresses anthropogenic contamination only. This is contamination caused by human activities. It does not address natural water quality problems.

The Strategy is aimed at protecting groundwater as a resource. It is not a drinking water protection plan. This distinction is important although it may not be immediately grasped. Drinking water may be the most important use of groundwater, but drinking water can be protected by water treatment, or bottled water, or perhaps by protection of aquifers only locally where major users are concentrated. Such approaches may be viable but would ultimately be very expensive. Such approaches would not serve Iowa's large rural population very well, either. The development of practices which prevent contamination at the source, be that source a storage tank or an agricultural field, seems more appropriate and prudent. Preventative actions protect large aquifers and small aquifers as well as deep and shallow aquifers, and may set in place an ethic which can carry over into all personal and economic activities. Further contamination is the result of one or many personal actions. The concept of prevention recognizes that groundwater, per se, is not drinking water; but it is potential drinking water. It is also the base flow in our streams; it is a source of life to plants and animals both common and rare. Most importantly, the ethic of prevention can protect us from both the known and the unknown, and it is probably the least expensive way of ensuring our valuable drinking water sources, too.

The Strategy evolved by first evaluating potential sources of groundwater contamination and the programs designed to manage or control these sources. Technical literature was reviewed and personal interviews were made with people managing these programs. Alternative control recommendations were then prepared. These materials were made available to agency staff and to two committees established by the Department for this purpose. The Technical Advisory Committee included representatives from the following institutions:

Iowa Department of Agricultural and Land Stewardship
  Division of Soil Conservation
  Laboratory Division
Iowa Department of Natural Resources
  Environmental Protection Division
  Geological Survey Bureau
Iowa Groundwater Association
Iowa State University
  Cooperative Extension Service
  Water Resources Research Institute
University of Iowa
  Department of Geology
  Department of Preventive Medicine
  University Hygienic Laboratory
University of Northern Iowa
  Iowa Institute for Environmental Education
U.S. Geological Survey
U.S. Soil Conservation Service

The Program Advisory Committee was composed of representatives from the following institutions:

American Water Works Association, Iowa Section
Department of Agriculture and Land Stewardship
Iowa Association of Business and Industry
Iowa Association of Municipal Utilities
Iowa Audubon Council
Iowa Corn Growers Association
Iowa Farm Bureau Federation
Iowa Fertilizer and Chemical Association
Iowa Irrigation Association
Iowa Natural Heritage Foundation
Iowa Soybean Association
Iowa Water Well Association
League of Conservancy Districts
League of Municipalities
League of Women Voters of Iowa
Sierra Club, Central Iowa Chapter
State Association of Counties

Committee participants were open, candid and helpful in spite of time constraints which minimized their contribution. Their willingness to participate is evidence of the widespread interest in groundwater. They should be utilized more fully in future planning efforts.

Public input was derived through a public attitude survey and public meetings. The public attitude survey was conducted under contract with a private company. Using standardized techniques, 400 Iowans were polled via telephone during the period of time September 29 - October 2, 1986. They responded to questions about sources of contamination, severity of groundwater contamination and alternatives to control the problems. This mechanism proved very successful as a vehicle for deriving input from the public. A summary of results is presented in Appendix A. Similarly, through the summer and fall, 1986, at various small group meetings, Iowans were asked their opinions about sources of contamination in Iowa. These were also valuable for learning how the public thinks. Five public meetings were held to discuss general findings and recommendations of the Strategy, as proposed here. Constructive input was limited by a short notification time, the inadequacy of public meetings, and a lack of printed materials. However, comments were very informative. The comments made and questions raised at these meetings are appended to this report in Appendix B.

Department of Natural Resources staff suggested the recommendations to the Environmental Protection Commission. The recommendations took into account the opinions of the advisory committee members, other agency staff, and the public. The final recommendations are, however, the sole responsibility of the Department and the Commission. The recommendations were adopted on January 6, 1987, after review

by a subcommittee of the Commission and significant Commission discussions. With presentation to the General Assembly on January 15, 1987, they become open for discussion, adaptation and adoption. They should set the agenda for discussions on groundwater protection.

BACKGROUND INFORMATION

Hydrogeology and Contamination

Groundwater is water which saturates soil and rock materials and is contained within the earth. When it is contained within a surface soil and is above the water table it is often called soil water, but all water below the permanently saturated water table is appropriately called groundwater. Aquifers are saturated bodies of rock, sand or gravel from which water can be extracted through sustained periods of time by pumping. Aquifers are both porous (have space for water) and permeable (allow water to flow at a relatively rapid rate). Aquifers are highly variable in porosity, permeability, areal extent, thickness and depth. In general they are only known directly from wells developed into them and inferentially by important geologic investigations.

For purposes of this report aquifers may be divided into four types: alluvial, drift, bedrock and deep rock. They are illustrated in Figure 1.

- Alluvial aquifers are saturated sand and gravel deposits filling valleys along rivers and streams. They are usually named after the river which deposited the sand and gravel.

- Drift aquifers are saturated sand and gravel deposits which occur as regular and irregular bodies and are contained within a mass of clayey glacial drift. These aquifer deposits formed both within and upon glaciers. These aquifers are usually unnamed, but a few buried channels have been named for a place nearby. The extent of drift aquifers is usually poorly known, and they may be very localized.

- Bedrock aquifers are saturated bodies of the uppermost lithified rock formation. In Iowa these aquifers are usually limestone, or dolostone, but may be sandstone. Near Manson, the bedrock aquifer is formed in volcanic rocks. These aquifers are usually named by the rock formation or the formation's geologic age. Often these aquifers cover vast areas.

- Deep rock aquifers are saturated bodies of lithified rock which are buried beneath the bedrock. In Iowa these are generally sandstone, limestone, or dolostone. They are named for the rock formation or the age of the rock which is saturated. Such aquifers usually cover vast areas.

Aquitards are bodies of rock which impede groundwater flow. They have low permeability and will not produce water from a well under normal pumping. They often separate aquifers and may surround them. Like aquifers, aquitards are highly variable. The higher their clay content, in general, the more they retard water movement. Aquitards do not stop water movement, they retard it and they can strongly influence both the direction and rate of flow.

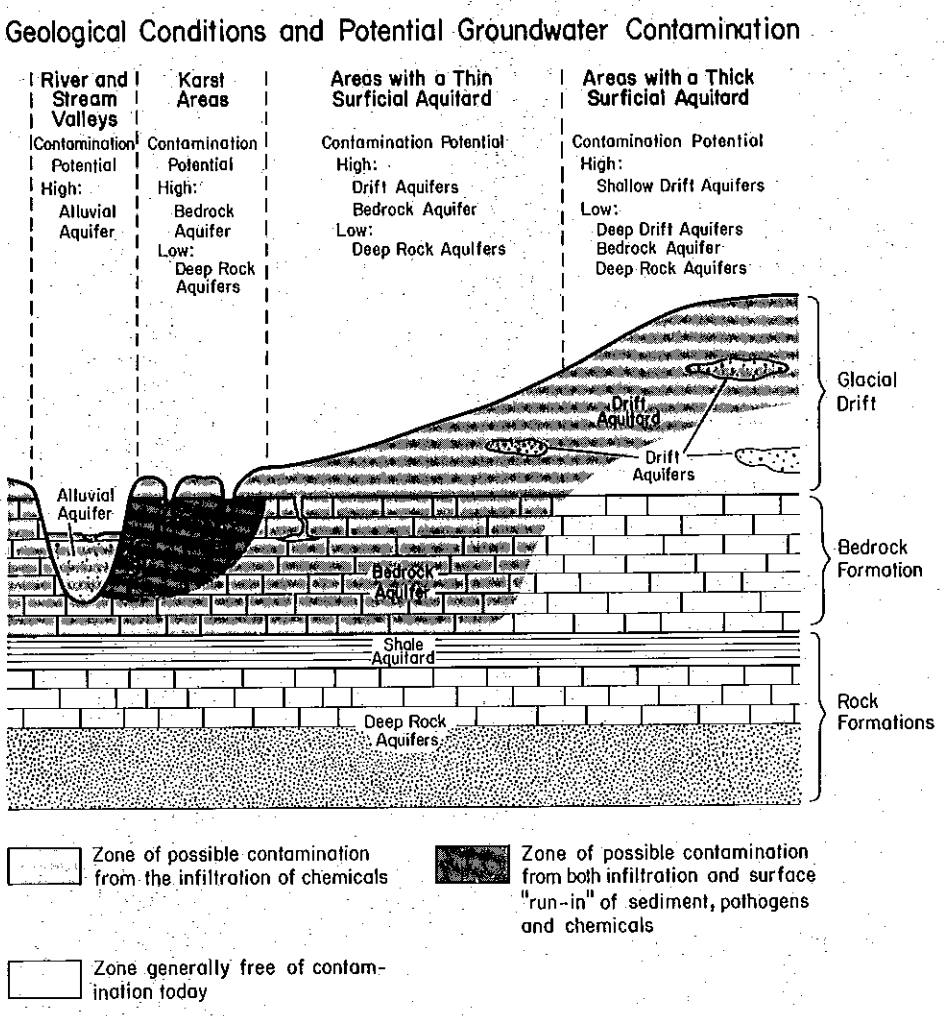

Figure 1. Geological Conditions and Potential Groundwater Contamination.

Groundwater recharge comes from rainfall. Alluvial aquifers or bedrock aquifers may receive recharge within hours of rainfall if they are immediately beneath a soil saturated by rain. The rainfall infiltrates the soil surface, percolates through the subsoil and recharges the aquifer below. Drift aquifers, most bedrock aquifers and deep rock aquifers receive this infiltrating water more slowly. Recharge may be measured in weeks or months, commonly years or decades, often centuries or millenia for deep rock aquifers. The mechanism is the same though, percolation through soil, aquitards and other aquifers.

In some areas where limestone lays directly beneath very shallow soils, groundwater recharge can be very direct. Surface water can flow into holes in the ground (sinkholes) and recharge the aquifer in a few minutes or hours. Such recharge is restricted to regions called karst areas which occur in primarily northeast Iowa.

Although direct surface water recharge to groundwater is relatively exceptional, groundwater interaction with surface flow is the rule. Groundwater continuously discharges to rivers and streams. Thus, in periods of little runoff (mid-summer, mid-winter) surface water quality is a reflection of groundwater quality. Surface flow and groundwater are inseparable.

Each of the aquifer types are susceptible to anthropogenic contamination, but the potential of each type is different. Highly susceptible to contamination are alluvial aquifers and bedrock aquifers in karst regions or where surficial aquitards are thin. Recharge through soils can be measured in days to years, and water quality in these aquifers could respond on such time scales. Water quality in bedrock aquifers of karst regions can change on time scales measured in minutes and hours when surface water enters sinkholes. As aquitards get thicker, contamination responses are less likely to occur and contamination may not appear for years. Thus, shallow drift aquifers, may reflect contamination from the past decade, but deeper aquifers within the drift may not. Similarly, bedrock aquifers may reflect contamination in one area, but not in another because of slower contamination movement where aquitards are thicker or less permeable. Deep rock aquifers are generally not contaminated from anthropogenic sources except where major fracturing has occurred, where abnormal recharge has occurred because of major water withdrawals, or where poor well construction or improper well abandonment has taken place. Figure 1 shows schematically which aquifers may be experiencing contamination today. It should be noted that local water quality within an aquifer can vary greatly. No perfect prediction of contamination is possible. However, in a general sense, a model exists for assessing the vulnerability of aquifers in Iowa.

Natural Groundwater Quality

Natural water quality varies considerably in Iowa. Inorganic ions, such as magnesium, calcium, sodium, iron, fluoride and sulfate are common constituents of groundwater. Such ions vary depending upon the rocks which contain the water and the depth of the aquifer. The higher the concentration of dissolved ions, the less desirable the water for most purposes.

In Iowa water quality often mirrors water quantity. The best natural groundwater quality is generally in alluvial aquifers. These generally have dissolved inorganic ions that are measured at less than 500 milligrams per liter (mg/l). Alluvial aquifers, associated with major rivers, can yield large amounts of water as well. Drift aquifers located throughout the state are highly variable in both quantity and quality. Often however, they provide good quality water which is adequate for domestic uses. Rock aquifers in northeast Iowa have good water (Figure 2). Dissolved solids are generally less than 1,000 mg/l and yields may be high. The bedrock aquifers in northwest Iowa have fair water quality. Generally, the total dissolved solids in the water is less than 1,500 mg/l, but such levels are less than desirable and water yields are somewhat variable. Southern Iowa generally has Iowa's poorest water. Groundwater extracted from bedrock often exceeds 1,500 mg/l and yields are highly variable. Regardless, most of Iowa's groundwater resources are usable with little or no treatment necessary to provide safe water.

Radioactivity is another natural contaminant in groundwater. It is derived from the natural radioactivity trapped in the rocks where the water is stored. While it is not generally excessive, it is highest in deep rock aquifers, especially in central and southeast Iowa, where it often exceeds drinking water standards.

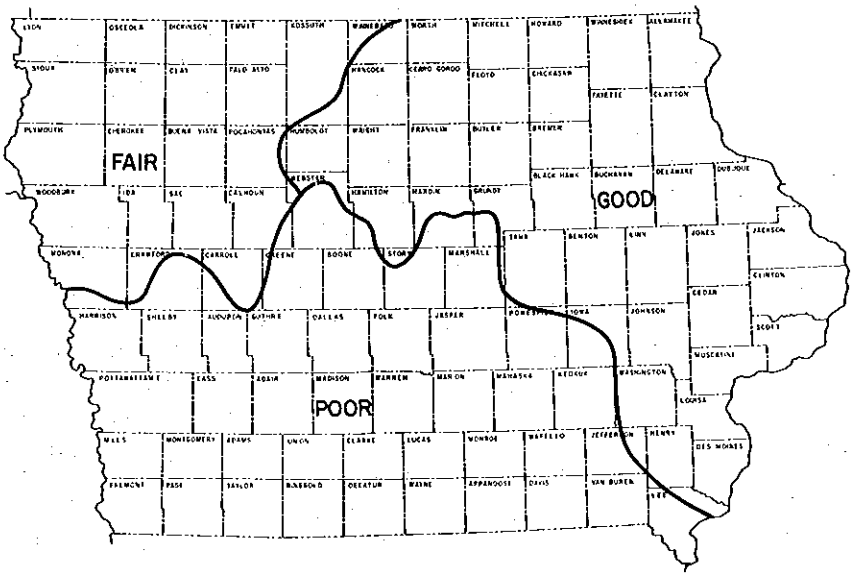

Figure 2. Natural Occurring Water Quality in Iowa's Bedrock Aquifers. Source: Iowa Geology 1984.

Groundwater Use and Potential Exposure to Contamination

Iowa is highly dependent on groundwater as a source of drinking water and also for other uses as well. Recent estimates suggest that 70 to 80 percent of all Iowa's drinking water comes from groundwater. In addition, it accounts for 80 percent of the water used for irrigation, 70 percent of the water used for livestock, and 70 percent of the water used by industry (excluding power generation).

Alluvial, drift and shallow, unprotected bedrock aquifers are the most susceptible to contamination from anthropogenic sources. This can be seen in Table 1.

Table 1. Pesticide Contamination by Aquifer Type.
Source: Kelley et. al. 1986.

Alluvial	39%
Drift	14%
Bedrock (less than 50' of cover)	62%
Deep Rock and Bedrock (more than 50' of cover)	4%

Alluvial and deep aquifers supply the greatest number of people with drinking water (Table 2). Assuming that the data in Table 1 represent conditions for the entire state, a rough estimate of potential exposure of Iowa's population to pesticides through groundwater can be made by multiplying the percent of contaminated samples times the population indicated under each of the four aquifer types. This computation yields the total potential exposure of rural and municipal groundwater users in Iowa to pesticides which is approximately 715,000 people. This is about 29% of those using groundwater. This estimate tends to be substantiated by sampling which has shown that forty percent of all wells sampled for pesticides have been found to contain pesticide residues. In addition to pesticides, a number of other synthetic organic compounds have been identified through a limited program of groundwater sampling. These are identified in Table 3. It seems that a substantial percentage of Iowa's population may be exposed to contaminants through their drinking of groundwater. The contaminant exposure rises substantially when users of surface waters are added.

Table 2. Estimated Iowa Population Served by Water Source. Source: Iowa Department of Natural Resources.

Water Source	Municipal*	Rural**
Surface Water	810,000	< 5,000
Groundwater		
Alluvial	1,010,000	30,000
Drift	220,000	140,000
Bedrock (upper)	280,000	40,000
Deep Rock (and deeper bedrock)	1,040,000	500,000

*Municipal populations total more than population served because many water systems tap several water sources to supplement quantities, blend quality, or for use as a standby or auxillary supply.

**The data used may tend to over estimate usage from deeper rock aquifer sources.

Table 3. Synthentic Organic Compounds Other than Pesticides Found in Iowa Groundwater. Source: Kelley, 1985.

Organic Solvents
- Tetrachloroethene
- Trichloroethene
- 1,1,1-Trichloroethane
- 1,1-Dichloroethane
- Methylene Chloride
- Carbon Tetrachloride
- 1,1,1-Dichloroethyene
- 1,2-Dichloroethane
- 1,1,2-Trichlorethane

Aromatics
- Benzene
- Toluene
- Styrene
- Ethylbenzene

Trihalomethanes
- Chloroform
- Bromoform
- Bromodichloromethane
- Dibromochloromethane

EVALUATION OF CONTAMINANT SOURCES AND PROGRAMS FOR THEIR CONTROL

Thirteen potential sources of groundwater contamination were evaluated during the development of this plan. They were selected from those sources widely believed to be among the most important in Iowa. Many potential sources were not carefully evaluated because they were thought to be inconsequential. Information believed to be most relevant to policy analysis was compiled. This included collection of data about the sources' geographic distribution and documented or possible affects on groundwater quality. Health impacts were considered as well, especially as contaminant distribution and population exposure relates to potential health risk. Furthermore, existing laws and programs were evaluated to determine inadequacies and needed improvements. Brief synopses of each are included below for informational purposes.

Sources on the Land Surface

Five potential sources of contamination were identified which are generally considered to originate at the top of the soil. Thus, these sources are either spread or spilled onto the ground surface.

Agricultural Use of Nitrogen Fertilizer

Concentrations of nitrate in Iowa's groundwater have increased steadily over the last twenty years in response to the increased use of commercial nitrogen fertilizers (Figure 3). Because high concentrations of nitrate in drinking water have a known adverse effect of human health, the trend of the last two decades is a concern to both the general public and government officials.

The primary reason for concern is the health of infants who are susceptible to methemoglobinemia when exposed to high concentrations of nitrate. Methemoglobinemia is a condition which limits the supply of oxygen to the tissues, particularly in infants, producing a bluish color of the skin. However, health concerns over exposure to high concentrations of nitrate in drinking water go beyond the risk of methemoglobinemia. Several studies have implicated elevated concentrations of nitrate in drinking water with other health concerns including ing cardiovascular disorders, hypertension, increased cancer rates and congenital malformations.

Nitrate in groundwater has become a pervasive problem in Iowa. Under the Safe Drinking Water Act a standard of 45 mg/l (milligrams per liter) has been established and all public water supplies were required to monitor for nitrate in the water they serve to the general public. Currently, about 50 of Iowa's approximately 2,000 public water supplies exceed the standard and another 260 are experiencing problems of increased concentrations. In addition, about twenty

percent of the samples submitted from private wells exceed the standard. The significant increase in nitrate concentration in these wells and the number of wells experiencing problems, has taken place since the mid 1960's (Figure 4.)

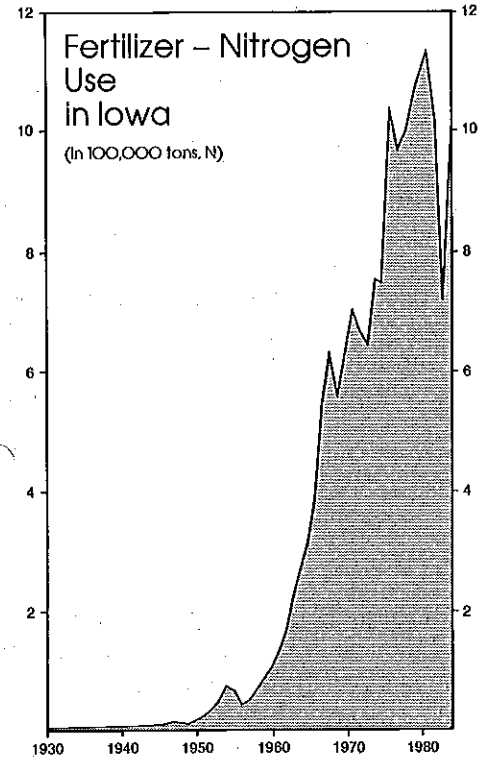

Figure 3. Fertilizer-Nitrogen Use in Iowa. Source: Iowa Geology 1986.

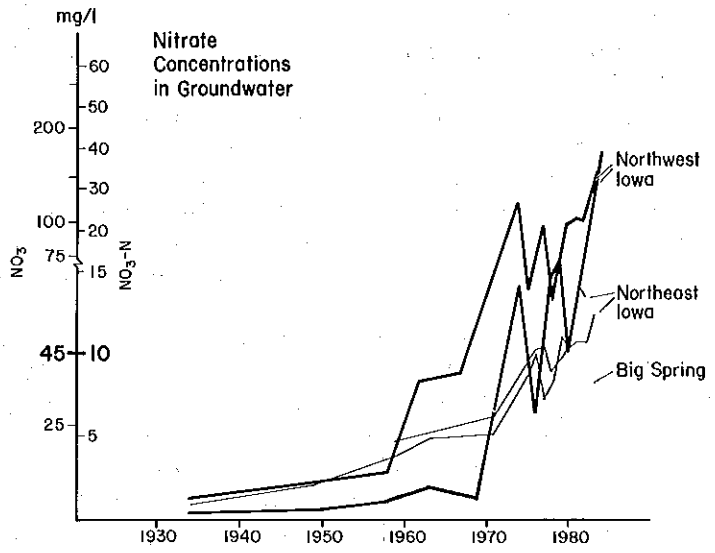

Figure 4. Nitrate Concentrations in Groundwater. Data plotted is from four public water supplies and Big Spring. Source: Iowa Geology 1986.

Research has shown that increasing nitrate concentrations in groundwater are directly related to the increased use of nitrogen fertilizers in modern agricultural practices. On an annual basis, over one million tons of commercial nitrogen fertilizers are applied to Iowa fields, making Iowa the second highest user in the United States (Figure 5). When one considers all the typical sources of nitrogen to cropland in Iowa an average balance shows: fertilizer-N contributes 55-60%; manure-N 10-15%; legume-N 8-10%; rainfall-N 5-8%; and soils 15-20% (Figure 6). Of these sources only fertilizer-N has grown significantly in the last fifteen years.

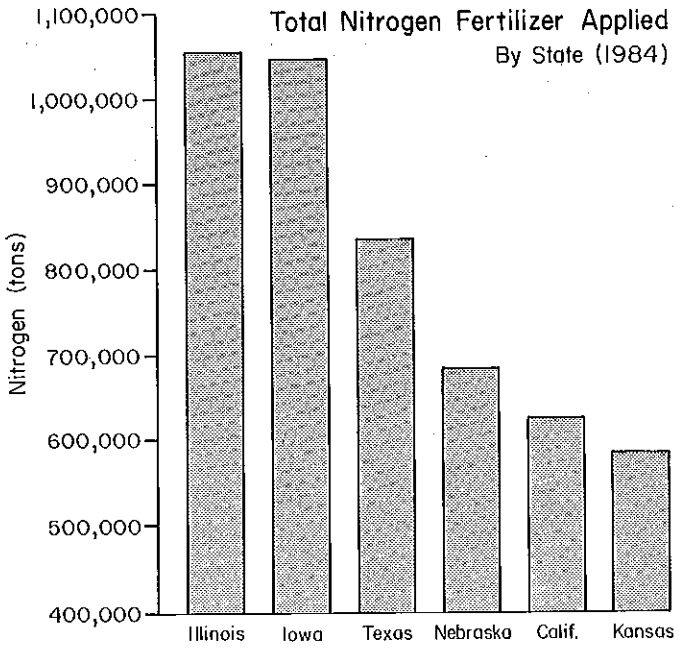

Figure 5. Total Nitrogen Fertilizer Applied by State. Source: U.S. Department of Agriculture, Agricultural Statistics, 1985.

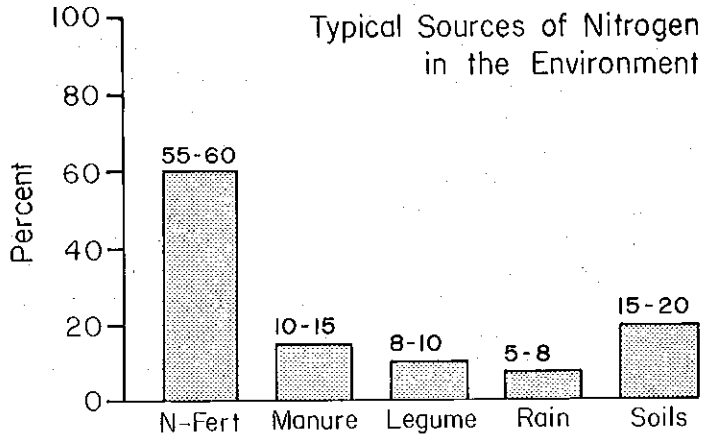

Figure 6. Sources of Nitrogen in the Environment. Source: Hallberg, 1986.

Although in small geographic areas surface runoff into sinkholes, ag-drainage wells and improperly abandoned wells does contribute to nitrate contamination of ground water, research has shown that the major mechanism by which nitrate moves to ground water is infiltration through the soils. Research suggests that between 30 and 50 percent of the nitrogen applied to Iowa's fields is lost. This loss represents a $200 million cost to farmers each year.

Wells developed into shallow aquifers appear to be the most vulnerable to nitrate contamination. Shallow bedrock, shallow drift and alluvial wells are the most frequently affected by nitrate leaching from the surface (Table 4).

Table 4. Average Nitrate Concentration (as NO_3) by Well Depth. Source: Rajagopal, 1984.

Well Depth (feet)	Public	Non-Public
25	21	15
50	12	19
75	13	13
100	9	10
125	5	6
150	5	7
175	4	5
200	3	2
225	6	3
250	5	3
> 250	1	1

High nitrate concentrations in drinking water are generally perceived by the public to be a serious problem. There has been concern expressed by the public in cases where nitrate concentrations have exceeded the standard in groundwater or drinking water. Although there is no total agreement on just how significant a threat to human health elevated nitrate concentrations pose, data suggest that concerns are justified. Cases of nitrate poisoning do occur each year in the midwest. More importantly perhaps is the idea that nitrate contamination of an aquifer clearly demonstrates the vulnerability of the resource to other contaminants that may move through the soils in a similar fashion.

The size of the population at risk from ingestion of water with elevated concentrations of nitrate is significant. Approximately 762,000 people, or about 26 percent of the state's population, are served by water with high concentrations of nitrate above 22 milligrams per liter.

Current agricultural practices have resulted in the problem that exists today. Without changes in the way nitrogen fertilizers are managed, it is reasonable to expect the problem to continue and expand to include both increasing concentrations and deterioration of deeper aquifers.

Controlling nitrate concentrations in ground water is dependent upon controlling nitrogen input such as excessive nitrogen fertilizer application. Although there are several nitrogen sources contributing nitrate to the environment, only a few are controlled. State and local regulations control minor sources of nitrogen input such as septic systems, wastewater treatment and feedlot operations. However, no controls are placed on the single largest source - nitrogen fertilizer. Recently educational efforts have been undertaken by the Cooperative Extension Service to help raise the awareness of the problem within the farm community, but budget constraints threaten to adversely impact on such efforts.

The most pressing needs related to controlling the problem of nitrate in groundwater are:

1. information on more efficient use of nitrogen fertilizer and best management practices to effectively control nitrogen losses to the environment, and
2. development and implementation of effective public education programs.

Agricultural Use of Pesticides

Pesticides are now being detected in low concentrations in the shallow groundwaters of the state. The implication to human health from exposure to these compounds is unknown. Although quantitative evidence is lacking regarding the effects to human health resulting from chronic exposure to pesticides, their presence in groundwater clearly indicates water quality degradation. Such degradation is occurring to susceptible aquifers statewide.

Pesticides were first detected in groundwater in Iowa in 1974 by researchers from Iowa State University. Subsequently, researchers from a number of federal and state agencies undertook work to better define the problem of pesticides in Iowa's groundwater. Perhaps the most definitive studies were conducted by the Iowa Geological Survey in northeastern Iowa. Based on this work and the corroborative findings of other research, it is now clear that the most commonly used pesticides are leaching to shallow groundwater across the state.

In total, nine herbicides and three insecticides have been detected in monitoring conducted in Iowa. The most frequently detected compounds have been the herbicides (Table 5). Generally, concentrations have been less than one part per billion. Concentrations have been known to be as much as 100 times greater in local areas where the contamination has been found to be influenced by leaching from chemical storage and handling facilities. Data clearly indicate, however, that the major source of these pollutants

is their widespread application to farm fields and subsequent movement through the soils to the groundwater. Iowa is a major user of pesticides, perhaps second only to California in total use (Figure 7). The total loss from Iowa's farm fields does not appear to be large, usually between one and five percent of the 75 million pounds of active ingredient applied annually. However, the economic impact of such a loss is substantial; representing between a $5 and $23 million loss annually. The loss to groundwater is less than one percent, perhaps 0.1 percent.

Table 5. Summary of All Pesticide Data from Groundwater Quality Monitoring in Iowa. Source: Kelley, et. al., 1986.

Common Name Active Ingredient	Maximum Concentration ug/l	% of All Detections	Months of Detections
Herbicides			
alachlor	16.6	15%	1-12
atrazine	13.0	72%	1-12
chloramben*	1.7	< 1%	7
cyanazine	13.0	13%	1-12
dicamba*	2.3	2%*	3,6,7
metolachlor	9.0	9%	1-7,11,12
metribuzin	4.4	10%	1-12
trifluralin	0.2	1%	6,7
2,4-D*	0.2	< 1%	4
Insecticides			
fonofos	0.9	2%	4,6,8
sulprofos**	1.4	< 1%	5
terbufos**	12.0	5%	5

*Analyzed by different methods, thus N not the same as for other herbicides.
**Only detected in one study.

The implications to human health from the long-term exposure to pesticides are unclear. And it is because of our lack of knowledge that concern has been expressed by both the scientific community and the general public. Certainly, various epidemiological studies suggest cause for concern. For example, mortality from some cancers is significantly higher in rural farm families. Aggregate county studies reveal that excessive mortality from leukemia, multiple myelonia and non-Hodgkin's lymphoma is consistently associated with area herbicide usage.

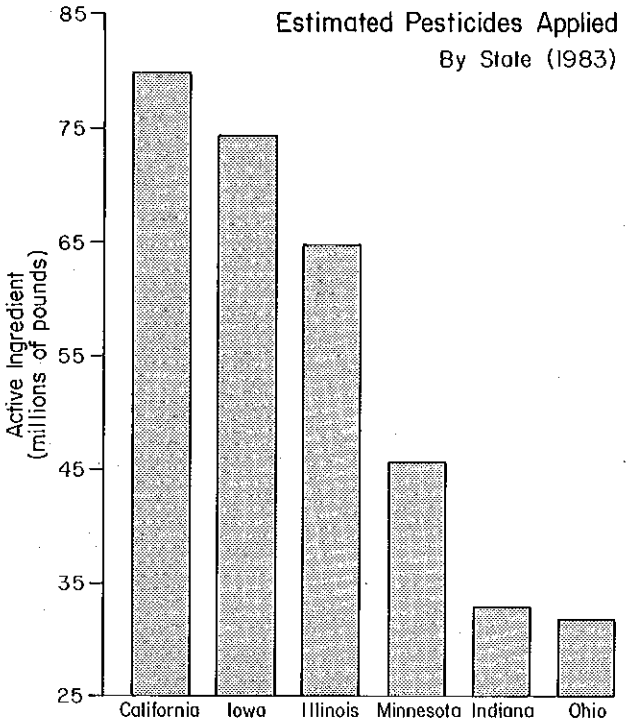

Figure 7. Estimated Pesticides Applied by State. Source: Gianessi, 1986. The California total was amended through personal commucations with Gianessi.

Because we are only just beginning to look for and find pesticides in groundwater and drinking water and chronic health disorders may require twenty years or more to manifest themselves, the impacts to public health and the resulting economic ramifications may not be known for years. However, a substantial part of the state's population may be at risk. Based on the monitoring to date of 60 public water supplies at least 785,000 people, or 27 percent of the state's population are periodically consuming low concentrations of pesticides via their drinking water (Figure 8). About twenty percent of these people are likely to have been exposed to residues of more than one pesticide. For those Iowans using private water wells for their drinking water wells for their drinking water the situation may be worse. Private rural wells may be shallow and located in vulnerable geologic settings. Researchers have observed an association between the detection of pesticide residuals in wells and elevated nitrate concentrations. In some counties in western Iowa up to 70 percent of the samples submitted from private wells have been found to exceed the nitrate standard.

Current pesticide management practices have resulted in the problems presently being experienced in Iowa. Without changes in these practices, it is reasonable to expect the problem to continue and expand both in geographic area and into deeper aquifers.

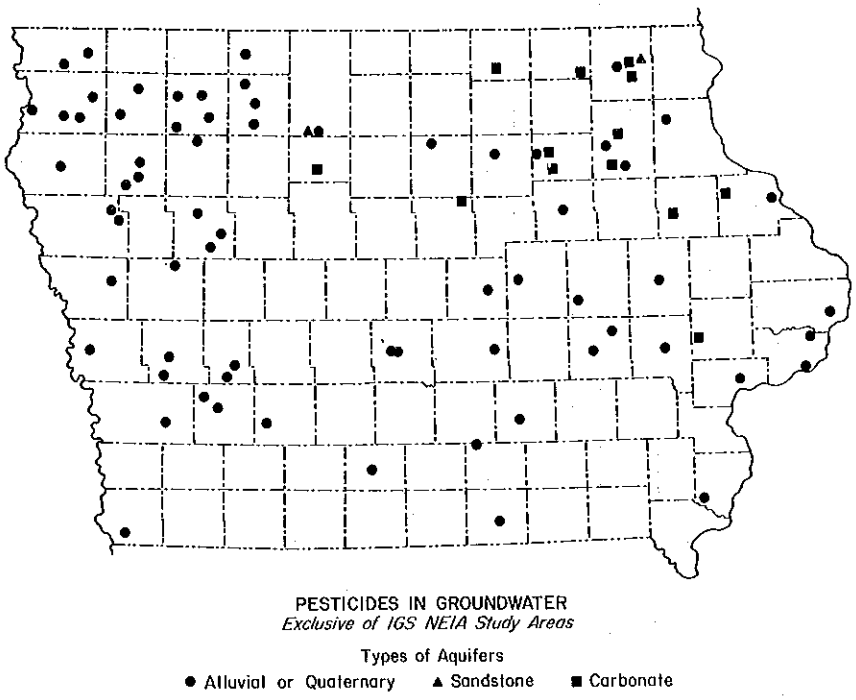

Figure 8. Pesticides in Iowa's Groundwater.
Source: Hallberg, 1986.

Pesticides are registered for use in Iowa by both the U.S. Environmental Protection Agency and the Iowa Department of Agriculture and Land Stewardship. Both agencies have the authority to ban or restrict the use of a pesticide. In addition to the registration of pesticides, the Iowa Department of Agriculture and Land Stewardship certifies individuals who wish to apply pesticides. There are approximately 50,000 farmers certified to apply restricted use pesticides. In addition, around 5,500 commercial applicators are certified. About 4,400 of these commercial applicators are involved in the use of agricultural chemicals, the remainder are involved in urban lawn care and pest control enterprises.

Major needs which should be addressed concerning this contaminant source include:

1. information on the health implications related to long-term exposure to low pesticide concentrations,
2. additional information on effective pesticide management practices which can minimize further the pesticide movement into groundwater,
3. more effective education programs, and
4. an annual record of pesticide use in Iowa.

Land Application of Solid and Liquid Wastes

The application of animal wastes, industrial wastewater treatment sludges and product residues, and municipal sewage sludge onto the land surface has become a common practice. It is an alternative to burning or discharging our wastes to rivers and streams.

At land application sites soluble constituents such as chlorides and nitrates will move through the soil and into groundwater. Other contaminants may become soluble under low pH conditions or simply exceed the absorptive properties of the soil and move into the groundwater.

Historically animal wastes have been looked upon as a valuable resource in providing necessary nutrients for plant crops. Unfortuantely, all too often land application is more of a disposal method rather than a resource management technique, and the emphasis is on convenience and time savings rather than on effectiveness. Under such management nitrogen credits may not be taken when manure is applied. As a result, commercial nitrogen fertilizer may be excessively applied because the manure nitrogen and the commercial fertilizer nitrogen are additive sources.

At the end of 1984 there were nearly fifteen million head of hogs and six million head of cattle on Iowa farms. On a daily basis, that equals 4.06 million cubic feet of cattle manure and 1.7 million cubic feet of hog manure. Over one year this manure could potentially produce enough nitrogen to fertilize 4.7 million acres of corn at 160 pounds per acre. Unfortunately, much of the nitrogen is lost before it is applied to the fields. Depending upon the handling, storage, and spreading techniques used, anywhere from 20 to 90 percent of the nitrogen content is lost. Improved manure handling techniques would preserve more of the fertilization value of the manure.

There are 22 permitted land application projects for the disposal of municipal wastewater sludges. These may contain hazardous substances such as lead or cadmium. These projects plan to utilize 8,300 acres of cropland over the planned terms of the projects. Other municipalities may also land apply sludge, but their sludge has been tested and found to have no hazardous contaminants. There are 675 municipal wastewater treatment plants in the state and many of them land apply their sludge. At 200 acres per wastewater plant, approximately 135,000 acres of cropland have been used for the disposal of sewage sludge. A typical nitrate nitrogen value for municipal sludges in the Midwest in 140 ppm or 2.5 percent total N by weight. Several municipal wastewater plants also spray irrgate their final effluent for additional treatment.

Industrial land applications of waste occur the least frequently. The Department of Natural Resources has been notified of nine such operations in the state. The waste material varies from paunch manure to lime sludge. Several industries spray irrigate their wastewater for additional treatment following a lagoon.

Septage, waste from septic tanks, is also commonly land disposed in Iowa. There are no state or local permit requirements for this disposal practice. Typical concentrations of NH_3-N range from 60 to 120 parts per million. Viruses, bacteria, and synthetic organic compounds are also present in septage.

Groundwater monitoring is not required at any of the land application sites in Iowa. However, studies conducted at sites in Oregon and other states have shown no significant changes in ground water quality due to the application of sewage sludge containing heavy metals.

Contamination of groundwater is not expected to be as high a risk with animal wastes, if evenly applied, as with the application of other nitrogen fertilizers since the nitrogen is not as readily available when bound to organic compounds found in the waste. It is also not suspected to be a major contributor to the long-term rise in concentrations of nitrates in groundwater noted since 1960 since livestock numbers have decreased or remained steady during most of that time.

Bacterial contamination is a concern where sludge or septage have not been properly stabilized, where public access has not been controlled, and for shallow wells within 300 feet of the site. This is especially a concern along alluvial aquifers. In addition, miscellaneous organics such as household degreasers found in domestic wastes and animal hormones and antibiotics found in animal wastes may also be a concern. However, no monitoring has ever been conducted to assess these concerns.

Industrial wastes are controlled under Resource Conservation and Recovery Act and state rules for land disposal. At these sites, groundwater conditions and waste contents are considered prior to issuing a permit for disposal of most of these types of wastes. In addition, a permit is required for all wastes exceeding concentration limits for any of the following: lead, cadmium, zinc, arsenic, barium, chromium, chlorides, copper, cyanides, fluorides, mercury, nickel, phenols, selenium, and silver.

A set of guidelines for land application of animal wastes is published in Title 567, Chapter 65 of the Iowa Administrative Code. These guidelines include an application rate based on nitrogen and phosphorus contents of the waste. A maximum application rate of 400 pounds of nitrogen per acre is recommended, though cautions are given for any application rate above 200 pounds of available nitrogen per acre.

Current land application practices do not appear to have had any significant impact on ground water quality. Although, clearly there has been a lack of monitoring at these sites. The number of acres involved in land application may increase in the future as restrictions on landfills become more stringent.

In protecting ground water, the state needs to take the following actions:

1. establish groundwater monitoring in the vicinity of some land application sites in Iowa,
2. review existing rules on stabilization, recordkeeping, and notification requirements for septage haulers,
3. rigidly enforce the State's requirements for the land application of municipal sludge.

Additionally, testing for pH at land application sites should be rigidly enforced.

Storage, Handling, and Transportation of Hazardous Chemicals

Toxic and carcinogenic chemicals are a part of our society. They are used to power vehicles, clean appliances, and manufacture plastics or other materials that are widely used. These chemicals are stored and transported in everything from small vials to large trucks. Spills, leaks, runoff, and land application of these chemicals have contaminated local groundwater across the state.

Potential sources of spills, leaks, and runoff from above ground storage include: 146 regulated hazardous waste facilities located in 52 counties; over 1,400 auto repair and service garages; approximately 1,300 ag chemical dealerships; as well as numerous barge terminals, rail terminals and petroleum tank farms (Figure 9).

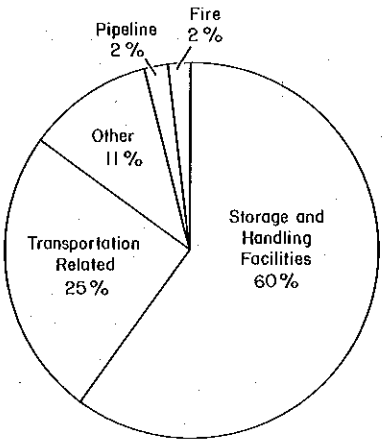

Figure 9. Number of Reported Spills of Hazardous Substances by Source. Source: Iowa Department of Natural Resources.

In addition to handling and storage facilities, in 1983 nearly 4.5 million tons of chemicals were transported to or from Iowa by rail. Another 1.7 million tons of chemicals and gasoline were hauled by barge. And, more than five million tons of liquid chemicals were hauled by truck. Over the last five years, there have been 1,859 chemical/fuel

spills reported in the state (Figure 10). The highest concentration occurred at facilities located in either Polk or Scott Counties and the largest volumes of materials spilled were petroleum products. Five spill sites have been identified for remedial action by the state and placed on the State Registry of Abandoned or Uncontrolled Sites.

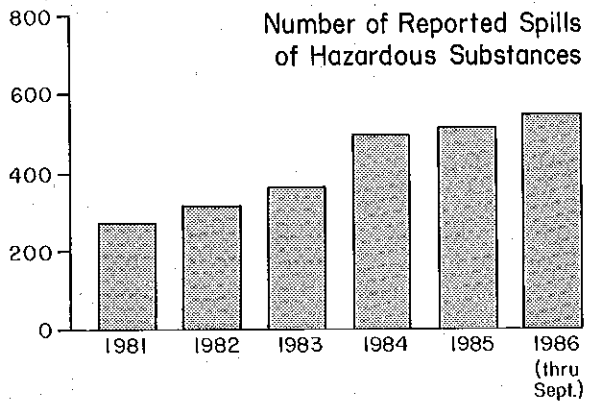

Figure 10. Number of Reported Spills of Hazardous Substances. Source: Iowa Department of Natural Resources.

Potential groundwater contamination from the storage, handling, and transportation of hazardous chemicals is local in nature and depends on the vulnerability of the surrounding geology. And indeed, a number of organic compounds associated with these sites have been detected in local public drinking water supplies. Concentrations very close to a site can be expected to be high. Groundwater monitoring in the vicinity of agricultural chemical dealerships have shown that concentrations may be 100 to 300 times higher than concentrations found in wells impacted by nonpoint sources.

Spills, leaks, accidents, and runoff from storage facilities are expected to continue to occur in the future. Reduction in their impact may be expected, however, if best management practices (BMPs) for material handling are followed.

At least five state agencies and their federal counterparts are involved in the regulation of hazardous chemical storage and transportation. The State Fire Marshal's Office has adopted national fire protection standards for flammable and combustible liquids (NFPA 30). These standards address tank storage, tank testing, and leak testing. Their main concern is public safety from fire hazards. The Department of Agriculture and Land Stewardship administers the Federal Insecticide, Fungicide, and Rodenticide Act. They regulate the storage and sale of pesticides.

The Department of Natural Resources has the authority to regulate facilities that pollute the air, land or waters of the state. Above ground storage and handling facilities are addressed by specific regulations including the reporting of hazardous conditions and abatement of hazardous conditions, land application of waste pesticides, land application of used oil, and hazardous waste facility site licensing. Other hazardous waste generation, storage, transportation and disposal activities are regulated by the U.S. Environmental Protection Agency. The U.S. Department of Transportation enforces shipping and labeling requirements under the Hazardous Materials Transportation Act. And the Iowa Department of Commerce and Industry regulates the transportation of any substance except water by pipeline.

While the transportation, storage and handling of hazardous chemicals has a number of regulations designed to protect the environment, there is room for improvement. Recent rules on storage and containment around fertilizer and pesticide storage facilities represent a major improvement.

There are four areas that need to be addressed:

1. the lack of control over the generation of small quantities of hazardous waste,
2. the lack of information regarding hydrogeological characteristics and water quality around storage sites,
3. the lack of information on the health impacts associated with exposure to a full array of compounds, and
4. the lack of alternatives to present disposal practices.

Urban Residential Use of Pesticides and Fertilizers

Concentrations of pesticides and nitrates have been increasing steadily in Iowa's groundwater in recent years. Concerns over the potential adverse impact on human health due to this contamination has increased as well. One potential source of these contaminants may be their use in the urban environment.

Urban households outnumber farms by 670,000 to 113,000. However, the amount of urban residential area is much less than farm area (115,000 versus 33,700,000 acres). Total applications of pesticides are much lower for the urban population (616 tons per year versus 32,850 tons per year for agricultural pesticides) (Figure 11). The same is true for total fertilizer applications (2,415 tons per year urban versus 1,072,000 tons per year for agriculture).

Although total agricultural pesticide application is 50 times greater than that applied to urban residential areas, the urban application rate is greater. Urban pesticides are applied at an average rate of 10.7 pounds per acre versus three pounds per acre for agricultural pesticides. The agricultural fertilizer application rates for agriculture and urban turf are about equal.

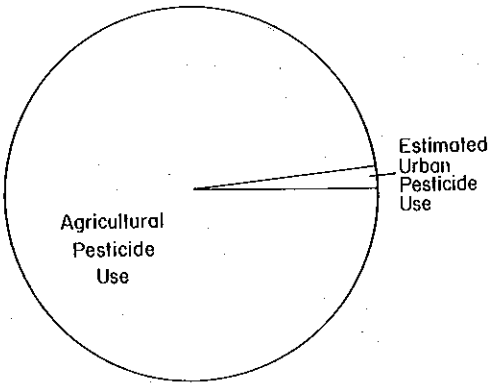

Figure 11. Comparison of Urban and Agricultural Pesticide Usage in Iowa. Source: Pimintel and Padgitt Personal Communications.

The impact on public health from long-term exposure to water contaminated with pesticides and nitrates is not fully understood. There is an association between exposure to pesticides and increased cancer rates. There is also growing concern over the health impacts of exposure to nitrates. However, the greatest risk in urban areas may be due to direct contact, for example children playing on lawns.

Any pesticides sold in Iowa must be registered with the Iowa Department of Agriculture and Land Stewardship and the U.S. Environmental Protection Agency.

There are no regulations governing applications of pesticides registered for general use or fertilizers by urban residents. Though encouraged to follow label directions, there are no rules requiring training or certification. Urban residents are prohibited from buying restricted use pesticides unless they are registered applicators.

Professional pesticide applicators are required to be registered by the Iowa Department of Agriculture and Land Stewardship. This registration requires special training in the application and handling of pesticides.

As noted, there are no existing programs on urban pesticide or fertilizer use. Traditionally, the state and U.S. Environmental Protection Agency have avoided environmental regulations directed toward the individual household. Examples abound: residential waste is exempted from the state's prohibition on open burning; household hazardous wastes are exempt from Resource Conservation and Recovery Act regulations; and private wells are exempt from the Department's permit and reporting requirements.

The use of pesticides and fertilizers in the urban environment is expected to continue at current levels. At present, there is little information on the use and impact of these products. Increased study of urban pesticide and fertilizer use is expected in the future and would be helpful to evaluate future policy.

The following five sources of contamination are placed below the surface of the soil and generally buried.

Sources Within the Soil

Abandoned Dumps and Unpermitted Land Disposal Sites

The contamination potential from most unpermitted land disposal sites is greater than from permitted sites because they lack precautions made for siting, designing and operating to minimize leakage. Potential contaminants include metals, pesticides, inorganics, halogenated organics, and other organics.

Abandoned dumps and hazardous waste disposal sites constitute hazards which may require remedial actions to reduce or prevent groundwater contamination. These remedial actions are expensive but they may not be effective always. Identification of a responsible party to take such actions may be difficult.

Abandoned dumps are the result of past practices which would not be acceptable today. Municipal dumps are illegal today. Approximately 2,000 municipal dumps were closed by 1976. Closure consisted of coverning the debris with six to twelve inches of soil and revegetating the area. Four of these former municipal dumps are on or proposed for U.S. Environmental Protection Agency's National Priority List under the Superfund Program.

Private disposal of industrial wastes containing hazardous waste is also prohibited today. Prior to the Resource Conservation Recovery Act legislation, it was common practice for many industries to dispose of their hazardous wastes on site or on land leased by them. The Comprehensive Environmental Response Compensation and Liability Act required all parties who were aware of a disposal site containing hazardous substances to report its location by June 1, 1981. These sites are compiled as a list called CERCLIS. Currently, 335 potential uncontrolled sites have been listed for Iowa; they include permitted landfills, lagoons, and spill sites as well as abandoned dumps (Figure 12).

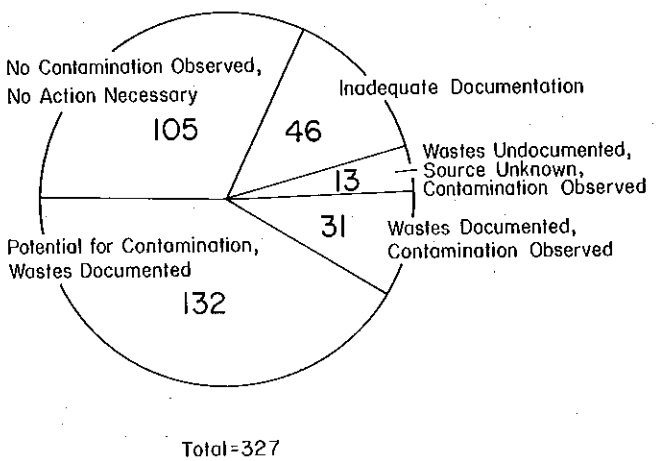

Figure 12. CERCLIS Abandoned or Uncontrolled Sites in Iowa. Source: Iowa Department of Natural Resources.

Five industrial dumps located in Iowa are on or are proposed for the U.S. Environmental Protection Agency's National Priority List. Remedial actions have begun for most of them (Figure 13).

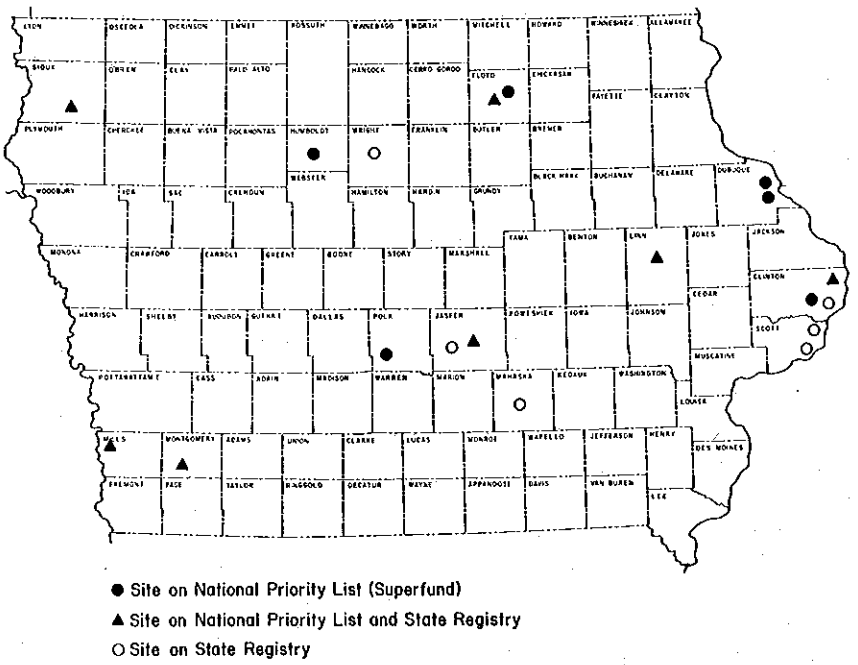

Figure 13. Abandoned or Uncontrolled Hazardous Waste Disposal Sites. Source: Iowa Department of Natural Resources.

Current state laws allow some unpermitted land disposal projects to continue today. The disposal of residential waste on property where it was generated presently is exempt from permit requirements. Furthermore, private disposal of industrial wastes is allowable as long as these wastes do not contain materials classified as "hazardous". The Environmental Protection Commission is considering legislation to address this issue. There are no reporting requirements on the composition, quantity, or location of the "nonhazardous" wastes. Of course, as demonstrated by municipal landfills, waste defined as nonhazardous waste may also contaminate groundwater. Definitions in the rules allow the nonhazardous sources to be disposed in unpermitted sites until a contamination problem is detected.

Abandoned hazardous waste disposal sites have contaminated 59 drinking water wells across the state, including fourteen public water supplies. Contamination at these sites may be short lived, as apparent in the case of the Waterloo water supply. However, contamination may also be continuous, although decreasing, as is the case of the Ames supply, or it may be persistent and variable as are the supplies monitored along the Little Sioux River.

Ninety percent of the known problem sites are impacting shallow aquifers. Halogenated hydrocarbons are the most frequently detected contaminants. A large number of sites remain to be investigated and at least an equal number are expected to be discovered in the future.

Since the most significant type of waste found at the uncontrolled sites investigated by the Iowa Department of Natural Resources is industrial waste, these sites probably present the greatest groundwater threat. Most industrial disposal sites are located near population centers making their potential impact even greater.

Both the Iowa Department of Natural Resources and the U.S. Enviromental Protection Agency depend upon the notification of a landowner, an observer, or a concerned party to develop their list of potential sites. There are not enough staff to actively look for waste disposal sites.

Once a site is placed on CERCLIS, there is a seven-step process that the site may go through. After identification the next step is to determine whether or not immediate removal is necessary. The lead agency makes a preliminary assessment of the situation. If no removal is required (or following removal), an on-site investigation is conducted to determine the appropriate response and the degree of threat. The next step is remedial action which addresses the long-term effects of the site. The last step is documentation and recovery of costs. Clean-up costs vary considerably. Examples in Iowa range from $250,000 to $9 million. The major factors in determining costs are the amount of waste and the extent of groundwater contamination.

Since most of these problem sites are caused by past practices, the outlook for the future looks better as these sites are identified and cleaned up.

While the Comprehensive Environmental Response Compensation and Liability Act addresses the worst case sites, containing hazardous substances, the extent of other private disposal practices will not be known unless a reporting or permit requirement is enacted.

With the current staff, it would take eight years to investigate the 100 potential sites identified to have wastes on-site. That does not include the two to three sites added each month.

Protection of groundwater resources could be improved if the following needs are met:

1. reporting and monitoring be required at all disposal projects,
2. state funds are available to investigate uncontrolled sites or, increased state funds are available to match federal superfund money, and
3. an active program to seek out sites or prevent contamination is initiated.

Landfills

Landfills are a potential source of leachate which may contaminate groundwater. Leachate is generated in landfills from the liquids buried along with the waste and from infiltrating rainfall. This leachate may contain pathogens, heavy metals, organic compounds, as well as low concentrations of toxic or carcinogenic materials. Although leachate may surface near landfills, it also may move down through the soils to the groundwater and thus impact the quality of the groundwater.

Throughout Iowa's history, land disposal has been the primary method of solid waste disposal. Prior to 1975, there were numerous private dumps and approximately 2,000 town dumps which allowed open burning of wastes as well as burial. In 1975, these dumps were replaced with sanitary landfills. Until 1981, hazardous wastes were also legally disposed of at permitted landfill sites. As a result of that practice, 59 landfills have been placed on CERCLIS (a computer list for uncontrolled sites). They have been reported to the U.S. Environmental Protection Agency as disposal sites for hazardous waste prior to 1981.

Today there are 125 permitted landfill sites located in 83 counties (Figure 14). These utilize a total of 10,000 acres of land. Open dumps, though illegal, still occur. Private land disposal projects are legal and continue, especially at manufacturing sites and on farms. However, it is estimated that as much as 95 percent of the solid waste generated today is disposed of in permitted landfills. Since 1975, this totals about twenty million tons of solid waste, about 0.6 tons per person per year.

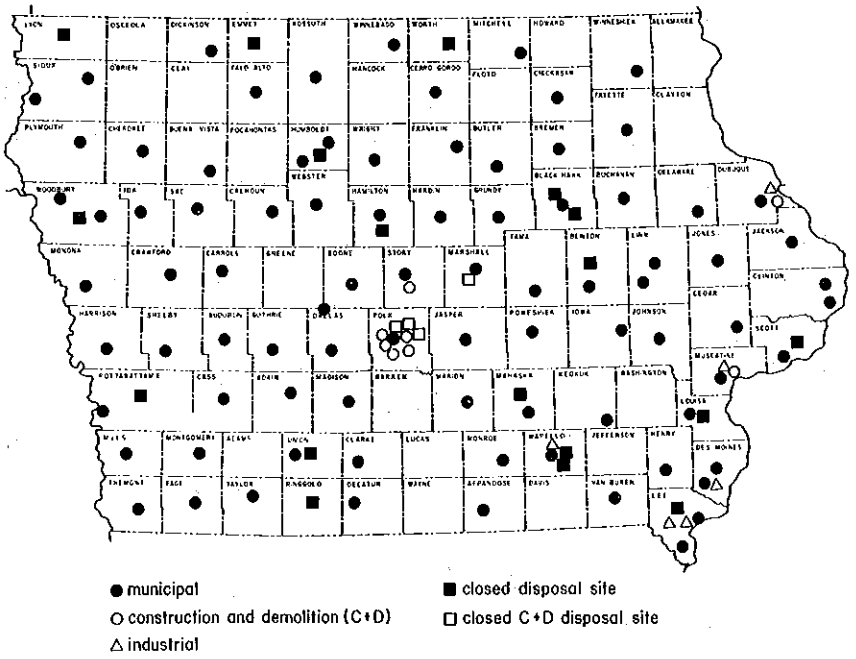

Figure 14. Landfills Permitted by the Iowa Department of Natural Resources. Source: Iowa Department of Natural Resources.

Iowa's regulations for permitted landfills tend to favor development at upland sites. At such locations in Iowa, landfills are generally developed into clay rich glacial drift or silty loess above glacial drift. However, other sites have been developed including twelve landfills in abandoned quarries or abandoned coal mine areas and seven at former dump sites near rivers. Two are located within known karst areas.

Groundwater monitoring is required at all permitted landfills, although five sites had not yet installed their wells by the end of 1985. Based on current data, less than ten percent of the permitted landfills have shown any indication of groundwater contamination. However, groundwater contamination was never expected to be a problem, so ground water monitoring wells were not required, until recently, at many sites. Furthermore, for sites with older monitoring wells, many probably have not been properly constructed or properly located and the water quality samples have been analyzed for indicator parameters only. For example, chlorides have been analyzed, but not metals or organics. Thus, only an incomplete picture of groundwater contamination around landfills is available today.

Monitoring of municipal solid waste landfills in Minnesota and Wisconsin have shown contamination of groundwater with volatile organic compounds. These studies show that even rural landfills which do not receive significant industrial waste can produce a leachate containing a mixture of organic compounds.

Most of Iowa's landfills are located in a rural setting with the exception of eight sites located within three miles of the city limits of Sioux City, Fort Dodge, Cedar Rapids, Burlington, and Waterloo. Twenty-nine are located within three miles of a small town (2,000-20,000 population). The risk to these populations, of course, depends upon the direction of groundwater flow, the nature of the leachate, the proximity to discharge areas, the source of drinking water, among other factors.

Every local government is required to provide for the disposal of solid wastes for its population. The Iowa Department of Natural Resources establishes rules to regulate solid waste management and is required to issue permits for sanitary disposal projects. Local boards of health are directed to cooperate with the state in enforcing the state solid waste rules.

The law designates incorporated cities and towns as the management authorities within their boundaries and the county board of supervisors as the management authorities within the remaining unincorporated portions of each county. Many of these organizations contract with outside firms for the operation and maintenance of the facilities.

By law, landfills are required to consider alternative disposal methods by 1988 and to implement a plan to use alternative methods by 1997. If alternative methods are found, the use of landfills will be greatly reduced by 1997. Under almost any alternative method--recycling, incineration, composting or reduction--there will be a final residue which must be landfilled. This reduced volume however, might be such that a single landfill facility could accomodate the residential waste from the entire state. Reasonable estimates of our ability to do this could be studied at a state level.

Unfortunately, the cost of alternatives will likely prohibit any significant reduction in landfill operations even with the implementation of recently passed legislation unless economic factors change appreciably in the near future.

Clearly, if the state is to continue to use landfills to dispose of waste, several changes need to be made to ensure groundwater protection. Current ground water monitoring requirements at landfills are deficient in the types of parameters analyzed, in the frequency of sampling, and in the siting and construction of monitoring wells. New rules are proposed that would correct these.

In addition, current siting criteria needs to be reviewed and improved. Current rules need to be changed to address the impact of the disposal of hazardous wastes in sanitary landfills prior to 1981 and the continuing disposal of household hazardous wastes at permitted landfills.

Lagoons

Excessive seepage from lagoons is a known source of groundwater contamination. Its impact is very similar to landfills except that the waste content differs and the contamination process does not depend on the recharge from rainfall. There is a constant hydraulic head present in a lagoon which forces the liquids down through the underlying and adjoining soils.

Lagoons have been used as a method of wastewater treatment since the mid-1950's. The most common lagoons are built for the biological decomposition of human or animal wastes. Ninety-five percent of the lagoons in Iowa are either municipal or agricultural lagoons. Other uses for lagoons include cooling ponds, ash disposal, settling basins, temporary holding basins, and total retention ponds.

An inventory of pits, ponds and lagoons conducted in 1981 showed 2,188 impoundments located at 1,439 sites across the state. Of these, less than five percent were suspected of leaking (Figure 15). However, the inventory showed lagoons in every county of the state.

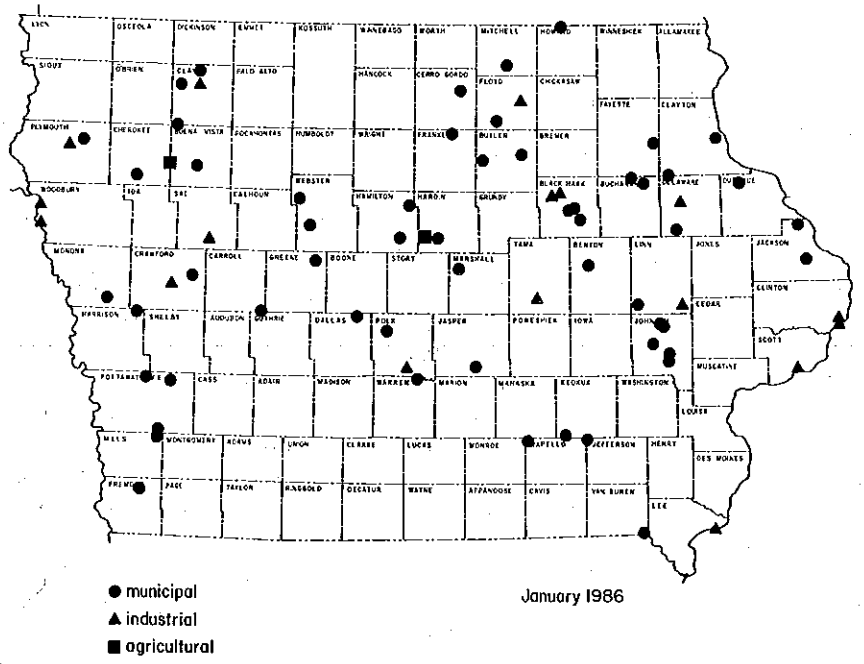

Figure 15. Lagoons Suspected of Leaking. Source: Musterman, Wilfang & Fisher, 1981.

The Iowa Department of Natural Resources requires an operating permit for all municipal and industrial lagoons that discharge to surface water. The Department has also issued operating permits for about half of the semi-public or private lagoons in the state. The Department's design standards allow for a seepage rate of 1/16 of an inch per day with six feet of head. For a one acre lagoon, 1/16 of an inch equals over 600,000 gallons per year.

Research has shown that agricultural lagoons have a natural bottom sealing mechanism which prevents excessive seepage after a short period of use. However, lateral seepage into nearby streams or discharge points is also expected. Groundwater monitoring near a hog waste storage pond in central Iowa found nitrate concentrations of eight to ten times the drinking water standard for nitrate.

Dredging to remove excessive solids build-up is a common practice at agricultural and municipal lagoons. The impact on the sealing capacity of these lagoons from dredging is unknown.

Due to the hydraulic force of leaking lagoons and the volume of stored liquid wastes lagoons may pose a significant threat to groundwater. Unfortunately, only minimum groundwater monitoring has ever been conducted at these sites.

Lagoons located near private or public wells in karst terrain and lagoons containing toxic wastes have the highest potential for causing significant groundwater contamination problems.

Lagoons are inexpensive to construct, maintain and operate. Thus, they will continue to be used in the treatment of wastewaters in the future.

Currently, regulation of lagoons can fall under four separate environmental programs administered by either the U.S. Environmental Protection Agency or the Iowa Department of Natural Resources. These programs include the Clean Water Act program for effluent discharge permits, the Resource Conservation and Recovery Act program for treatment or storage of hazardous wastes, the Comprehensive Environmental Response Compensation and Liability Act program for the clean up of abandoned lagoons which contained hazardous materials, and the Toxic Substance Control Act program which restricts the use and storage of toxic substances such as liquid wastes contaminated with polychlorinated biphynols.

The most encompassing of these programs is the effuent discharge permit system which is handled primarily by the Iowa Department of Natural Resources.

There is nevertheless a need to collect better water quality information for lagoon sites, particularly when dredging occurs. In addition, enforcement of the permit requirements for agricultural lagoons should be improved.

Septic Tank Systems

Pollution of groundwater from septic tank systems occurs when the capacity of the surrounding soil to treat the wastewater is exceeded or when the underlying soils are highly permeable allowing contaminants to rapidly move to the groundwater table before treatment is complete.

The U.S. Environmental Protection Agency estimates that between 25 and 35 percent of the households in Iowa use septic tanks. That equals 300,000 to 400,000 septic tanks. Local contamination may occur near any single unit; however, regional problems caused by the density of tanks in a region have been the major concern of most regulatory agencies.

A density of 40 or more septic tank systems per square mile represents a potential threat to the shallow groundwater of the area. Based upon countywide statistics, Polk County and Linn County are the only counties which approach or exceed this density in the state. Of course, local densities may exceed these estimates several times depending upon the distribution within the county.

The pollutants most commonly found relative to septic tank systems are nitrates, bacteria, a mixture of organic compounds, and several inorganic compounds (such as sodium, chlorides, potassium, calcium, magnesium and sulfates). As Figure 16 shows, septic systems are not a major source of nitrate for groundwater although they are appropriately cited as one of many sources.

Private septic systems are regulated by the Iowa Department of Natural Resources rules. The local board of health is designated in the current rules as the administrative authority unless the system discharges to a surface water. Then the Department has the permit authority.

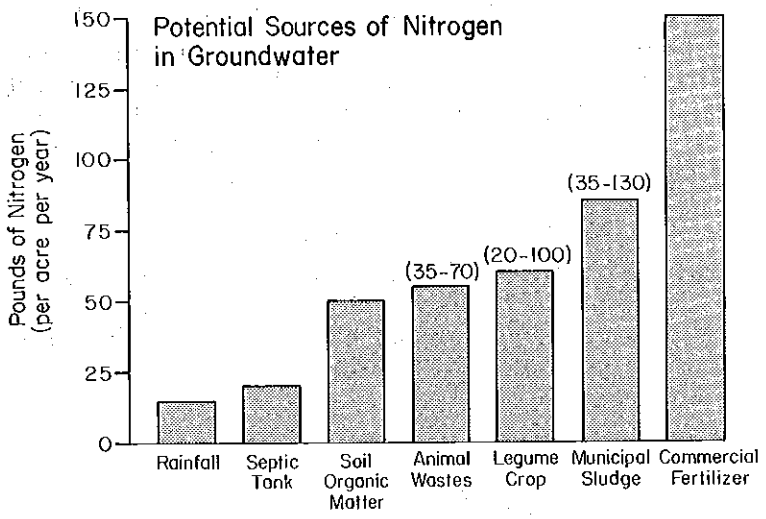

Figure 16. Potential Sources of Nitrogen in Groundwater. Source: Hallberg, 1986.

Iowa Department of Natural Resources rules contain siting and construction requirements including: a minimum depth to groundwater of three feet, a minimum separation distance of 50 feet from a private water supply well and 200 feet from a public water supply well, and a maximum percolation rate of one inch in 60 minutes. No minimum percolation rate is given, though unstable ground is to be avoided. In addition, where the septic system serves more than 50 people on a regular basis, the U.S. Environmental Protection Agency may assert authority under the federal Underground Injection Control program.

While contamination from septic systems has a local impact on water quality in areas of high septic tank density, the number of septic tanks is expected to decrease near metropolitan areas as public treatment facilities are made available. Specifically, expansion of the Des Moines wastewater treatment plant is expected within the next five years and will service portions of the city previously unsewered.

The Iowa Department of Natural Resources has also made an effort in the past few years to identify unsewered rural communities and to encourage public treatment at these communities.

Although septic systems are not believed to pose a significant threat to the state's groundwater additional information on their impact on water quality would be useful. Zoning or land management controls to restrict the density of septic tanks according to soil types may be helpful in some locations.

Underground Storage Tanks and Pipelines

Underground tanks were originally required for the storage of some hazardous chemicals to reduce the danger of fire and explosion. The risk of contaminating groundwater, however, is increased because contaminants are closer to the groundwater table and the ability to detect leaks is greatly reduced. The impact of even a very small leak may be significant over the 20 to 50 year lifespan of an underground tank.

Over 150 incidents of leaking underground tanks have been investigated by the Department of Natural Resources over the past four and a half years (Figure 17). Contamination from leaking underground tanks have affected the public water supplies of eight communities in Iowa, and four have had to cease using specific wells.

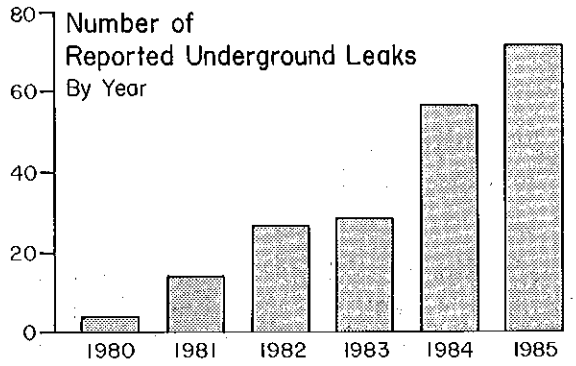

Figure 17. Number of Reported Leaks from Underground Storage Tanks. Source: Iowa Department of Natural Resources.

Since implementation of a registration program in July of 1986, approximately 28,000 tanks at over 10,000 locations have been registered with the Iowa Department of Natural Resources. A study conducted by the U.S. Environmental Protection Agency showed that approximately 25 percent of the existing tanks were leaking nationwide.

There are 11,670 miles of pipeline in Iowa carrying natural gas, crude oil, anhydrous ammonia, and other petroleum products for eleven different pipeline operators. Less than two percent of the reported spills in Iowa involve pipeline breaks. That does not suggest, however, that the volumes are insignificant. The second largest pipeline spill in the United States occurred in Polk County in 1981. It involved over 900,000 gallons of crude oil. Transcontinental pipelines are better monitored than most underground tanks. Pressure gauges at pumping stations often have automatic shut-off valves which activate at preset high or low pressure levels and during no flow conditions. Due to the high pressures (more than 1,000 pounds) and high volumes, the detection limit for most systems is five barrels (210 gallons) per day. Thus, while they are monitored carefully,

the monitoring will not detect leaks which could have very serious affects on groundwater. The 210 gallon per day limit is also the reportable quantity set by the Office of Pipeline Safety of the U.S. Department of Transportation.

Nearly all of the products stored in underground tanks and transported through pipelines are of a hazardous nature and pose some threat to human health. Other risks involved with leaking underground tanks include fire and explosion, damage to wildlife, damage to plant life/crop loss, and damage to aquatic life.

Nationwide, 45 percent of the incidents of release from underground tanks have contaminated groundwater. Eighty-five percent of the underground storage tank leaks reported in Iowa have resulted in contamination of shallow groundwater.

At least three state agencies and their federal counterparts are involved in the control of underground tanks and pipelines. They include: the Iowa Department of Natural Resources, the Iowa Department of Commerce and Industry, and the State Fire Marshal's Office of the Iowa Department of Public Safety.

Recently the Iowa Department of Natural Resources proposed registration rules for underground tanks similar to the U.S. Environmental Protection Agency's regulations. Construction standards for underground tanks have not yet been proposed pending finalization of federal regulations. Other regulations enforced by the Department include the hazardous conditions reporting requirements and emergency response activities.

The Iowa Department of Commerce and Industry is responsible for the control of the transportation of all substances (except water) by pipeline in the state. They have adopted many of the operating standards promulgated by the Office of Pipeline Safety of the U.S. Department of Transportation.

The State Fire Marshal's Office enforces testing and inspection requirements for the underground storage of flammable products which were established by the National Fire Protection Association.

The major environmental program for underground tanks is included in the 1984 Amendments to the Resource Conservation and Recovery Act. The Act regulates 83 percent of the tanks reported to be leaking. The other seventeen percent are exempt and include small residential tanks, tanks storing heating oil, and tanks containing recycled wastes.

There has been a continuous increase in the number of reported releases per year since 1980. This trend is not expected to level off for several years.

Several private petroleum companies have voluntarily implemented maintenance and replacement programs for their aging tanks. These programs systematically replace the oldest tanks and ensure the integrity of the others. The impact of these programs on the discovery of leaking tanks is not expected to be seen for several years because of the large number of potentially leaking tanks.

Another program expected to reduce the number of leaking tanks is the monitoring rules proposed by the Department of Natural Resources. These rules would require all new tanks to install observation wells at each end of a single wall tank and to monitor the interstitial area of a double wall tank.

To effectively protect groundwater resources, the state needs to undertake several activities:

1. the state should be mapped to identify areas vulnerable to groundwater contamination,
2. the construction requirements for new underground storage tanks should be finalized,
3. additional staff should be added to respond to the expected increase in the number of detected leaking underground tanks, and
4. old tanks need to be replaced and/or subjected to the same rules as new tanks.

Special Mechanisms of Contamination

The final three contaminant sources are really not sources at all. Rather they are special mechanisms which allow point contamination of groundwater by conveying water from the land surface directly down into aquifers below.

Abandoned Wells

Any hole in the ground that penetrates down to an aquifer becomes a potential avenue for pollutants to enter the groundwater. A properly constructed and maintained water well will protect the resource, but if the well is abandoned and remains open, then runoff from precipitation and snow melt can find ready access to sources of drinking water. Surface runoff contains everything with which it comes in contact--human and animal waste, farm fertilizers, and pesticides. Once into the groundwater system, these pollutants travel with the subsurface flow to be pumped to the surface later by an unsuspecting user. Less obvious is the situation where a well originally penetrated a zone of contaminated or highly mineralized water which was cased out to prevent entry of that water into the well, and the well was completed in a deeper, better quality source. Given time, the well casing will deteriorate and fail. When that happens, the inferior water can enter the well and reduce the quality of the better water. Well drilling professionals and health officials have been concerned about these wells for many years. Improper well abandonment is widely believed to be a bad practice, but research on their affects to aquifers is generally lacking.

In 1982, the Iowa General Assembly directed an inventory of abandoned wells. Coordinated through county assessor's offices, each property owner or tenant was asked to provide information about the number and nature of wells on their property. The primary reason for this inventory was concern for the potential, detrimental impact abandoned wells might have on groundwater quality. A total of 21,775 abandoned wells were reported; an average of 217 abandoned wells were reported per county. Although the inventory cards did not inquire as to whether or not these wells had been plugged, a surprising number of cards indicated that owners had plugged or filled the wells.

Analysis is concluded that the well inventory represented a 60 percent sample. Thus, approximately 36,300 abandoned wells may be estimated to occur in Iowa. This estimate does not consider abandoned municipal or commercial wells, nor private wells within towns.

The lowest number and percentage of wells were reported in northeastern Iowa where reliable productive wells of relatively shallow depth have been easy to develop. The largest number and percentage of abandoned wells were reported in south-central Iowa and to a lesser extent in northwestern Iowa. These areas, historically, have been deficient in reliable groundwater supplies. People frequently have required alternative supplies because of contaminated shallow supplies or unsatisfactory yields. The development of rural water systems to meet needs in these areas may also have contributed to the number of abandoned wells. In a state with declining farm populations and expanding rural water systems, it is reasonable to expect the number of abandoned wells to continue to increase.

Although the number of abandoned wells estimated is substantial, it is less than some previous estimates. In terms of the potential adverse impacts on ground water quality, the wells may pose less of a threat than previously thought.

There is no state law that requires an abandoned well to be plugged unless it is within 100 feet of another well. The state relies upon an educated and conscientious citizenry to respond to a problem that endangers a resource vital to all Iowans. Threats from this source could be eliminated by requiring proper well plugging.

Agricultural Drainage Wells

In areas of north-central Iowa, land is drained by means of agricultural drainage wells. These wells may drain both surface water and tile-drainage water into deeper aquifers below (Figure 18). These aquifers also serve as a primary source of drinking water in the areas with agricultural drainage wells. Studies have shown that the wells are delivering sediment, nitrogen, and pesticides to the groundwater and are affecting the drinking water supplies of nearby users.

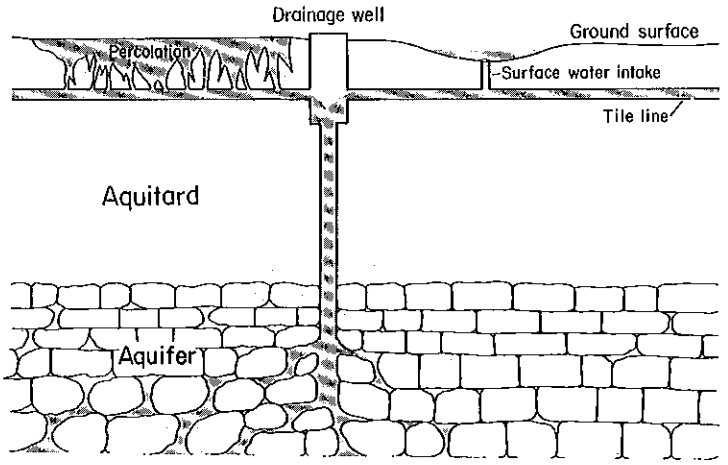

Figure 18. Schematic Diagram of Agricultural Drainage Well. Source: Glanville, 1985.

A combination of low topographic relief and tightly packed, poorly drained soils produced vast sloughs and marshes rich with plant and animal life over large areas of north-central Iowa. Underlying a portion of these areas are highly fractured carbonate bedrock formations. As early as the 1800's efforts were made to convert this productive marshland to agricultural land by draining the surface waters. Most of this change was accomplished through drainage districts, but the development of drainage wells contributed some part to this omission of land. The installation of these wells reached a peak in the 1940's and 1950's.

Since 1980, three studies of agricultural drainage wells have been undertaken in Iowa. The first of these studies identified wells in a number of counties in the state but found that three areas (draining about 16,000 acres) contained high concentrations of the wells. It was estimated that as many as 700 agricultural drainage wells draining 70,000 acres could exist in Iowa (Figure 19). However, the exact number and location of agricultural drainage wells has never been determined. While various methods of locating the wells have been used, estimates still range from 400 to 700 wells.

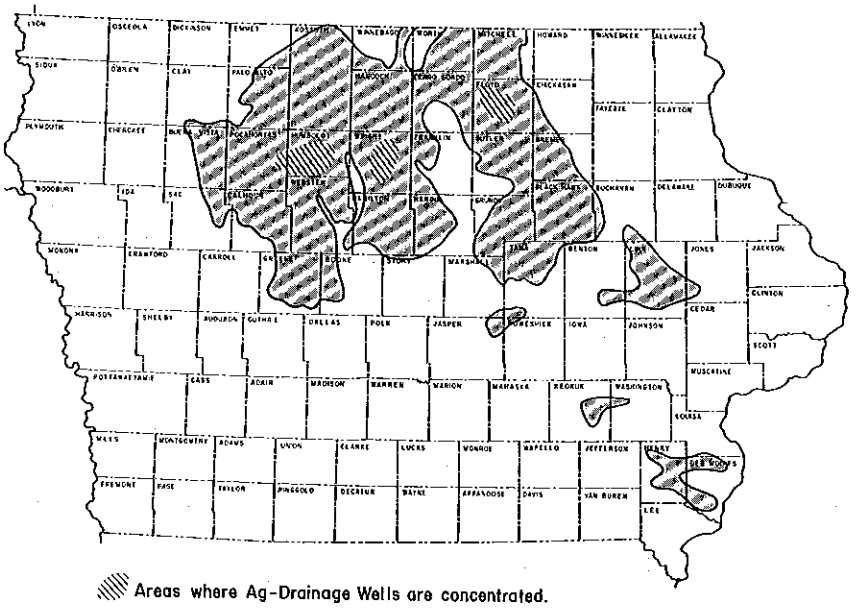

Figure 19. Location of Areas Possessing Conditions Favorable for Possible Development of Agricultural Drainage Wells. Source: Musterman, Fisher & Drake, 1981.

Between 1981 and 1983, researchers from Iowa State University conducted a study of agricultural drainage wells in Humboldt County. Water entering four wells was monitored. As a result of this monitoring, high concentrations of nitrate and pesticides were found entering the wells. The study also looked at the impacts drainage wells were having on nitrate levels in nearby drinking water supplies. The percent of water supply wells exceeding the nitrate standard was significantly higher for areas having agricultural drainage wells than for the areas without such wells. Further, average nitrate concentations from deeper wells in areas with drainage wells were found to be significantly higher than in areas where there are no drainage wells. Because agricultural drainage wells normally discharge to deeper bedrock aquifers, these results show that the wells are having an impact on the water quality of the aquifers used by nearby water supplies.

Perhaps of greater concern is the fact that agricultural drainage wells provide an opportunity for serious contamination of a deeper aquifer as a result of a spill. This is particularly true with drainage wells that have surface inlets and are located on the right-of-way of county or private roads. In the event of a spill, clean-up could be economically and technically impractical and risk to nearby residents could be considerable.

Prior to 1957, no regulatory requirements existed for the installation of drainage wells in Iowa. Thus, these wells become a viable alternative even in situations where natural drainage existed. In 1957, the state recognized the potential for contamination of ground water supplies from these wells. Between 1957 and 1982, permits were required to install new wells. Wells constructed prior to 1957 were generally exempted from the permitting requirements. Under the laws implemented in 1957, a new well could be granted a permit if it could be shown that no pollutants would be discharged to the groundwater.

In 1983, the state law changed. All drainage wells, regardless of their date of construction, must now be permitted. However, under the rules of the Iowa Department of Natural Resources, the discharge any pollutant, other than heat, to Iowa's groundwater is illegal. Thus, in light of the research conducted on the wells, the Department may not issue a permit for the wells without violating these rules.

Drainage wells by their nature are also injection wells and as such are subject to regulation under that portion of the Safe Drinking Water Act dealing with underground injection control. In Iowa, this program is administered by the U.S. Environmental Protection Agency.

Agricultural drainage wells are a poor practice in areas where drinking water quality is a concern. If groundwater quality is to be protected, the wells need to be properly closed.

Sinkholes

Sinkholes are natural holes in the ground which allow sediment, bacteria, and other contaminants including nitrate and pesticides to run directly into the upper bedrock aquifer. Sinkholes have locally been used as dumps, further endangering water quality. Areas with numerous sinkholes are known as karst regions. In Iowa, the karst regions are generally restricted to the northeastern corner of the state.

More than 12,000 sinkholes have been identifed and mapped in northeastern Iowa (Figure 20). Sinkholes occur where solution caverns or conduits enlarge to the point where they can no longer support the overlying soil material. The resulting collapse of this material into the solution cavity results in an opening on the land surface, or sinkhole.

Studies of groundwater contamination in northeastern Iowa have revealed two processes by which contaminants reach the groundwater. The most widespread process and the most important is by infiltration. The second process is direct surface runoff into sinkholes of sediment, attached pollutants, and soluble and insoluble contaminants.

Iowa karst regions typically exhibits poor water quality, with occasional high turbidity, high nitrate concentrations, pesticides, bacterial concentrations, and other pollutants may find their way to the groundwater through the sinkholes. Groundwater quantity and quality can fluctuate widely in this region. During runoff events, water from wells in major conduits will likely turn cloudy and contain

peak levels of bacteria and pesticides as well as other contaminants. The average annual sediment yield to sinkholes is estimated to be 1,101,000 tons. The area draining to individual sinkholes may be very small or as large as several square miles. The total area draining to sinkholes in northeastern Iowa is estimated to be about 280,000 acres.

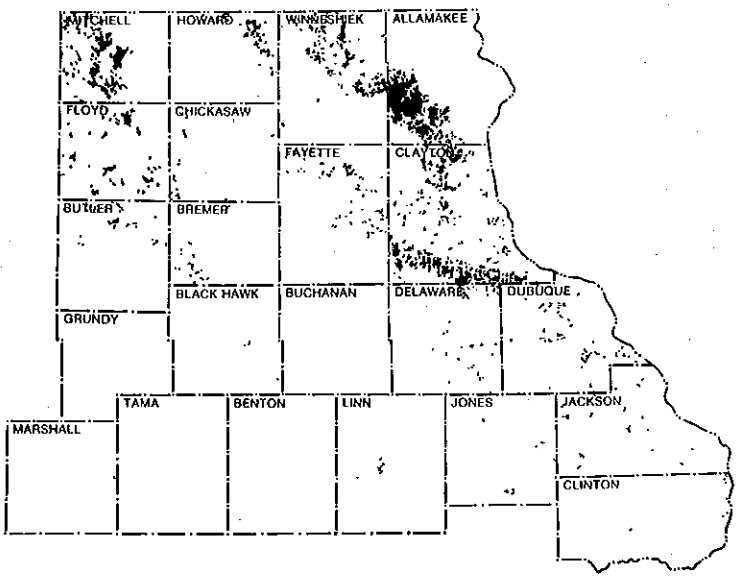

Figure 20. Location of Sinkholes in Northeast Iowa.
Source: Hallberg and Hoyer, 1982.

In addition to the introduction of pollutants from nonpoint sources, sinkholes have, in the past, been used as municipal and private dump sites. Although open dumping has not been the practice of municipal operations since 1972, private dumping in sinkholes still continues. In addition, karst regions constitute a hazard to engineered installations which can result in contamination of ground water. In several incidents in the Midwest, one in Iowa, sinkholes have opened in the bottom of municipal lagoon systems draining the lagoon to the groundwater system below.

Although the number of sinkholes is large, their overall contribution to deteriorating ground water quality in karst regions is not great. They do, however, provide the opportunity for catastrophic impacts on ground water quality if care is not taken in the siting and operation of large scale municipal waste disposal systems.

Existing state regulations prohibit open dumping in sinkholes and require consideration of karst conditions in the siting and operation of large scale waste disposal systems. No regulation of runoff to sinkholes is in place. The state has relied upon an educated public to respond to the problem and take measures necessary to protect groundwater resources.

Current agricultural practices have contributed to many of the problems associated with sinkholes. In the absence of changes in those practices, the problems can be expected to continue. Recent revisions in the criteria for the siting of municipal wastewater treatment systems may prevent the loss of another large lagoon system in the karst region.

Aside from this, there is no program in place, either regulatory or educational, to control runoff into sinkholes from agricultural practices.

RECOMMENDATIONS FOR PROGRAM DEVELOPMENT

The following thirteen recommendations suggest how Iowa's groundwater protection program should develop. They do not require action by the General Assembly. Rather, these recommendations suggest policy and provide a basis for program development. Further, these recommendations identify program improvements which only require additional financial and staff resources to implement.

Nondegradation Goal A1

The Environmental Protection Commission recommends that nondegradation be maintained as the goal of Iowa groundwater policies and programs.

Nondegradation is a concept which implies no deterioration beyond existing water quality conditions. For existing contaminated waters, the concept also implies improvement in water quality back towards pre-contaminated quality. Clearly, any contamination is undesirable and may constitute some additional risk to the public health and environment and existing contamination problems should be mitigated within practical limitations.

Nondegradation is the concept which underlies current State policy. It is expressed in the Iowa Administrative Code, Chapter 61, Water Quality Standards, 567-61.2(455B);

> 61.2(1) Policy Statement. It shall be the policy of the commission to protect and enhance the quality of all the waters of the state. In the furtherance of this policy it will attempt to prevent and abate the pollution of all waters to the fullest extent possible consistent with statutory, and technology limitations. This policy shall apply to all point and nonpoint sources of pollution.

A goal of nondegradation is consistent with the opinions of most people who have expressed views on the subject during the course of this planning process. It is existing policy and should be retained and strengthened by incorporation into law.

Recently, nondegradation has been considered as unrealistic, unattainable, even naive. People have argued that all of man's activities affect water quality and society must instead accept degradation, define acceptable concentrations of contamination and control its location. While there is some truth to the arguments, these alternatives are undersirable. They presume that only certain aquifers are worth protecting, and that acceptable contamination can be defined for both existing and possible uses of the water. Aquifers worth protecting are usually defined as those which provide drinking water to large numbers of people. Such a policy is usually called differential protection.

In a state where nearly one-fourth of the population has private well water supplies, where many of the public water supplies serve small towns having limited financial resources, where most shallow water supplies (the ones most susceptable to contamination) are acceptable for drinking water, and where the most important source of contamination is nonpoint agricultural sources, differential protection seems unacceptable. All of our resources and all of our people deserve protection. Differential protection usually seeks to isolate aquifers and define acceptable pollution. Unfortunately, aquifers are not always easily defined and they are always interrelated. Differential protection commonly ignores the potential for future groundwater development and the all important fact that groundwater provides the sustaining base flow to surface waters which also supply drinking water. Equally important, our knowledge about acceptable levels of contamination for any one pollutant, much less for a "stew" of contaminants, is extremely limited.

Everyone desires minimal pollution, if not zero contamination, and it seems prudent to attempt a worthy goal that is difficult to reach rather than to guarantee success with goals that provide little benefit. Furthermore, as some contamination is already widespread and as we are beginning to understand some methods of control, implementation of prevention techniques should both improve water quality in some areas and prevent further contamination everywhere. Nondegradation should continue to be our state's goal.

Prevention, Improvement and Public Confidence A2

The Environmental Protection Commission recommends that three policies guide Iowa toward its goal of nondegradation:

1. **Prevent contamination,**
2. **Improve groundwater quality where contamination is present, and**
3. **Enhance and maintain public confidence in groundwater quality through public awareness.**

Prevention of groundwater contamination was emphasized in various ways by nearly all people contacted during Strategy development; prevention is the key to success in protecting groundwater. A recent report by the Environmental and Energy Study Institute, a non-partisan research group associated with Congress, recommended "that Congress enact a prevention based goal for groundwater protection... to prevent contamination to the maximum extent possible." In a national process of policy decision making the "Institute found broad agreement that prevention should be the fundamental consideration and the first priority in groundwater protection decisions. Groundwater should not be contaminated by society's activities if it can be avoided."

An orientation toward prevention is consistent with seeking nondegradation. It is a proactive approach...stop contamination before it starts.

A preventative orientation of policies and programs is a realization that society cannot successfully manage each and every activity. Regulatory and nonregulatory policies should instead institute as much as possible, a framework for success which requires a minimal amount of day-to-day management. Perhaps more importantly, policies should encourage those activities which emphasize proper handling of potential contaminating materials. Monitoring and enforcement cannot be done everywhere. Specific rules for one activity may not apply to others. However, principles such as proper handling of all chemicals, their judicious use and reuse, and overall efficiency may apply in situations where personal decisions can prevent contamination. These personal decisions add up and are very important.

Prevention is essential because it is far less expensive than cleanup. Cleanup of hazardous conditions on the ground can cost millions for just a one acre site; cleanup within an aquifer may cost even more - and it may be technologically impossible for many years. Cleanup of water drawn for drinking is an essential technology which society must have available, and many already are using, but it has major costs as well. Further legal action is expensive.

Prevention is also safer. Aquifer cleanup may be impossible, drinking water cleanup may be possible, but not back to a pre-contaminated state. Management-intensive approaches may define specific practices or contaminants, but they ignore the rest. Long-term health effects of most anthroprogenic contaminants are largely unknown. We cannot generally define safe limits, although society should continue to try and improve our understanding. Even where health limits have been established, lower concentrations are preferred. And prevention, not cleanup, nor management, is the viable mechanism to achieve this protection.

Public confidence repeatedly was mentioned as crucial to the success of groundwater protection programs. There must be confidence that policy makers have the information needed and the ability to act in the interest of Iowa. Policies must be understood and supported by the public. Thus, the public needs to learn what has been gained from research and water quality monitoring, from regulatory programs and training sessions. The public requires that prevention of contamination, early detection of problems, and public disclosure of information be built into the groundwater protection strategy. The public also requires that Iowa programs be tailored to meet the needs of Iowa. Programs limited by statutes from being more restrictive than federal laws and regulations may not meet Iowa's needs. The General Assembly should consider the impact of placing such a limitation on groundwater programs. Public confidence is served by research and monitoring, public education and open policy making.

Improve Programs A3

The Environmental Protection Commission recommends that the Department of Natural Resources place emphasis upon improving programs at this time, and develop guidelines or standards in the future if such guidelines become desirable or necessary to enhance Iowa's groundwater protection efforts.

The Department of Natural Resources already administers many environmental programs. Most are regulatory and were designed with a primary emphasis on surface water. Consideration of protecting groundwater was secondary or incidental. Most are inadequately funded and staffed and yet all are being asked to perform better because there is increasing attention and concern from the public. Initiatives presented in this Strategy reflect a change in past direction and a new agenda to acquire needed information, to inform the public about their environmental problems and possible solutions, to improve management and enforcement programs, and to improve rules and regulations. It has been suggested that nothing new is needed except to do a better job of existing responsibilities. For programs to improve and address new concerns, major staff efforts and investments are necessary. These are the areas to emphasize in order to prevent contamination, facilitate clean-up and maintain the public's confidence in Iowa's groundwater resources.

The issue of setting standards or guidelines for groundwater is one that should be left for possible consideration if and when they are deemed desireable and necessary to enhance Iowa's groundwater protection efforts. Groundwater standards have been developed in other states as a part of groundwater protection programs. Standards do not prevent contamination. They are not recommended at this time. The proposed initiatives in this Strategy represent a very ambitious agenda. They are designed to protect our resources and provide public confidence. With an emphasis on groundwater protection programs focused on research and education for the immediate future, resources directed at establishing standards seems inappropriate.

The issue of groundwater standards is usually marked by confusion, among both professionals and non-professionals. How are they set? Who believes the values have significance? What are they for? Where are they applied...in the aquifer or in drinking water? Do they apply to aquifers currently used for drinking water or potentially or to all groundwater? How many do you set?

It seems that drinking water standards are of more value than groundwater standards. The U.S. Environmental Protection Agency should rigorously conduct testing on compounds found in groundwater to assess their health effects. These should be published in the form of maximum contaminant levels and recommended maximum contaminant levels. Such values prove helpful in evaluating contaminated conditions and assessing alternatives for local mitigation. But groundwater standards must not be confused with drinking

water standards. Drinking water standards represent the maximum amount of a contaminant allowable in drinking water. No one wants aquifers to be even close to such levels - and they need not be. Professionals do not trust such values and once an aquifer approaches such values it is very difficult, if not impossible, to go back.

If groundwater standards are chosen in the future, they should be developed as numerical measures to guide actions, i.e. guidelines. They should define actions very conservatively. Activities such as contaminant verification should begin whenever any new compound is discovered at any concentration. Investigations about the sources of contamination should begin when verified compounds are found at several locations or at some minor (10%-20%) portion of a national numerical standard, such as Maximum Contaminant Level or the recently proposed Groundwater Recommended Guidance Level, or some arbitrary value such as 1 part per billion in the absence of such a value. The guideline should be simple, defining actions based on national standards of drinking water or groundwater. Iowa should not get involved in setting health based standards. Such an action would be expensive and would take away from other necessary activities. Guidelines could also be developed to help define cleanup activities in mitigation cases.

Contaminant Issue Priority A4

The Environmental Protection Commission recommends that the State of Iowa direct its resources at programs in groundwater protection according to the following priority of issues.

Priority I

- Agricultural use of nitrogen fertilizer.
- Agricultural use of pesticides.
- Abandoned hazardous waste disposal sites, abandoned dumps, and unpermitted land disposal.

Priority II

- Underground tanks and pipelines.
- Landfills.
- Storage, handling and transportation of hazardous substances.

Priority III

- Agricultural drainage wells.
- Abandoned wells.
- Sinkholes.

Priority IV

- Land applications of solid and liquid wastes.
- Lagoons and pits.
- Septic systems.
- Urban use of nitrogen fertilizer and pesticides.

Widespread agreement exists among water resource professionals, interested parties, and the general public concerning the relative importance of groundwater contaminant sources. For policy and program development, this consensus represents a significant opportunity because it elevates discussions from those about priorities and objectives to those of alternative approaches and financial resources. Documentation of the priorities is a major contribution to groundwater policy development.

The diffuse-source agricultural contaminants of nitrate (from nitrogen fertilizer) and pesticides, and the potential contaminants from mostly unknown disposal sites are thought by almost all Iowans as the most serious sources of contamination (Priority I). Very little attention has been paid to these topics until very recently, except at a few hazardous waste (Superfund) sites. Thought to be of somewhat less importance, Priority II sources of contamination are already regulated and have received more attention in the past. Each Priority II source is also actively involved in recent legislation and/or rule development. Priority III contaminant sources are not really sources at all, but physical entities

that allow or promote contamination. These have received more popular discussion in the past, although little or no action has ever been proposed. Except for the use of fertilizers and pesticides in urban areas, Priority IV sources are generally subjected to extensive rules. Each covers a limited area of the state and problems associated with each is expected to be localized. Often concerns in this group have been more related to surface water contamination or effects from contact rather than aquifer contamination.

During preparation of this Strategy, questionnaires about these contaminant sources and possible solutions were prepared. They were used to assess the problems and possible solutions. These materials are on record at the Department of Natural Resources.

Interagency Cooperation A5

The Environmental Protection Commission recognizes that multiple agencies have the responsibility to protect Iowa's groundwater resources and recommends that interagency cooperation must be recognized as essential to successfully accomplish groundwater resource protection.

The Department of Natural Resources clearly is the pivotal environmental agency related to protecting groundwater, but many other groups also have key roles. And just as the Iowa Department Natural Resources must review and upgrade its regulatory, research and educational programs, every other agency must enhance its efforts to protect groundwater resources from contamination. It is urged that each agency consider how it can change, develop or participate in programs which may help protect groundwater. Groundwater quality can not be protected without the contributions and cooperation of all agencies. Following is a list of institutions and their groundwater roles. Certainly others can be added.

Department of Agriculture and Land Stewardship: regulation of pesticide labeling, handling and storage; registration of pesticides; certification of pesticide applicators; regulation of fertilizers and soil conditioners; control of insect pests and plant diseases; soil resources management; administration of Agricultural Energy Management Fund; compilation of agricultural statistics; water resources management; education, research, public assistance and analytical services

Department of Natural Resources: administer programs to prevent, abate and control water pollution; regulation of water and sewage treatment, hazardous substances and waste, litter, land disposal and underground storage tanks; oil and gas exploration and production; construction and plugging of water wells; investigates natural resources; administers program of conservation easements; education, research and public assistance

Department of Public Health: supervision, investigation, reporting and education on public health
University of Iowa Hygienic Laboratory: analytical services; research
Water Resource Districts: coordination; implementation of water management programs
Iowa State Water Resources Research Institute: research; training
Cooperative Extension Service: education
Cooperative Experiment Station: research
Department of Preventive Medicine: research; assistance; training
Soil Conservation District: implementation of soil conservation programs
County Boards of Health: regulation of septic systems and private wells
Iowa State University, University of Iowa, University of Northern Iowa: education, research
Professional and trade associations: education
Public interest groups: education
U.S. Environmental Protection Agency: regulation; research; grants
U.S. Department of Agriculture, Soil Conservation Service: soil and water conservation technical information and services
U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service: conservation assistance
U.S. Department of Interior, Geological Survey: research; monitoring; service

Local Government A6

The Environmental Protection Commission recommends that the State of Iowa develop methods to significantly increase involvement of local governments in groundwater protection efforts.

Groundwater protection involves the integrated actions of all levels of government. Too often, the federal government tells the state what it must do or the state tells local governments what they must do. Financial resources are generally inadequate with the result that responsibilities are being inadequately assumed.

It is widely recognized that many acute groundwater quality problems have specific, local origins. Often the problems are within a quarter of a mile, almost certainly within ten miles. In the case of non-point agricultural contamination, the problem stems from virtually an infinite number of localized sources. Moreover, water is generally used locally. Thus, both groundwater contamination sources and users are local. Nevertheless, local agencies have not yet begun to address water quality issues very seriously in Iowa. Perhaps, the major efforts have been by municipal water utilities. Their methods for addressing the problem have generally been to find alternative water sources (at more expense) or to manage water quality by blending water from several different aquifers or several different wells.

Local government has in the past shown a lack of commitment to many environmental problems, even when their local people would be the beneficiaries. County sanitarians exist in only 47 of the counties. Boards of Health are often not active. Zoning, if it is ever done in the county, generally is not used for any environmental purposes. In the future, mandates for sanitarians and defined roles in groundwater protection action activities may be required of counties.

Local government should begin to consider their potential roles in protecting groundwater. At least at this time, political support for these efforts might be surprisingly high. Other organizations such as soil conservation districts, water resource districts, drainage districts and county conservation boards should consider options in which they could participate.

Two factors are certain:

1. local people benefit the most from decisions which protect groundwater, and
2. mandated programs without funding can accomplish little.

The Strategy does not recommend any specific actions by local government. However, parts of many of the initiatives proposed can be adapted for local implementation and some were designed to help local governments. Elements especially pertinent to local entities include:

1. declaration that drainage wells and abandoned wells are illegal,
2. monitoring of public wells for problem assessment,
3. challenge grant program for private well water quality assessment,
4. vulnerability mapping,
5. landfill alternative planning grants,
6. statewide hazardous waste collection and transportation system,
7. permanent conservation easements on watersheds draining to drainage wells and sinkholes, and
8. financial assistance programs for closing drainage wells and old abandoned wells, developing alternative drainage, protecting sinkhole watersheds and developing manure storage.

Of the elements in the list above, vulnerability mapping and the development of a statewide hazardous waste collection and transportation system are primarily state responsibilities.

It is hoped that regional, county and city groups might find these programs useful and participate actively or administer such program elements as are appropriate.

The Well Head Protection provisons and the Sole Source Aquifer provisions of the Safe Drinking Water Act have a potential for a major impact on local groundwater protection programs. How the U.S. Environmental Protection Agency will administer these provisions is unclear at this time, as is

the response of state or local governments to them. However, these provisions have the potential to develop major planning and zoning controls over areas associated with municipal water supplies and they may become very important in the near future.

Groundwater Information B1

The Environmental Protection Commission recommends that the Department of Natural Resources significantly improve the resource information base upon which groundwater protection policy must be based. This includes improved monitoring data, better coordination and utilization of all data and studies to increase our understanding of hydrogeology throughout Iowa.

The objectives of this initiative include:

1. improved resource data so that it may be used for problem assessment and policy development, and
2. improved public awareness.

The collection, management, interpretation and public disclosure of water quality information is the very basis for Iowans understanding our problems and developing solutions. It is the basis of public confidence in our water quality in the face of much current uncertainty. It is the basis of policy development. The consistent development of pertinent information is the basis for a resource program whether it be for protection or management.

State Groundwater Monitoring Plan

A statewide groundwater monitoring plan should be implemented beginning in FY88. A recent plan developed by the Department of Water, Air and Waste Management in 1985 outlines a way to use municipal, private, ambient and site assessment sampling points to provide a flexible and compelling water quality information set. The plan should be reviewed by state and federal agencies to decide how to manage the network. Funding for such a program would provide a strong incentive for water resource agencies to move ahead.

Although full development of a monitoring plan is beyond the scope of the Groundwater Protection Strategy, some specific proposals are included here which fall within the concepts developed in the monitoring plan and which further the objectives of the Strategy. This initiative includes proposals under the municipal, private and research monitoring concepts of the plan. Proposals to accelerate evaluation of hazardous sites and other problems also include monitoring of the site assessment type. The proposals here would help assess all major aquifers and the vulnerability of all types of aquifers.

Municipal Monitoring: Raw water from each aquifer serving a municipality should be monitored on a rotating time schedule for bacteria, nitrate, volatile organic compounds and synthetic organic compounds including pesticides. The compounds analyzed should include all identified compounds from groundwater either from previous research or the current, one-time sampling program being conducted on finished public water supplies. Safe Drinking Water Act

requirements for sampling water for contaminants are inadequate to evaluate contamination. These compounds must be analyzed to supplement Iowa data. Results should be reported to the Iowa Department of Natural Resources and the municipality and made publicly available annually. If organics are detected, quarterly sampling should be required. In addition, selected aquifers must be sampled more frequently to develop information on temporal variability necessary to help assess the data from infrequently sampled sources. This would serve as a useful tool for assessment of sources of contaminants and serve as a useful compliment to possible local groundwater protection programs.

Private Well Monitoring: An assemblage of 300 private wells drawing from the full range of aquifers should be developed and sampled to assess rural contaminants. Possibly working in cooperation with some private organizations, the wells would be selected to meet criteria of construction, depth, geographic location and aquifer type.

Contaminants analyzed would include bacteria, nitrate, volatile organic and synthetic organic compounds including pesticides. Again, variable temporal sampling techniques should be employed, but all would be sampled annually for a goal of ten years. Individual private results would remain confidential, but aggregate results would be annually reported.

A second type of private well assessment should also be conducted. A two percent sample of private wells, drawn randomly, should be sampled one time as a method of describing the water Iowa's rural population is drinking. Such a sample could readily be used because it would be statistically valid. Such an approach, which would sample about 2,500 wells, would compliment the fixed set of private wells. The random set would emphasize areal coverage and the water consumed; taking into account well placement, construction and maintenance problems. The fixed set would be the control for well problems and focus upon temporal changes of the aquifers.

Ambient Research Aquifer Monitoring: An assemblage of 150 wells installed as research wells as a part of Iowa Department of Natural Resources or U.S.Geological Survey/State Cooperative projects will be selected and maintained for ten years to evaluate aquifers. These wells are often constructed in groups to evaluate related aquifers. They should be sampled for bacteria, nitrate, volatile and synthetic organic compounds including pesticides on a variable temporal schedule.

Local Government Initiative: The Iowa Department of Natural Resources should develop a mechanism to match local initiatives to evaluate water quality. Recent successful efforts in Guthrie, Green, and Mitchell counties reflect the serious interest of local governments and citizens. The state, in conjunction with federal agencies, should develop staff and financial resources to match local dollars in water quality testing. Further, services of data evaluation

and education should become a part of the program. Such a progam could assist local planning and education efforts and would have a benefit of greatly aiding Iowa's rural water quality problems. The program should be structured in such a manner as to enable all local governments to participate.

Groundwater Vulnerability Mapping

A premium must be placed upon taking existing data and placing it in a form which can facilitate use in managing all programs. It would take advantage of our current understanding about how contamination occurs, where it occurs, where aquifers are and identify which aquifers are most vulnerable to contamination. As such, this can guide environmental programs of the Iowa Department of Natural Resources such as landfill permitting, assist epidemiological analysis, and guide local government decisions related to groundwater protection. Completed maps should be published in 1990.

Data Management

A plan should be developed to update and integrate current data management systems among the natural resource agencies which are developing primary groundwater data, Iowa Department of Natural Resources, University Hygienic Laboratory, and U.S. Geological Survey. Improvements are always necessary, but the recent Iowa Department of Natural Resources organization makes such review especially timely. The plan should be developed by the Iowa Department of Natural Resources in 1987 and should address:

1. geographic coding - standard locational conventions of water quality data and other locational data such as facility and permit records,
2. data compatibility - coordination of data coding responsibilities and data transfer, and
3. data entry - timely entry, especially of monitoring or special research data, and avoidance of duplicated efforts.

Geographic Information System

The Iowa Department of Natural Resources should begin to develop a natural resource, geographic information system. Definition of goals, system requirements and hardware/software planning should begin in 1987 for implementation in 1988. Water contamination is a problem of the interaction of land management with natural systems. Problem identification, assessment and resolution can all be enhanced by bringing the pertinent data together. The system should include land use information, geologic and hydrogeologic information, political boundaries, permitted locations, dumps, abandoned sites, significant spills, transportation routes, lakes, rivers, parks, wildlife areas and preserves. The system should include digitized soil survey data, and Iowa Department of Natural Resources should support this activity and coordinate efforts with Iowa Department of Agricultural and Land Stewardship to facilitate the inclusion of this valuable resource. Such a system can facilitate all planning efforts in the Iowa Department of Natural Resources and assist resolution of resource issues in a timely manner.

Data Utilization

The University Hygienic Laboratory has served as the analytical lab for Iowa's groundwater quality measurement. The facilities have been available for both research and private services. Iowa is fortunate to have developed such a state facility. The lab has developed a considerable research data base. Better use of this data base could be achieved if private analyses were computerized and the data were more available for research. A program to computerize private analyses is underway, and the state should seek to support the activity to accelerate it so that old data may be entered and made more useful. Such a program would lower the cost of data management and benefit water quality research projects that address longer time periods. The lab should seek ways to increase its locational information on analyses and in so doing these analyses could help meet the state's needs for improved groundwater quality assessments. University Hygienic Laboratory should be given continuing support to research their data to help evaluate groundwater trends.

Special Research Issues

The first special issue which needs research is an evaluation of aquifer recharge through Iowa's glacial drift. Glacial drift covers most of Iowa varying from a few feet to hundreds of feet in thickness. This cover is largely clay-rich and it is known to act as an aquitard, protecting aquifers below. It is routinely called upon in siting activities as a natural source of protection for various permitted facilities, such as landfills and lagoons. Recharge does occur through glacial drift and the Department of Natural Resources must determine where drift is most porous, how the water moves, and how much of recharge actually occurs under field conditions rather than only laboratory conditions.

The second issue requiring major, special research is contamination in alluvial aquifers. Cities especially use these aquifers for their water supplies. An understanding of contaminant occurrance and movement in these aquifers could help develop water management techniques which could reduce contaminant levels delivered from wells developed in these alluvial aquifers.

Report Contaminants; Request Risk Assessments B2

The Environmental Protection Commission recommends that the U.S. Environmental Protection Agency should be apprised when any contaminant is found in Iowa's groundwater, and requested to develop health-based risk assessment of the contaminant for drinking water. These actions should be made by the Director of the Department of Natural Resources and may be in cooperation with the Iowa Secretary of Agriculture, the Commissioner of the Iowa Department of Public Health, and other appropriate agencies.

The U.S. Environmental Protection Agency has the responsibility to set drinking water standards. This recommendation affirms the need for such drinking water standards and recognizes Iowa's responsibility to inform the U.S. Environmental Protection Agency of contaminants in Iowa's

groundwater and to seek action from the U.S. Environmental Protection Agency. The proposed monitoring would derive highly credible data which is useful to both national and state problem assessment and policy development. Such a program would deserve the U.S. Environmental Protection Agency's attention.

Public Awareness B3

The Environmental Protection Commission recommends that the Department of Natural Resources significantly increase its educational program on Iowa's groundwater resources, contamination problems, and methods of preventing contamination. Public awareness and understanding is a key element in developing policy and in applying preventive measures to the daily activities which lead to groundwater contamination.

Education must receive higher priority if groundwater protection is to be accomplished. Prevention requires that the many decisions Iowans make each day take into account the action's potential impact on groundwater. Throughout meetings which occurred in development of this strategy, the need for education was emphasized and reemphasized. Internalized concerns by all Iowans are a necessary part of this strategy. Public awareness, public understanding, and public knowledge is the link between what some researcher knows and a personal decision, that a few professionals know and public policy. Prevention requires regulation and environmental management, but it also requires a re-thinking of methods and an emphasis on public understanding. Rhetoric towards the value of education is common. Such education should not be limited in scope only to schools, but should include a broader view of public education such as is needed to combat groundwater contamination.

Education efforts on all sources of contamination, and control methods for each need to be intensified. The Iowa Conservationist has expanded recently to include certain broader resource issues, but major emphasis must be placed on a wide range of educational activities. The Iowa Department of Natural Resources should develop a comprehensive groundwater education plan during FY87. This plan should be prepared in coordination with the Cooperative Extension Service, Department of Public Health, Department of Agriculture and Land Stewardship, Department of Public Instruction, and Iowa Public Television. Such plan development goes far beyond the scope of this Strategy, but should consider these elements.

1. Brief, attractive bulletins on groundwater, Iowa Department of Natural Resources resources programs, groundwater problems, sources of contamination, and practices which can help avoid contamination.
2. Public service announcements which emphasize ways that individual citizens can protect water resources, or which describe problems, new rules, or incentive programs, should be developed for broadcast on television and radio.

3. Special features for television.
4. Visual programs for group use.
5. Environmental curriculum development for public schools.

Results of monitoring and special research need to be reported routinely as a part of building public awareness. Monitoring results of water in aquifers serving municipalities should be summarized and reported annually by Iowa Department of Natural Resources. Contaminants should be required to be reported to water users. Similarly, private and research monitoring results should be reported annually, although personal privacy should be protected.

The public is very concerned; it wants to know more. Providing them the information will help them make the decisions which are required to prevent contamination and lead to better, informed, groundwater policy.

Furthermore, the state should recognize contributions private groups can make towards educating other Iowans. The state should encourage these groups to pursue educational activities. Their involvement costs little, is educational to the participants and greatly enlarges the potential for meeting our public awareness needs.

Uncontrolled Sites B4

The Environmental Quality Commission recommends that the Department of Natural Resources accelerate its assessment on all known potentially hazardous waste disposal sites and that preliminary on-site assessments be conducted on all sites by a special Iowa Department of Natural Resources team by FY91. Detailed field assessments of ten sites including five landfills should begin during FY88.

The objective of this initiative is to accelerate the development of an orderly process for acquiring and evaluating information about sites believed to exert an adverse impact on groundwater. This must be done in a timely fashion as the public needs to learn both about potential sites located near them and because a general evaluation of certain types of potential sites, especially landfills, abandoned town dumps, chemical storage sites, and grain storage areas, must be conducted as a matter of making informed policy. It is expected that serious hazardous waste sites will be uncovered and that a more complete assessment of risk about certain classes of sites can be learned. Staff, equipment, training and financial resources to contract for detailed investigations are needed to accomplish those tasks.

The Department of Natural Resources should assemble a larger team of geologists, hydrologists, engineers and environmental specialists to conduct preliminary site investigations of all known hazardous waste sites. This includes 222 sites maintained on the CERCLIS file which are presently in need of further documentation. The purpose of the visits is to document:

1. the the presence of waste,
2. the presence of contaminated water, if any,

3. the local hydrogeologic setting and the risk to aquifers,
4. the present risk to drinking water, if any, and
5. agency jurisdiction, ownership, and applicability of permits.

Following these preliminary investigations, a recommendation must be made which determines the level of activity required at the site. Some will require no further action. Others will require detailed studies. Some may require determination of a responsible party. The sites must be prioritized for action. Comprehensive Environmental Response Compensation and Liability Act guidelines would apply in all investigations. From such site visits recommendations for the National and State Priority Lists can be made.

The concept of public confidence requires initiation of detailed site investigations at different types of sites. Sites selected to represent different kinds of problems, such as landfills, storage sites, spills, abandoned dumps, and sites with unknown sources of contamination should be chosen. They might also represent different types of hydrogeologic conditions. Landfills must be highlighted because of concern for them and the proposed reduction in their usage. However, even if they are closed, contaminants leaching from these sites may influence water qulaity for many years. Such investigations should be directed by the Iowa Department of Natural Resources, but may involve contractors to conduct these detailed investigations.

Ultimately, this process will yield the information needed to evaluate the seriousness of these sites. Further, it may reveal a need to develop a clear policy on the clean-up of sites as well as a need to significantly increase our financial resources allocated to hazardous waste activities.

Efforts should also be made to establish the location of other potential sites in the state. Using the same team, a review of department records and monitoring about suspected potential sites should be conducted to seek out other sites. Further, geographic locations for all permitted facilities including permitted dealers, hazardous waste generators, landfills, dumps, should be obtained and inserted into data bases for future reference. Finally, any chemicals found in groundwater through these investigations should be forwarded to the U.S. Environmental Protection Agency with a request to develop health-related drinking water standards.

Landfill Alternatives B5

The Environmental Protection Commission endorses the development of alternatives to conventional county landfills as a means of protecting Iowa's groundwater and recommends that planning studies include both general reviews of alternative, current technologies and grants to local governments so that those technologies may be evaluated for their specific needs.

The General Assembly established a process and timetable for reducing Iowa's dependence on landfills for disposal. In carrying out this mandate it seems appropriate that certain studies be done only once. These include studies to compile current information on available technologies, such as waste reduction, recycling, composting and energy production, the economics of these technologies and general modelling of their application to certain areas population/distribution. Repetitive grants should be avoided by this practice. Statewide goals, such as a 75% reduction in landfilling, could be established based on such studies.

Grants to counties using the Groundwater Fund would go towards applying general results to specific county or regional areas. Grant percentages should be based on the ability to pay and should favor regional planning in low population areas. A plan should be developed in FY87 with grants available in FY88.

Underground Storage Tanks B6

The Environmental Protection Commission recommends that full administration of an underground storage tank program be instituted in 1987. This program should emphasize prevention of groundwater contamination, leak prevention and early leak detection, and should require compliance by all facilities by 1990.

Perhaps no contaminant source is as potentially, acutely dangerous as the leakage of gasoline or other hazardous fluids. Recent legislation required rule development for these tanks. The registration of tanks has begun and rules for tank construction standards are in final drafting as of the date of this report. The program must move forward and can be in place in FY88. However, the program requires staff to enforce compliance with registration, reporting and construction requirements. Also, staff may be involved in cleanup activities as well. Public awareness and education will be a major component of the program.

The Environmental Protection Commission adopted emergency rules effective January 14, 1987, that specify the groundwater monitoring requirements for underground storage tanks.

Problem Assessment B7

The Environmental Protection Commission recommends that special assessments be made of the possible impacts on groundwater from pipelines, land application of solid and liquid wastes, lagoons and pits, septic systems and urban use of nitrogen fertilizer and pesticides.

One of the principles of this Strategy is that policy should be made based upon facts. Such has proven very helpful in the case of agricultural sources of contamination, and the same principle underlies the hazardous waste initiative, and the monitoring of public and private water supplies.

Land disposal of wastes, lagoons, pipelines and the urban use of fertilizers and pesticides could all be assessed more thoroughly if research was conducted which was specifically designed to evaluate their potential for contaminating groundwater. Such research could involve literature reviews, case studies, and field investigations which monitor sites. In the case of pipelines, it could involve review of records in Departments regulating pipelines as well as legal review of authorities and responsibilities. Such research could be conducted well through the universities researchers in coordination with state objectives.

RECOMMENDATIONS REQUIRING ACTION BY THE GENERAL ASSEMBLY

The following fourteen recommendations are proposals which can help protect Iowa's groundwater resources. They require actions by the General Assembly before they can be implemented.

Groundwater Legislation C1

The Environmental Protection Commission recommends that special groundwater legislation be drafted and introduced to the Iowa General Assembly in 1987. This legislation should acknowledge the importance of groundwater as a resource in Iowa, define contamination, establish a goal of nondegradation, establish individual and corporate responsibility to prevent contamination, and grant increased authority to act in protecting groundwater resources.

Groundwater is a precious resource to the State of Iowa. It has a value beyond that of most State resources. Generally society places an economic value on its resources. It talks about the resource in terms of cost-benefit, profit and sometimes usefulness. However, groundwater is more than a resource like lead and timber, to which you can assign a cost. As a society, we must look at groundwater, like the soils of the State. Both are important to the quality of life and are things to which dollar-and-cent values must not be assessed. Quality groundwater is essential to a quality life and is the basis of a clean environment. Quality groundwater is essential to make Iowa a desireable place to live.

Special groundwater legislation would reinforce and recognize the importance of groundwater as a resource in Iowa. Currently there is little in the Code of Iowa which specifically addresses the importance of the resource or the responsibility to protect it. Currently, the goal of nondegradation is expressed by Department rule only. Further, there is a need to gain increased legal authority for the State to take action when necessary to protect groundwater.

The legislation needs to focus on requiring actions that prevent contamination of groundwater by human activities and clean up contamination when it is discovered. Contamination is considered to be any change in the quality of groundwater from its natural quality that is directly or indirectly caused by human activities. Waiting until the contamination becomes a problem to public health or limits the use of groundwater is not appropriate. The action initiated when contamination is found may be more detailed monitoring and evaluation of the extent and impact of the contamination. Legislative efforts to eliminate contaminants should be reasonable and recognize the importance of the activities of society. Legislation should recognize best management practices and best available technologies in the prevention and improvement of Iowa's groundwater, as well as the importance of public awareness and confidence. Emphasis should be directed predominantly toward those contaminants which pose a

significant risk to human health, the environment, the quality of life and future development in the State of Iowa. Again, the emphasis needs to be initiating actions which prevent contamination or which minimize it when it is first discovered, and not waiting until it becomes a problem to humans.

Agriculture C2

The Environmental Protection Commission recommends that the State of Iowa act immediately to initiate a ten-year, multi-agency, nonregulatory program directed at protecting groundwater from contamination resulting from the use of agricultural fertilizers and pesticides.

This recommendation has the following objectives:

1. development of management techniques which are more efficient than those widely used today and which reduce nitrate and pesticide losses to the environment, especially to groundwater;
2. widespread adoption of management practices which protect groundwater; and
3. development of information which can guide future groundwater policy concerning control of nonpoint, agricultural contamination of groundwater.

The proposed initiative includes three major components: research, education and evaluation.

There is a widespread agreement by both the Iowa public and the state's resource managers that non-point groundwater contamination resulting from nitrogen fertilization practices and pesticide applications constitutes our state's major source of contamination. In a survey of public attitudes conducted as a part of the Groundwater Protection planning process, more than 90% of Iowa's population considered these sources as a problem. The Ten-Year Agricultural Initiative employs a strategy of voluntary controls which should reduce the impact of nitrate and pesticides on Iowa's groundwater. It builds upon the activities of the "Big Spring Basin Demonstration Project" and the recently accepted proposal to the Agricultural Energy Management Advisory Council, entitled "A Demonstration-Education Program to Implement Integrated Farm Management for Energy Conservation, Environmental Protection, and Enhanced Profitability". It strengthens these efforts by increasing the agriculture research and demonstration efforts, by enhancing the educational program, and by assuring broader program evaluation.

Research

Research forms the cornerstone on this initiative. Agricultural research which explains and demonstrates more efficient use of nitrogen fertilizers and pesticides serves to convince farmers and agricultural experts, alike, that alternative management techniques can and should be used. Efficient use of these chemicals should produce economic benefit to the farmer and environmental benefits to all.

A ten-year plan of research should be developed among agricultural leaders, businessmen, researchers, state and federal agency personnel. Both basic and applied agricultural research must be included in the research plan. Basic research seeks to understand the factors which affect nitrogen and pesticide transformations and movement. It explains how things work, when they work and why they work. It is essential to design and evaluate management alternatives. Applied research should be the main emphasis of the plan. The research should evaluate timing, placement, application rates in relation to tillage systems and farm economics. It should also include consideration of rotation effects, natural pest control options, and forms of products (such as stabilized nitrogen) in regard to overall farm management and planning.

Although a specific research plan for this initiative goes beyond the scope of the Groundwater Protection Strategy, it should include efforts such as these:

1. development of a predictive soil test for nitrogen;
2. evaluation of nitrate and pesticide leaching in soils;
3. evaluation of the economics and potential groundwater effects from application rates, timing of applications, placement of nitrogen and pesticides, and the influence of crop rotations;
4. development of genetically improved crop varieties;
5. development of biological controls and improved integrated pest management techniques; and
6. evaluation of minimum input farming.

Iowa State University Experiment Station and the College of Agriculture are candidates for most of this research. Iowa State University researchers are recognized as leaders in the field and support of this initiative can help to accelerate and enhance their work. This can serve as a "magnet" to help researchers bring in other funds to further their work. Such research fits well with the new Tilth Center concept at Iowa State University, as well as other Iowa State University undertakings.

Education

Education is a key to success. Information has to be disseminated consistently, confidently and widely to target groups. A ten-year plan must be developed and implemented. Some progress has been made recently with development of the Agricultural Energy Management program, partial implementation of the Big Spring Basin Demonstration Project and recent slide-tape presentations. Much more remains to be incorporated into educational materials quickly. The plan should include the development of conventional pamphlets, reports and slide/video tape presentations. Further it should include projects to demonstrate management practices throughout the state, presentations at clinics and seminars, professional training for Extension staff, farm leaders, teachers and conservationists. Curriculum materials for high school

vocational-agricultural courses should be developed and informational "spots" should be developed for television and radio. Farm planning programs, such as Iowa 2000, should include current information on fertilizer and pesticide management and realistic yield goals as a part of the recommendations and alternatives presently directed only at soil conservation. Materials should stress economic and environmental impacts. Yields should only be discussed in reference to economics. Emphasis on the development of such educational materials should be placed at the beginning of the program to explain what we know now, and, again, near the end to explain what we will have learned from the research. Clinics, field demonstrations, personal contacts, and professional training need to be conducted throughout the ten-year initiative.

Further, special materials need to be developed for inclusion in the pesticide applicators certification plans, administered by the Department of Agriculture and Land Stewardship, which teach applicators about the potential groundwater effects from pesticide use.

Role of Business

Agribusiness is expected to be a part of this initiative and can play a key role. Agribusiness conducts significant research and sponsors numerous educational activities as a part of their business. Corporate research should be directed at finding products and management alternatives which can supplement those identified through publicly funded research. Private educational activities should emphasize efficiency and resource protection. Product advertising can educate users about efficiency and emphasize products or practices which protect our resources.

Local meetings and demonstration plots which they sponsor can utilize resource-protecting management practices. Corporate educational efforts may prove very succssful as the rural public is very concerned both about their water supplies and about their production costs. Agribusiness has no reason to be singled out as a culprit in this issue and proudly points to some past responses to environmental issues. For this voluntary approach to groundwater protection to succeed, the business community must make significant contributions.

Agribusiness and farmers both have responsibilities for protecting groundwater. The report, 1985 Agricultural Statistics reveals that soybean fields are now fertilized with nitrogen at an average rate of 23 lbs/acre. This is disturbing as the crop is not known to benefit from such fertilization. Farmers should purchase fertilizers for bean fields without nitrogen, and dealers should stock and recommend appropriate blends without nitrogen. Such practices only lead to product waste, and aggravate existing groundwater problems. Efforts by the fertilizer industry can help to alleviate such situations.

Farm organizations can play a key educational role as well. One of their major functions is educational and they can serve their membership by emphasizing efficiency and groundwater protection in meetings and educational materials. Government cannot solve this problem alone, and only the combined efforts of government, university, business, farm groups and individual farmers can make this initiative work.

Evaluation

This ten-year agricultural initiative requires regular evaluation. As with all resource programs, there are no quick fixes. The strategy is a long range one which takes into account the time realities of the groundwater system as well as the time realities of research, information dissemination and technique adoption. The strategy requires patience.

How much patience? How is it determined if the plan is working? The answer is monitoring of both groundwater quality, and nitrogen and pesticide sales. Written evaluations must be made biennually when the Commission reports to the General Assembly as a part of an ongoing groundwater protection planning process.

The Groundwater Strategy Implementation Council should approve the research and educational plans. This would assure that public needs are addressed and that a variety of interests are well served.

Although progress may be difficult to assess, the judicious evaluation of groundwater quality data and product usage data must accompany the research and education programs to evaluate their success. It is recommended that a ten-year monitoring plan be developed. This special groundwater monitoring must assess nitrate and pesticides in environments which may respond on a timescale of ten years. The Big Spring Basin and alluvial aquifers are good examples. It is expected that the Big Spring Basin Demonstration Project and special research directed at alluvial areas, combined with monitoring large numbers of domestic wells and municipal wells will enhance the process. The groundwater monitoring plan should be administered by the Iowa Department of Natural Resources in conjunction with other agencies.

The Department of Agriculture and Land Stewardship should be responsible for collecting and reporting fertilizer and pesticide use data. Currently, detailed fertilizer information is reported, but pesticide data is generally lacking. It is recommended that the Department of Agriculture and Land Stewardship be given the responsibility and authority to obtain and report pesticide sales data. It is recommended that pesticide data be obtained from retailers on an annual basis. Records would be aggregated to a county or agricultural reporting district basis so that regional use patterns can be identified. Reporting may be restricted to agricultural-use products only, or may include non-ag uses.

Other Issues

It should be noted that national policy issues and economics affect Iowa's nonpoint groundwater problems. Cropland set aside programs, farm crop loan rates, export markets, crop prices, alternative crops, dairy supports, land values and production costs all strongly affect land management in Iowa. Some may work in concert with resource protection, others clearly work against it. Regardless, Iowa's problems have not been created in a vaccuum, and federal policies should be shaped so that they are consistent with groundwater protection. This initiative clearly opposes certain federal policy directions. This proposed initiative stresses research as federal support for agricultural research dwindles. This initiative supports education, while federal support for the Cooperative Extension Service is being sharply cut.

Consideration of Pesticide Restrictions C3

The Environmental Protection Commission recommends that the Iowa Secretary of Agriculture shall be petitioned to consider restrictions on pesticides if the Department of Natural Resources determines that the contaminant concentration found in groundwater or their widespread occurrence in groundwater represent significant risk to human health and the environment.

Although the thrust of the nonpoint contaminant source programs proposed in the Strategy are voluntary, it should be noted that extensive pesticide regulations exist. These include special restriction on uses, application rates, labeling, protective clothing, and licensing of the products. The Iowa Department of Agriculture and Land Stewardship administers the Federal Insecticide, Fungicide, Rodenticide Act for the Environmental Protection Agency in Iowa. Under this authority, the Iowa Secretary of Agriculture may be petitioned to consider placing special restrictions on pesticides in Iowa. This mechanism should be employed for pesticide products found in Iowa's groundwater if their occurrence is thought to represent a significant risk to human health or the environment.

Hazardous Waste Facility C4

The Environmental Protection Commission recommends that the State of Iowa proceed to develop a facility to safely store and/or process hazardous waste by 1992.

The objective of this initiative is the prevention of groundwater contamination by minimizing disposal of hazardous waste in locations where it can cause problems. Uncontrolled disposal of hazardous wastes creates fear, although many of the products are used in everyday activities. Our society uses many products which create hazardous waste during manufacturing or which may be hazardous wastes themselves if they are improperly used. For Iowa industry such wastes are a major problem and current practices such as on-site and out-of-state disposal are not suitable alternatives for today. Iowa must develop a place for industrial producers, especially the small generators, and a place for household hazardous waste to go besides the landfill or some other form of land disposal such as disposal on a driveway, lawn or

roadside. Prevention of groundwater contamination requires that such wastes not be disposed of indiscriminantly.

This recommendation leaves open private, public-private cooperative ventures, or multi-state compacts as options. However, the state should decide and move ahead.

It should be noted that such a facility could include an adjacent recycling and/or waste reduction facility, both of which would be consistent with protecting water and conserving resources. Such facilities could be considered while still progressing with the storage facility. Decisions on these facilities should not be made such that they will interfere with the storage facility.

Hazardous Waste Collection and Transportation C5

The Environmental Protection Commission recommends that a statewide hazardous waste collection and transportation plan be developed and implemented in conjunction with a hazardous waste facility.

Having a facility and deriving maximum benefits from it can be two different issues. Household waste and waste from small generators must be collected routinely and efficiently transported to the hazardous waste facility. Alternatives to collecting county or regional household waste on a city, county, and regional basis must be developed. Alternatives to transporting them to the hazardous waste facility must be developed. Further routine collection of small generator wastes must be considered. Without a convenient, institutionalized system, prevention of groundwater contamination will be lost because fewer people will use the central facility. Again, public, private or joint efforts may be considered for adoption.

Health Information C6

The Environmental Protection Commission recommends that pertinent health information be collected and evaluated as a part of the continual development of groundwater protection policy.

The goal of this initiative is the development of an information base to help guide future groundwater policy development.

Iowa's public is highly concerned with water quality. The public's primary motivation for protecting groundwater quality is protection of its drinking water. The public understands that acute health problems can result from contamination, and it fears that chronic health problems may be far more common and hazardous in the long term. But, there are many unknowns. While epidemiological studies of environmental factors may never conclusively prove causal or non-causal relationships, they surely can improve on our understanding. It has in the past. Further, it could affect policy in the future. However, such information cannot contribute if our society doesn't collect the pertinent data and direct researchers toward the concerns which need addressing. Policy should be based on factual information, not emotional fears.

A health initiative should be undertaken in two general areas:

1. support for central compilation of pertinent data, and
2. support for epidimeological research in relation to groundwater/drinking water contamination.

Currently, cancer data is centrally collected and managed through the Iowa Cancer Registry program, located within the Department of Preventive Medicine, University of Iowa. The registry is supported by the National Institute of Health. Iowa's registry is the oldest such cancer data source in the nation and is very valuable for epidemiological research. However, other data may be meaningful as well and an expanded set of data should be available. For example, the proposed Birth Defect and Low Birth Weight registry program at the University of Iowa is strongly endorsed as a valuable addition to critical health data. Two additional registries also would be very valuable: a registry of diagnosed cases of methemoglobinemia and a registry of illness related to pesticides. Methemoglobinemia is a known threat to infants, but it is easily treated if diagnosed--and not centrally reported in Iowa. Thus its incidence is not recorded. Similarly, no one knows the extent of pesticide poisoning. Physicians should be required to report diagnosed cases for a period of ten years into the future so that an incidence record can be made available for epidimeological research.

The Iowa Department of Public Health should coordinate such efforts. The state needs to provide funds to help establish and maintain these records.

Researchers investigate problems for which data is available, for which they are supported to conduct the research, and which interest them. The registry programs would provide them data and the state support would focus researchers' attention on water-quality issues. It should foster the kind of cooperation that is necessary to maximize results by bringing medical and groundwater researchers together.

An extra benefit to the state's support for registries and epidemiological research is expected--the Preventive Medicine Program will be in a better position to receive further support from the National Institute of Health and the Environmental Protection Agency. National interest for epidemiological research will also see the added potentials for using Iowa as a focal point for such research. Iowa's problems will be addressed, information gained and our people served by more knowledge from which to develop enlightened groundwater policy.

Research into health-based, risk assessments of specific contaminants is not the business of the State of Iowa. Developing these assessments for drinking water should remain an Environmental Protection Agency task. It is an expensive environmental task and it should receive a high priority. However, Iowa has a responsibility to notify proper Environmental Protection Agency officials about the occurrence of contaminants and request priority for contaminants found in

Iowa. There is a myth that the Environmental Protection Agency will soon develop drinking water standards for all potential contaminants. In fact, progress is slow and the Environmental Protection Agency proposed developing standards for only two of the thirteen pesticides found in Iowa's water. Iowa should petition the Environmental Protection Agency to accelerate such assessments and place contaminants found in Iowa's groundwater among those upon the list for risk assessments.

Conservation Easements C7

The Environmental Protection Commission recommends that a program be developed to establish permanent conservation easements within watersheds which drain to sinkholes or in the areas which become wetlands after closure of agricultural drainage wells.

The objective of this initiative is to make available attractive options for taking land out of agricultural production (or other, adverse uses) in locations where low intensity land management would help protect groundwater resources.

A conservation easement is a recorded land-use agreement in which the property owner conveys to a governmental unit or charitable organization (the "holder") certain rights to be enforced by the holder for public benefit. The conservation easement assures that significant natural resources are fully identified and protected against intentional or inadvertent destruction. Although the easement is a voluntary, negotiated agreement between the original donor and the easement holder, once the easement is imposed and recorded it binds current and future owners to abide by its terms. Enforcement of the easement is accomplished through periodic inspections of the property, ongoing consultation with the owners concerning possibly permissible activities, and legal action to compel compliance with the easement in the event of a violation of its terms.

Two conservation easement programs are proposed. The first would produce wetlands in areas where drainage wells are presently providing drainage. This would add valuable wetland habitat for wildlife while eliminating excess crop land. It is proposed that the state would purchase the easement for 25% of the current, appraised value of the land or up to 25% of the cost of developing an alternative drainage outlet, whichever is least. The Iowa Department of Natural Resources would provide help in establishing a favorable marsh environment.

The owner would receive a land tax reduction as provided under current wetland laws and retain private ownership. Alternatively, the owner may desire to give the property to the state or some non-profit organization. It is assumed that normally this would occur concurrent with the plugging of the drainage well. Following development of appropriate rules by the Iowa Department of Natural Resources and the Iowa Department of Agriculture and Land Stewardship, implementation by a local agency would seem appropriate. Approximately 70,000 acres are eligible.

The second program would allow for a conservation easement purchase of watershed lands which drain to sinkholes. Reducing intense agricultural activity on such lands will also lower the risk to groundwater. It is proposed that the easement purchase be $100.00 per acre and lands could be put into either fenced timber or grass. The Iowa Department of Natural Resources would provide assistance in establishing these resources by providing seedlings, seed and technical advise. Harvesting timber or limited grazing should be allowed under terms of proposed easements. Ownership would be retained unless there was a desire to donate the property to the state or other public nonprofit groups. Following development of appropriate rules by the Iowa Department of Natural Resources and the Iowa Department of Agriculture and Land Stewardship implementation by a local agency would seem appropriate. Approximately 280,000 acres are eligible in Iowa.

Under both of these proposed programs, it is hoped that cooperation can be developed with appropriate federal, state, local and private organizations. Where lands are being repossessed by Federal Farm Home Administration, it is hoped that Federal Farm Home Administration would seek to place eligible lands under these programs. Similarly, various conservation and environmental groups can help through publicity, technical advice to landowners, and even, perhaps, matching dollars. Finally, the positive results of such programs will be realized locally. Local agency involvement is vital to success.

Approximately 50,000 acres of Iowa farmland is currently a part of Federal Farm Home Administration inventory farmland and eligible to be given or sold as conservation easements to public or private nonprofit groups. An idea which could offer assistance to this initiative would be development of a proposal to Federal Farm Home Administration that all these lands be transferred to the state. Naturally, most of these lands would not be in watersheds draining to drainage wells or sinkholes. However, perhaps they could be used in trade, or resold to generate revenue which could subsequently purchase easements in the desired watersheds. Such a proposal might be viewed favorably if comparable areas of land were removed from production. Federal Farm Home Administration's goals and the water quality goals of this initiative are similar.

Drainage Wells C8

The Environmental Protection Commission recommends that agricultural drainage wells should be recognized as a hazard to groundwater resources and declared illegal. They should be phased out and permanently sealed. The current moratorium on drainage well improvements should be maintained.

It has long been recognized that agricultural drainage wells are a potential source of contamination. In 1957, improvements to existing wells were prohibited. Although the practices may have been appropriate when they were developed, changes in modern agricultural practices make them a very inappropriate practice. Monitoring has confirmed their poten-

tial for contamination. The direct injection of contaminants into high quality deep rock aquifers should be ended. These days of surplus grain, falling land prices, and concern for groundwater, make today seem the appropriate time. Agricultural drainage wells constitute an unnecessary threat to our groundwater quality and place local users at unnecessary risk.

It must be recognized that drainage well closure may cause problems for some landowners. The proposed conservation easements and financial assistance alternatives suggested in separate recommendations should provide partial reparation for this proposal. However, as an increased incentive to cooperate in a timely fashion, the incentive program, if authorized, should end in 2000.

Abandoned Wells C9

The Environmental Protection Commission recommends that all water wells should be required to be properly plugged when they are abandoned or can no longer be of service. Improper abandonment should be illegal.

Improper abandonment of wells has long been a highly visible threat to groundwater resources. Proper well abandonment practices should be required when wells are removed from service. It should be the responsibility of the land owner and well driller or other well maintenance professionals to properly plug old wells. The Department of Public Health and Department of Natural Resources should jointly enforce rules for abandonment.

Well Closure C10

The Environmental Protection Commission recommends that programs be developed to plug all drainage wells and abandoned water wells.

Target Sinkhole Watersheds C11

The Environmental Protection Commission recommends that a program be developed which targets soil conservation in watersheds that drain to sinkholes. New practices should be considered in these watersheds and could include practices such as pasture, native prairie, filter strips, grass waterways, strip cropping, tree planting and sinkhole clean-up.

Storage Facilities C12

The Environmental Protection Commission recommends that a program be developed to help construct manure storage facilities so that existing organic fertilizer sources may be more effectively utilized. Further, county committees which set Agricultural Conservation Program (ACP) priorities are urged to encourage these facilities as well as making ACP cost-share alternatives for such facilities available.

Agricultural drainage wells, abandoned wells, sinkholes and manure storage practices do not represent a statewide threat to groundwater quality. However, the costs of dealing with these sources of groundwater contamination can be very high. Because of this, the Environmental Protection Commission cautions the General Assembly that these relatively low

priority issues can easily distract their attention from the more important groundwater protection issues that this Strategy addresses.

Programs can be designed to accelerate the implementation of practices which will help meet groundwater protection goals. Programs directed at plugging agricultural drainage wells and old abandoned wells can eliminate local threats of contamination. Programs directed at cleaning up garbage and other waste within sinkholes will help to reduce threats to groundwater in areas of the State with problems related to karst hydrology. A program to enhance manure storage is an incentive to employ more efficient fertilization and waste management practices as a part of the efficient agriculture to reduce nitrate contamination in groundwater.

There may be various approaches to implement these recommendations. One of these approaches is an incentive program of financial assistance. Such programs could be expensive. To help in determining the upper limit on the cost of implementing these programs, examples of incentive programs for alternative drainage, abandoned wells, sinkhole protection and manure storage are described in the following paragraphs.

Suggested Guidelines for Wells

Agricultural drainage wells and abandoned wells under any financial assistance program should be limited to existing wells. Newly abandoned wells should be properly abandoned at the owners expense. All drainage wells should be illegal and new ones should not be drilled. It goes beyond this Strategy to recommend rules, but a few basic guidelines are suggested.

Guidelines for Agricultural Drainage Well Financial Assistance Program:

1. State pays 100% of well plugging costs.
2. Well plugging will be done only by a well driller registered in the State of Iowa.
3. Rules will be developed by Department of Natural Resources.
4. Programs may be administered by a local agency.
5. Program will end December 31, 1999.

Guidelines for Old Abandoned Well Financial Assistance Program:

1. State pays 50% of well-plugging costs to a maximum of $300.
2. Well plugging will require verification by a registered well driller or a local, designated official.
3. Rules will be developed by the Iowa Department of Public Health and the Iowa Department of Natural Resources.
4. Programs may be administered by a local agency.
5. Program will end December 31, 1999.

Suggested Guidelines for Sinkholes

Concern for the effects of sinkholes on water quality is a legitimate, long-term concern for residents in the areas where sinkholes occur. Sediment, pathogens and high concentrations of agricultural chemicals in surface runoff constitute special groundwater problems unique to karst areas. Soil Conservation funds should be targeted into watersheds which drain entirely to sinkholes. Practices which minimize agricultural intensity such as pasture, native prairie, filter strips, grass waterways, strip cropping and tree planting should become eligible for special financial assistance.

Existing garbage and waste in sinkholes could be eligible for removal through a financial assistance program. While risk from sinkholes cannot be eliminated, risk can be minimized. One method is to provide an incentive to clean sinkholes of undesirable wastes. It is suggested that financial assistance be 50% of the clean-up cost to a maximum of $1,000 per sink, $10,000 per farm.

Such sinkhole financial assistance programs should be administered by a responsible local agency in accordance with rules developed by an appropriate state agency. Administration could begin in FY89.

Suggested Guidelines for Manure Storage

Many of Iowa's farmers have small herds of cattle or hogs. Manure from livestock is a known source of fertilizer. Proper storage enhances its value as a fertilizer and may allow it to be applied in a more timely manner. As such, development of an incentive program to install manure storage facilities enhances the options for an efficient agriculture. It may help entice farmers who are interested in installing such facilities to do so. It is suggested that state financial assistance be 50% of the total cost of implementation to a maximum of $5,000. The program should be administered through the local Soil Conservation District under rules developed by the Division of Soil Conservation, Department of Agriculture and Land Stewardship.

It should be noted that a similar cost-share opportunity exists under the Agricultural Conservation Program (ACP), administered by the Agricultural Stabilization and Conservation Service. However, it has never been emphasized in Iowa and county committees that set ACP priorities have never ranked it highly. These committees should be educated about water quality concerns and requested to prioritize manure management cost-share options. Presently, ACP programs can provide up to 75% cost-sharing to a maximum of $3,500.

Long-Term Financial Resources D1

The Environmental Protection Commission recommends that the State of Iowa make significant increases in long-term financial resources to support the groundwater protection programs of the state. Without such increases, most of the recommendations of this plan cannot be implemented.

The major problem facing Iowa groundwater programs is inadequate funding. In the past, laws have been passed which raised expectations, but money has not been provided to administer the programs adequately. Agencies have become so used to this practice that sometimes they have not requested adequate funding because it seemed futile. Programs are so inadequately staffed that all or many of the elements necessary to administer a program are incomplete.

Federal funds dominate the Iowa Department of Natural Resources environmental protection programs. Because state funds make up less than half of the budget for environmental programs, Iowa environmental programs are directed by the federal agenda, not Iowa's. With federal dollars so dominant, a large amount of time is spent meeting federal program and reporting requirements. Little time is left for determining Iowa's programmatic needs, evaluating state programs, collecting data important to Iowa, and developing educational programs. If the Environmental Protection Agency does not fund a program or activity, it probably does not get implemented. This should not be construed as suggesting that Iowa needs less money from the Environmental Protection Agency. Obviously, many needs go unmet because federal dollars are short. But, there is a clear need for substantial increases in state appropriations. These financial resources can be more flexible, can be used to meet administrative and programmatic needs, and facilitate better use of the federal monies. If Iowans want more done to protect their groundwater resources, and 83 percent recently indicated they do, they must be willing to make a substantial investment of funds over a period of years. Changes in government do not happen over night. Moreover, protection of groundwater and improvements in its water quality can only be measured over years.

Each proposal requires funds to initiate and implement. There is no reason to begin implementation of elements of this Strategy without adequate funding. That sort of action will lead to more frustration, dashed expectations and more programs being inadequately monitored, managed, administered and evaluated.

The way to improve Iowa's environmental programs and implement a groundwater protection strategy is through increased appropriations. Inadequate funding has been a major impediment to the implementation of groundwater protection in the past. Although funding is presented last, the development of adequate revenue may be the most important recommendation of this Strategy.

Oil Overcharge Settlement Funds
D2

The Environmental Protection Commission recommends that $37 million from the Oil Overcharge Settlement Funds be dedicated to support the proposed Strategy.

The precise amount of money that the state will receive from oil overcharge settlement cases is unknown. However, many of the highest priority programs can be funded for an estimated three to five year period if funds that are anticipated are judiciously managed and used. Tentative approval for using these funds to implement energy-efficient related parts of this strategy is pending, but approval is expected from the U.S. Department of Energy.

Oil Overcharge Settlement Funds cannot be used for some of the proposed programs, and they will become exhausted in the three to five year time period. If the initiatives are supported, auxillary funds are necessary, as well as long term funds. Possible alternative sources of funding include General Fund appropriations, tax code changes, user fees, special assessments, grants from various sources, and bonds.

The long-term financing of the Groundwater Protection Strategy probably will be a combination of a variety of sources of funds. The exact composition of the financing package is a matter to be decided by the Governor and the General Assembly. Work needs to begin now on putting the funding package together so that when the Oil Overcharge Settlement Funds are no longer available another source of funding for this program will be in place. Gaps in the financing of this program will severely affect its implementation and effectiveness and may cause it to fail.

IMPLEMENTATION COSTS

The cost of fully implementing all of the recommendations of this Groundwater Protection Strategy 1987 is estimated to be $230 million between July 1987 and June 1997. Oil Overcharge Settlement Funds can be used to cover $37 million of the estimated costs between July 1987 and June 1992. The balance of $193 million must be funded from other revenue sources to fully implement the Strategy.

Figure 21 shows the total cost per year and the portion of each year's costs that can be funded with Oil Overcharge Settlement Funds. Table 6 shows which of the recommendations can be fully or partially funded with Oil Overcharge Settlement Funds for each of the ten years covered by the Strategy.

Table 7 provides an annual estimate of the costs to implement the recommendations or programs outlined in this Strategy. The estimates are provided as an aid for consideration of the recommendations. Note that the program costs do not reflect the priority of each issue. There is no direct relationship between a program's cost and the relative importance of the issue it is designed to address. Financial assistance options are designed to eliminate the problem over ten years and their estimated costs are relatively high.

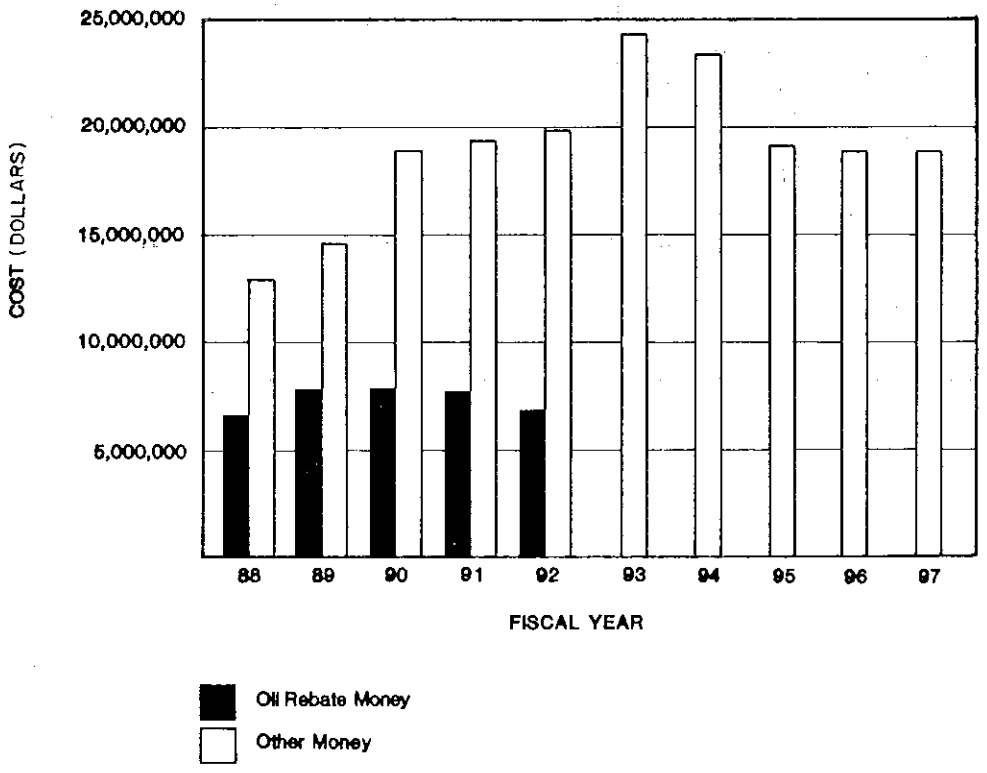

Figure 21. Cost Per Year by Funding Source.

Table 6. Programs Covered by Oil Overcharge Settlement Funds.

Recommendations		Fiscal Year 88	89	90	91	92	93	94	95	96	97
B1	Groundwater Information	X	0	0	0	0	-	-	-	-	-
B3	Public Awareness	X	X	X	X	X	-	-	-	-	-
B4	Uncontrolled Sites	0	0	0	0	0	-	-	-	-	-
B5	Landfill Alternatives	0	0	0	0	0	-	-	-	-	-
B6	Underground Storage Tanks	0	0	0	0	0	-	-	-	-	-
B7	Problem Assessment			X	X	X	-	-	-	-	-
C2	Agriculture	0	0	0	0	0	-	-	-	-	-
C4	Hazardous Waste Facility	-	-	-	-	-	-	-	-	-	-
C5	Haz. Waste Collect & Tran	-	-								
C6	Health Information	-	-	-	-	-	-	-	-	-	-
C7	Conservation Easements	-	-	-	-	-	-	-	-	-	-
C10	Well Closure	-	-	-	-	-	-	-	-	-	-
C11	Target Sinkhole Watersheds	-	-	-	-	-	-	-	-	-	-
C12	Storage Facilities	-	-	-	-	-	-	-	-	-	-

X = Total Funding 0 = Partial - = No Funding

Table 7. Groundwater Protection Strategy Implementation Costs.
In Thousands ($1,000's) of Dollars

		Fiscal Year										
	RECOMMENDATIONS	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	TOTAL
B1	GROUNDWATER INFORMATION											
	Municipal Monitoring											
	Oil	300	500	700	700	600						2800
	State						200	200	200	200	200	1000
	Local						400	400	400	400	400	2000
	Private Well Monitoring											
	Oil	400	600	600	600	600						2800
	State						400	400	400	400	400	2000
	Local											0
	Ambient Monitoring											
	Oil	100	100	100	100	100						500
	State						100	100	100	100	100	500
	Local											0
	Local Government Initiative											
	Oil											0
	State		100	100	100	100	100	100	100	100	100	900
	Local		100	100	100	100	100	100	100	100	100	900
	Vulnerability Mapping											
	Oil	100	100	100								300
	State											0
	Local											0
	Data Management											
	Oil	200	200									400
	State			50	50	50	50	50	50	50	50	400
	Local											0
	Nat. Res. Geog. Info. Sys.											
	Oil		500	250	150	100						1000
	State				50	100	200	200	200	200	200	1150
	Local											0
	Research											
	Oil	500	500	500	500	500						2500
	State						300	300	300			900
	Local											0
	Data Utilization											
	Oil	100	200	200	200	100						800
	State						100	100	100	100	100	500
	Local											0
B3	PUBLIC AWARENESS											
	Oil	400	400	400	400	400						2000
	State						200	200	200	200	200	1000
	Local											0

Table 7 (Cont'd)

	RECOMMENDATIONS		Fiscal Year 1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	TOTAL
B4	UNCONTROLLED DISPOSAL SITES												
	Initial Assessments												
		Oil	200	300	300	200							1000
		State					50	50	50	50	50	50	300
		Local											0
	Detailed Assessments												
		Oil	640	640	640	640	640						3200
		State						640	640	640	640	640	3200
		Local											0
	Mitigation												
		Oil											0
		State	850	850	850	850	850	2000	2000	2000	2000	2000	14250
		Local											0
B5	LANDFILL ALTERNATIVES												
	State Plans												
		Oil	100	100	100	100	100						500
		State	400	400	400	400	400	400	400	400	400	400	4000
		Local											0
	Rule Review/Revision												
		Oil		100									100
		State					100						100
		Local											0
B6	UNDERGROUND TANKS												
		Oil	375	375	375	375							1500
		State	200	200	200	200	400	400	400	400	400	400	3200
		Local											0
B7	PROBLEM ASSESSMENT												
		Oil			300	400	400						1100
		State						50	50	50	50	50	250
		Local											0
C2	AGRICULTURE												
	Research												
		Oil	800	800	800	800	800						4000
		State						800	800	800	800	800	4000
		Local											0
	Education/Demonstration												
		Oil	1700	1700	1700	1700	1700						8500
		State						100	100	100	100	100	500
		Local											0
	Evaluation												
		Oil	700	700	700	700	700						3500
		State	150	150	150	150	150	850	200	200	200	200	2400
		Local											0

Table 7 (Cont'd)

	RECOMMENDATIONS		Fiscal Year 1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	TOTAL
C4	HAZARDOUS WASTE FACILITY												
		Oil											0
		State	1000	700	5000	5000	5000	5000	5000	1000	1000	1000	29700
		Local											0
C5	HAZARDOUS WASTE COLLECTION AND TRANSPORTATION												
		Oil											0
		State	100	100									200
		Local											0
C6	HEALTH INFORMATION												
	Registries												
		Oil											0
		State	50	50	50	50	50	50	50	50	50	50	500
		Local											0
	Epidemiological Studies												
		Oil											0
		State		500	500	1000	1000	1000	500	250	250	250	5250
		Local											0
C7	CONSERVATION EASEMENTS												
	Wetlands												
		Oil											0
		State	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	14000
		Local											0
	Forest/Prairie												
		Oil											0
		State	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	18000
		Local											0
C10	WELL CLOSURE												
	ADW Closure												
		Oil											0
		State	700	700	700	700	700	700	700	700	700	700	7000
		Local											0
	Alt. Drainage (C7)												
		Oil											0
		State		1400	1400	1400	1400	1400	1400	1400	1400	1400	12600
		Local											0
	Abandoned Wells												
		Oil											0
		State	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	11000
		Local											0

Table 7 (Cont'd)

RECOMMENDATIONS		Fiscal Year 1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	TOTAL
C11 TARGET SINKHOLE WATERSHEDS												
Clean-Up												
	Oil											0
	State	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	14000
	Local											0
Conservation												
	Oil											0
	State	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	18000
	Local											0
C12 STORAGE FACILITY												
	Oil											0
	State	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
	Local											0
TOTAL PROGRAM IMPLEMENTATION		19565	22565	26765	27115	26690	25090	23940	19690	19390	19390	230200
	Oil	6615	7815	7765	7565	6740	0	0	0	0	0	36500
	State	12950	14650	18900	19450	19850	24590	23440	19190	18890	18890	190800
	Local	0	100	100	100	100	500	500	500	500	500	2900

Thus far all of the costs estimates shown have been for program implementation. In order to assure that the programs are properly implemented and that the funds are properly used, the Department of Natural Resources will need to add staff to coordinate and administer the program implementation activities. As Table 8 shows, 25 additional staff positions will be needed by the Department of Natural Resources to fulfill its program coordination and administration responsibilities. The cost of these positions and their associated support is estimated to be $750,000 per year.

TABLE 8
Coordination and Administration Staff

Program Manager	1
Program Coordinators	5
Program Specialists	12
Data Processing Support	2
Financial Support	1
Information & Education	2
Administrative Support	2
	25

APPENDIX A

SUMMARY OF PUBLIC ATTITUDE ON GROUNDWATER QUALITY IN IOWA

SURVEY OF PUBLIC ATTITUDE ON GROUNDWATER QUALITY IN IOWA

Public Opinion Poll Survey

Respondents in this study were asked to indicate, from a list of six problems or concerns facing Iowa today, which was the most important, second most important, least important and second least important. An analysis of their replies shows that a ranking from most important to least important would be:

1. Economic development to create jobs
2. Our schools and educational system
3. The quality of drinking water in Iowa
4. Controlling soil erosion
5. Maintaining and improving highways and bridges
6. Recreational facilities including parks and lakes

When asked about the degree of seriousness of the pollution of ground water, 44% of our respondents stated that it is "very serious", 42% stated "somewhat serious", 11% indicated that it is a "minor problem", 2% that it is "no problem" and 1% indicated "don't know/no opinion".

A majority of Iowans (63%) volunteered that "agricultural chemicals" are the main source of ground water pollution in Iowa. When asked if specific possible sources of ground water pollution caused "a great deal", "some", "very little", or "no" ground water pollution, a majority of our respondents attributed a great deal of pollution to farm pesticides (67%) and farm fertilizers (58%). More than one-third of Iowas attributed a great deal to hazardous waste disposal (39%). Additionally, more than one-fourth of our respondents attributed a great deal of ground water pollution to leaking underground storage tanks (28%) and accidental spills of hazardous materials (28%).

Less than one-fourth of our respondents indicated that four other possible sources are the source of a great deal of ground water pollution.

More than four-fifths (83%) of our respondents stated that they felt more needs to be done to solve ground water pollution problems.

When our respondents were asked if they strongly favor, favor, oppose or strongly oppose several possible solutions to ground water pollution problems, none of the solutions was strongly favored by a majority.

Fully 48% strongly favored the conducting of further research on the safe use of pesticides and fertilizers, 36% strongly favored making restrictions tighter on the use of farm pesticides, 29% strongly favored making restrictions tighter on the use of pesticides and fertilizers in towns and cities, 26% strongly favored making restrictions tighter on the use of pesticides and fertilizers in towns and cities, 26% strongly favored making restrictions tighter on the use of farm fertilizers and 22% strongly favored taxing fertilizers and pesticides so users would not use them excessively.

When those who favored restricting farm pesticides, farm fertilizers and the urban use of pesticides and fertilizers were asked if they should be totally banned, in every case, somewhat more than nine out of ten respondents indicated that those pesticides and fertilizers should be more tightly restricted but not totally banned.

Those respondents who favored the conducting of more research were asked how the search should be funded. More than one-fourth (28%) indicated that they didn't know. Fully 39% mentioned various taxes as a source of research funds and 20% mentioned various government sources.

Approximately two-thirds of our respondents (66%) indicated that not enough education for users of pesticides and fertilizers is currently being conducted.

Respondents were asked if they strongly favored, favored, opposed or strongly opposed, several proposed solutions to groundwater pollution caused by industrial and commercial wastes. None of the solutions was strongly favored by a majority of the respondents. Three possible solutions were strongly favored by approximately the same percentage of respondents. "Increasing regulations on disposal practices" and "requiring prodution processes which minimize hazardous wastes" were both strongly favored by 40% while "conducting research on ways to minimize the production of industrial waste" was strongly favored by 39% of our respondents.

"Increasing taxes on polluting industries was strongly favored by 35% of the respondents and 24% strongly favored "banning the activity which causes the pollution."

APPENDIX B

Summary of Comments and Questions at Groundwater Public Meetings

Conducted by: Iowa Department of Natural Resources
November 17-25, 1986

COMMENTS AND QUESTIONS AT GROUND WATER PUBLIC MEETINGS
November, 1986

Waterloo - 11/17/86

Comments

1. Most "education" to farmers come from chemical companies. They say, "Make sure you get your chemicals on your fields; now is not the time to reduce your chemical applications."
2. There are people at the University of Northern Iowa interested in conducting ground water research. Talk to us!
3. There needs to be more education on ground water.

Questions

1. Will the state cooperate with groups such as "Practical Farmers"?
2. Will the state really take an active role in protecting ground water? Will it put up the money?
3. Are there plans to educate the public even if the state doesn't do anything else?
4. Are there to be restrictions on agricultural chemical usage? If there are, how long before we see results?
5. Isn't it true that chemical companies have sponsored much of the research on agricultural chemicals?
6. Is the ground water problem new, or is it simply a matter that was recently recognized?
7. How does the cost of protecting ground water from ag chemicals compare to hazardous site clean up?
8. How big a ground water quality problem is there in Black Hawk County?
9. How can abandoned wells be identified? What resources are available to find them? Where will the staff come from to enforce rules and regulations about them?
10. Is research to be funded only into the universities? Are they involved in ground water research?
11. Why haven't we recognized that there is a problem earlier?

Public Attendance: 6

Washington - 11/18/86

Comments

1. DNR should study the ground water problem very hard. Use all the $27,000,000 to study the problem. Study it to death.
2. There is a growing awareness of ag chemical problems by farmers. They are concerned. They want viable alternatives.
3. There is a problem with states acting on their own to combat ground water contamination. A strict state can't be competitive with a less restrictive one.
4. Groups like the Farm Bureau need to become actively involved in the educational program.

Questions

1. What is the current status of the groundwater protection plan? Has it been to the Commission?
2. Can "Stripper Well" moneys be applied to all these proposed initiatives?
3. How long will "Stripper Well" money last? Then what?
4. What is the significance of "Ten Years" in the Agricultural Initiative? Does it mean we are just waiting another ten years and not doing anything?
5. Are there any new restrictions proposed on pesticides?
6. I understand that the plan proposed "non-degradation" as the prevention goal. That apparently means conditions get no worse and hopefully better. Do these initiatives support this goal?
7. How do you get farmers to do organic farming?
8. Could insurance somehow promote a change to organic farming?
9. How can the state compete with the chemical companies' advertising?
10. What are other states doing? Why not impose restrictions on pesticides like California?
11. Do we really need more information, or have we spend enough on research?
12. Is there a concern with the use of pesticides on the Muscatine island? Has anyone studied that area?

Public Attendance: 2

Des Moines - 11/19/86 Questions

1. How can you tell if the Agricultural Initiative is working? Two year reporting intervals seem too short to expect scientifically verifiable changes in groundwater.
2. What about ground water standards? They aren't mentioned. Does this mean that all levels of contamination are safe?
3. A non-regulatory approach is proposed, yet, much of the plan involves rules and regulations. Explain?
4. What about a tax on ag-chemical containers? Might that be a viable source of funds for the ground water programs?
5. Do I understand that for ag-drainage wells there is a proposed choice between alternative drainage and wetland easements?
6. Why not simply let drainage wells plug up naturally?
7. Do the Energy Rebate funds apply to all the initiatives? How are they allocated, approved, handled?
8. What is the schedule for the plan?
9. Will there be special ground water legislation proposed?
10. How do you define ground water?
11. It will take rules to implement the initiatives. Will they ever get done or will they be like the storage tank rules?

Public Attendance: 5

Atlantic - 11/24/86 Comments

1. I'm surprised that there is not a larger turnout.
2. I don't think people are very well informed.
3. A neighbor's water killed his hogs yet he still drinks it. People have to be scared out of their wits before they are concerned.
4. I feel too much of the public is complacent. I know our water is unsafe to drink. We drink distilled water.
5. We hear people say "our city water is ok, it gets tested" but they don't test for many chemicals.
6. We have trouble with iron bacteria in our well.
7. We have a reverse osmosis system to get out nitrate.
8. There seems to be a leukemia problem with the water near the Nishnabotna River.

Questions

1. What kind of reaction are you getting from the farmers and chemical companies?
2. You have a lot of plans. How are you going to carry them out?
3. Have other states begun action? What is Arkansas doing?
4. At Griswold they sunk a new well and they aren't supposed to fertilize around it. Is that going to do anything?
5. Doesn't some of the chemicals get down into the aquifer and move from state to state?
6. How will the legislature receive this plan? What will happen?
7. Would they do a "Big Spring" study out here in S.W. Iowa?
8. Are rural water systems better than country wells?
9. Will more terraces help?
10. What happens if you cut fertilizer in half? Will the same amount leach?

Public Attendance: 6

Spencer - 11/25/86 Comments

1. Animal manure is a better source of nitrogen than commercial fertilizer. We should raise more animals and use the fertilizer.
2. The idea of manure storage seems good.
3. I support the idea of closing ag-drainage wells. We know nitrates and pesticides are entering our aquifers. We need ducks and geese. Now is the time. Wildlife and hunting bring in money too.
4. I agree very much.
5. We are fortunate here. We have better water than California and Arizona. We need to protect our water now.
6. We put on too much nitrogen. It is put on for convenience. You have a tough job convincing people to use less.
7. I'm concerned about testing around lagoons. We have no research information. Chlorides are moving laterally and causing crop problems.

8. Public information is very necessary. People are asking questions. A ground swell will come. It has to begin with education.
9. There used to be a tax incentive on manure storage facilities. This should be considered again.
10. The Iowa Water Well Association has held a number of demonstrations on well drilling and ground water monitoring. The DNR should include this in an education program.
11. The Association for Public Justice is studying the problem of ground water. We support the DNR stand - monitoring and education are very important. There are 25 states going ahead with ground water protection. We are glad Iowa is moving ahead.

Questions

1. When you categorized the sources was the agreement only opinion or technical as well?
2. Is there a program for testing private wells?
3. Are there any cheaper tests for pesticides?
4. If nitrates are high does that mean pesticides are also probably present?
5. Is there a problem with labs? How do you develop consistency in water testing?
6. Aren't gravel pits a problem?
7. There are many sand point wells in this area. How deep are city wells?
8. Why isn't a tax on ag-chemicals being proposed?
9. What about ag dealers? Isn't there a need to investigate these spill sites?
10. Does DNR see motor oil as a big issue?
11. How is the $27 million budgeted? Is it for education?
12. Can the state declare ag drainage wells illegal?
13. What about aquifer classification? Some aquifers are more valuable than others.
14. Not having standards is a problem for someone in the field. How much do we clean it up to? Standards would be convenient.
15. If EPA allows Lasso, does that mean Iowa has to go along with it?
16. Are these initiatives before the Legislature?
17. Do you expect heavy lobbying on this issue?
18. Shouldn't there be a central reporting requirement for water analysis?
19. How about lead in the water for the City of Spencer?
20. How do you enforce the closure of abandoned wells?
21. If prevention is your goal, do you believe further controls and restrictions will be needed?

Public Attendance: 12

Selected Comments/Suggestions

Written Comments Received Fairfield - 11/14/86	"...my main concern is that the nitrates may be the least harmful of an array of pollutants contained in the water." "Ascertain criterion for naming families of agricultural chemcals for categories of toxicity, volaltility, and/or biogradability." "End spraying in ditches along rural roads!" "A contrainer deposit ($5 per five gal can) for pesticides and herbicides." "Get advice from Amish farmers." "The water here is terrible." "Our family members have all experienced diarrhea..." "How often is city water tested by the state?" "It will take Ames to answer this."
Hospers - 12/02/86	"I fully believe chisel (plowing) ground in the fall kills ...the nitrogen." "I think we need to go back to rotating corn and soybeans." "I think Lasso should be taken off the market; give dealers, etc. a chance to unload first."
Northwood - 12/05/86	"The plan needs to call for a moratorium on the use or introduction of any new pesticides." "The plan needs to enforcibly prevent the degradation, draining, or alteration of any and all of Iowa's wetlands." "Design and implementation of the plan must acknowledge that, while improving Iowa's water quality is costly in the short term, the long term benefits will be enormous." "A state tax on the sale of pesticides, and other water pollutants can be used to provide purchase and installation funds for "reborn" wetlands and for...grassed waterways and other features."
Des Moines - 12/04/86	"Lack of publicity on these hearings and the lack of any written plan for distribution prior to or at these hearings for comment has in effect nullified the public hearing process." "We do not believe that the Commission should adopt any priority plan for recommendation to the legislature at this time..." "You may very well find that when monitoring of these many other sources of groundwater contamination becomes a reality that this priority schedule will need to be drastically revised..." "We must move forward on all sources of groundwater contamination and all segments of society must bear a share of the burden if it is to be successful." "As an association we plan to expand our contribution from the industry to protect groundwater from contamination by our products..." "We will ask that these funds be administered by a proposed center of excellence for groundwater protection that is under consideration presently at Iowa State University at Ames." "Educational programs should be carried out by educational institutions rather than a regulatory agency." "We endorse the collection and evaluation of human health information." "There is no question that the state must make significant increases in financial support of a plan for groundwater protection in the state or it simply will not be accomplished."

APPENDIX C

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HOUSE FILE 631

AN ACT

RELATING TO PUBLIC HEALTH AND SAFETY BY ESTABLISHING MEASURES TO IMPROVE AND PROTECT GROUNDWATER QUALITY AND TO MANAGE SUBSTANCES WHICH POSE HEALTH AND SAFETY HAZARDS, BY ESTABLISHING GOALS, POLICIES, FUNDING MECHANISMS, INCLUDING TAXES AND FEES, AND ADMINISTRATIVE PROVISIONS FOR THE MEASURES, BY ESTABLISHING PROGRAMS RELATING TO THE MANAGEMENT OF AGRICULTURAL ACTIVITIES, SOLID WASTE DISPOSAL, HOUSEHOLD HAZARDOUS WASTES, STORAGE TANKS, FERTILIZERS, PESTICIDES, LANDFILLS, AND WATERSHEDS, BY PROVIDING PENALTIES, ESTABLISHING EFFECTIVE DATES, MAKING APPROPRIATIONS, AND BY PROVIDING FOR OTHER PROPERLY RELATED MATTERS.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF IOWA:

PART ONE -- GENERAL PROVISIONS

Chapter 455E

GROUNDWATER PROTECTION

Section 101. NEW SECTION. 455E.1 TITLE.

This chapter shall be known and may be cited as the "Groundwater Protection Act".

Sec. 102. NEW SECTION. 455E.2 DEFINITIONS.

As used in this chapter, unless the context otherwise requires:

1. "Groundwater" means any water of the state, as defined in section 455B.171, which occurs beneath the surface of the earth in a saturated geological formation of rock or soil.

2. "Department" means the department of natural resources created under section 455A.2.

3. "Director" means the director of the department.

4. "Commission" means the environmental protection commission created under section 455A.6.

5. "Contamination" means the direct or indirect introduction into groundwater of any contaminant caused in whole or in part by human activities.

6. "Contaminant" means any chemical, ion, radionuclide, synthetic organic compound, microorganism, waste, or other substance which does not occur naturally in groundwater or which naturally occurs at a lower concentration.

7. "Active cleanup" means removal, treatment, or isolation of a contaminant from groundwater through the directed efforts of humans.

8. "Passive cleanup" means the removal or treatment of a contaminant in groundwater through management practices or the construction of barriers, trenches, and other similar facilities for prevention of contamination, as well as the use of natural processes such as groundwater recharge, natural decay, and chemical or biological decomposition.

Sec. 103. NEW SECTION. 455E.3 FINDINGS.

The general assembly finds that:

1. Groundwater is a precious and vulnerable natural resource. The vast majority of persons in the state depend on groundwater as a drinking water source. Agriculture, commerce, and industry also depend heavily on groundwater. Historically, the majority of Iowa's groundwater has been usable for these purposes without treatment. Protection of groundwater is essential to the health, welfare, and economic prosperity of all citizens of the state.

2. Many activities of humans, including the manufacturing, storing, handling, and application to land of pesticides and fertilizers; the disposal of solid and hazardous wastes; the

storing and handling of hazardous substances; and the improper construction and the abandonment of wells and septic systems have resulted in groundwater contamination throughout the state.

3. Knowledge of the health effects of contaminants varies greatly. The long-term detriment to human health from synthetic organic compounds in particular is largely unknown but is of concern.

4. Any detectable quantity of a synthetic organic compound in groundwater is unnatural and undesirable.

5. The movement of groundwater, and the movement of contaminants in groundwater, is often difficult to ascertain or control. Decontamination is difficult and expensive to accomplish. Therefore, preventing contamination of groundwater is of paramount importance.

Sec. 104. NEW SECTION. 455E.4 GROUNDWATER PROTECTION GOAL.

The intent of the state is to prevent contamination of groundwater from point and nonpoint sources of contamination to the maximum extent practical, and if necessary to restore the groundwater to a potable state, regardless of present condition, use, or characteristics.

Sec. 105. NEW SECTION. 455E.5 GROUNDWATER PROTECTION POLICIES.

1. It is the policy of the state to prevent further contamination of groundwater from any source to the maximum extent practical.

2. The discovery of any groundwater contamination shall require appropriate actions to prevent further contamination. These actions may consist of investigation and evaluation or enforcement actions if necessary to stop further contamination as required under chapter 455B.

3. All persons in the state have the right to have their lawful use of groundwater unimpaired by the activities of any person which render the water unsafe or unpotable.

4. All persons in the state have the duty to conduct their activities so as to prevent the release of contaminants into groundwater.

5. Documentation of any contaminant which presents a significant risk to human health, the environment, or the quality of life shall result in either passive or active cleanup. In both cases, the best technology available or best management practices shall be utilized. The department shall adopt rules which specify the general guidelines for determining the cleanup actions necessary to meet the goals of the state and the general procedures for determining the parties responsible by July 1, 1989. Until the rules are adopted, the absence of rules shall not be raised as a defense to an order to clean up a source of contamination.

6. Adopting health-related groundwater standards may be of benefit in the overall groundwater protection or other regulatory efforts of the state. However, the existence of such standards, or lack of them, shall not be construed or utilized in derogation of the groundwater protection goal and protection policies of the state.

7. The department shall take actions necessary to promote and assure public confidence and public awareness. In pursuing this goal, the department shall make public the results of groundwater investigations.

8. Education of the people of the state is necessary to preserve and restore groundwater quality. The content of this groundwater protection education must assign obligations, call for sacrifice, and change some current values. Educational efforts should strive to establish a conservation ethic among Iowans and should encourage each Iowan to go beyond enlightened self-interest in the protection of groundwater quality.

Sec. 106. NEW SECTION. 455E.6 LEGAL EFFECTS.

This chapter supplements other legal authority and shall not enlarge, restrict, or abrogate any remedy which any person or class of persons may have under other statutory or common law and which serves the purpose of groundwater protection. An activity that does not violate chapter 455B does not violate this chapter. In the event of a conflict between this section and another provision of this chapter, it is the intent of the general assembly that this section prevails.

Liability shall not be imposed upon an agricultural producer for the costs of active cleanup, or for any damages associated with or resulting from the detection in the groundwater of any quantity of nitrates provided that application has been in compliance with soil test results and that the applicator has properly complied with label instructions for application of the fertilizer. Compliance with the above provisions may be raised as an affirmative defense by an agricultural producer.

Liability shall not be imposed upon an agricultural producer for costs of active cleanup, or for any damages associated with or resulting from the detection in the groundwater of pesticide provided that the applicator has properly complied with label instructions for application of the pesticide and that the applicator has a valid appropriate applicator's license. Compliance with the above provisions may be raised as an affirmative defense by an agricultural producer.

Sec. 107. NEW SECTION. 455E.7 PRIMARY ADMINISTRATIVE AGENCY.

The department is designated as the agency to coordinate and administer groundwater protection programs for the state.

Sec. 108. NEW SECTION. 455E.8 POWERS AND DUTIES OF THE DIRECTOR.

In addition to other groundwater protection duties, the director, in cooperation with soil district commissioners and with other state and local agencies, shall:

1. Develop and administer a comprehensive groundwater monitoring network, including point of use, point of contamination, and problem assessment monitoring sites across the state, and the assessment of ambient groundwater quality.

2. Include in the annual report required by section 455A.4, the number and concentration of contaminants detected in groundwater. This information shall also be provided to the director of public health and the secretary of agriculture.

3. Report any data concerning the contamination of groundwater by a contaminant not regulated under the federal Safe Drinking Water Act, 42 U.S.C. § 300(f) et seq. to the United States environmental protection agency along with a request to establish a maximum contaminant level and to conduct a risk assessment for the contaminant.

4. Complete groundwater hazard mapping of the state and make the results available to state and local planning organizations by July 1, 1991.

5. Establish a system or systems within the department for collecting, evaluating, and disseminating groundwater quality data and information.

6. Develop and maintain a natural resource geographic information system and comprehensive water resource data system. The system shall be accessible to the public.

7. Develop and adopt by administrative rule, criteria for evaluating groundwater protection programs by July 1, 1988.

8. Take any action authorized by law, including the investigatory and enforcement actions authorized by chapter 455B, to implement the provisions of this chapter and the rules adopted pursuant to this chapter.

9. Disseminate data and information, relative to this chapter, to the public to the greatest extent practical.

10. Develop a program, in consultation with the department of education and the department of environmental education of

the University of Northern Iowa, regarding water quality issues which shall be included in the minimum program required in grades seven and eight pursuant to section 256.11, subsection 4.

Sec. 109. NEW SECTION. 455E.9 POWERS AND DUTIES OF THE COMMISSION.

1. The commission shall adopt rules to implement this chapter.

2. When groundwater standards are proposed by the commission, all available information to develop the standards shall be considered, including federal regulations and all relevant information gathered from other sources. A public hearing shall be held in each congressional district prior to the submittal of a report on standards to the general assembly. This report on how groundwater standards may be a part of a groundwater protection program shall be submitted by the department to the general assembly for its consideration by January 1, 1989.

Sec. 110. NEW SECTION. 455E.10 JOINT DUTIES -- LOCAL AUTHORITY.

1. All state agencies shall consider groundwater protection policies in the administration of their programs. Local agencies shall consider groundwater protection policies in their programs. All agencies shall cooperate with the department in disseminating public information and education materials concerning the use and protection of groundwater, in collecting groundwater management data, and in conducting research on technologies to prevent or remedy contamination of groundwater.

2. Political subdivisions are authorized and encouraged to implement groundwater protection policies within their respective jurisdictions, provided that implementation is at least as stringent but consistent with the rules of the department.

Sec. 111. NEW SECTION. 455E.11 GROUNDWATER PROTECTION FUND ESTABLISHED.

1. A groundwater protection fund is created in the state treasury. Moneys received from sources designated for purposes related to groundwater monitoring and groundwater quality standards shall be deposited in the fund. Notwithstanding section 8.33, any unexpended balances in the groundwater protection fund and in any of the accounts within the groundwater protection fund at the end of each fiscal year shall be retained in the fund and the respective accounts within the fund. The fund may be used for the purposes established for each account within the fund.

The director shall include in the departmental budget prepared pursuant to section 455A.4, subsection 1, paragraph "c", a proposal for the use of groundwater protection fund moneys, and a report of the uses of the groundwater protection fund moneys appropriated in the previous fiscal year.

The secretary of agriculture shall submit with the report prepared pursuant to section 17.3 a proposal for the use of groundwater protection fund moneys, and a report of the uses of the groundwater protection fund moneys appropriated in the previous fiscal year.

2. The following accounts are created within the groundwater protection fund:

a. A solid waste account. Moneys received from the tonnage fee imposed under section 455B.310 and from other sources designated for environmental protection purposes in relation to sanitary disposal projects shall be deposited in the solid waste account.

The department shall use the funds in the account for the following purposes:

(1) The first fifty cents per ton of funds received from the tonnage fee imposed under section 455B.310 for the fiscal year beginning July 1, 1988 and ending June 30, 1989, shall be used for the following:

(a) Six cents per ton of the amount allocated under this subparagraph is appropriated to the waste management authority within the department of natural resources.

(b) Fourteen cents per ton of the amount allocated under this subparagraph is appropriated to the University of Northern Iowa to develop and maintain the small business assistance center for the safe and economic management of solid waste and hazardous substances established at the University of Northern Iowa.

(c) Eight thousand dollars of the amount allocated under this subparagraph is appropriated to the Iowa department of public health for carrying out the departmental duties pursuant to section 135.11, subsections 20 and 21, and section 139.35.

(d) The remainder of the amount allocated under this subparagraph is appropriated to the department of natural resources for the following purposes:

(i) The development of guidelines for groundwater monitoring at sanitary disposal projects as defined in section 455B.301, subsection 3.

(ii) Abatement and cleanup of threats to the public health, safety, and the environment resulting from a sanitary landfill if an owner or operator of the landfill is unable to facilitate the abatement or cleanup. However, not more than ten percent of the total funds allocated under this subparagraph may be used for this purpose without legislative authorization.

(2) An additional fifty cents per ton from the fees imposed under section 455B.310 for the fiscal year beginning July 1, 1988 and ending June 30, 1989 shall be used by the department to develop and implement demonstration projects for landfill alternatives to solid waste disposal including recycling programs.

(3) The additional fifty cents per ton collected from the fee imposed under section 455B.310 for the fiscal year beginning July 1, 1988 and ending June 30, 1989 may be retained by the agency making the payments to the state provided that a separate account is established for these funds and that they are used in accordance with the requirements of section 455B.306.

(4) The first fifty cents per ton of funds received from the tonnage fee imposed under section 455B.310 for the fiscal year beginning July 1, 1989 and ending June 30, 1990, shall be used for the following:

(a) Six cents per ton of the amount allocated under this subparagraph is appropriated to the waste management authority within the department of natural resources.

(b) Fourteen cents per ton of the amount allocated under this subparagraph is appropriated to the University of Northern Iowa to develop and maintain the small business assistance center for the safe and economic management of solid waste and hazardous substances established at the University of Northern Iowa.

(c) Eight thousand dollars of the amount allocated under this subparagraph is appropriated to the Iowa department of public health for carrying out the departmental duties pursuant to section 135.11, subsections 20 and 21, and section 139.35.

(d) The remainder of the amount allocated under this subparagraph is appropriated to the department of natural resources for the following purposes:

(i) The development of guidelines for groundwater monitoring at sanitary disposal projects as defined in section 455B.301, subsection 3.

(ii) Abatement and cleanup of threats to the public health, safety, and the environment resulting from a sanitary landfill if an owner or operator of the landfill is unable to

facilitate the abatement or cleanup. However, not more than ten percent of the total funds allocated under this subparagraph may be used for this purpose without legislative authorization.

(5) One dollar per ton from the fees imposed under section 455B.310 for the fiscal year beginning July 1, 1989 and ending June 30, 1990 shall be used by the department to develop and implement demonstration projects for landfill alternatives to solid waste disposal including recycling programs.

(6) The additional fifty cents per ton collected from the fee imposed under section 455B.310 for the fiscal year beginning July 1, 1989 and ending June 30, 1990 may be retained by the agency making the payments to the state provided that a separate account is established for these funds and that they are used in accordance with the requirements of section 455B.306.

(7) The first fifty cents per ton of funds received from the tonnage fee imposed for the fiscal year beginning July 1, 1990 and thereafter shall be used for the following:

(a) Fourteen cents per ton of the amount allocated under this subparagraph is appropriated to the University of Northern Iowa to develop and maintain the small business assistance center for the safe and economic management of solid waste and hazardous substances established at the University of Northern Iowa.

(b) Eight thousand dollars of the amount allocated under this subparagraph is appropriated to the Iowa department of public health for carrying out the departmental duties pursuant to section 135.11, subsections 20 and 21, and section 139.35.

(c) The administration and enforcement of a groundwater monitoring program and other required programs which are related to solid waste management.

(d) The development of guidelines for groundwater monitoring at sanitary disposal projects as defined in section 455B.301, subsection 3.

(e) Abatement and cleanup of threats to the public health, safety, and the environment resulting from a sanitary landfill if an owner or operator of the landfill is unable to facilitate the abatement or cleanup. However, not more than ten percent of the total funds allocated under this subparagraph may be used for this purpose without legislative authorization.

(8) One dollar per ton from the fees imposed under section 455B.310 for the fiscal year beginning July 1, 1990 and thereafter shall be used by the department to develop and implement demonstration projects for landfill alternatives to solid waste disposal including recycling programs.

(9) Each additional fifty cents per ton per year of funds received from the tonnage fee for the fiscal period beginning July 1, 1990 and thereafter is allocated for the following purposes:

(a) Thirty-five cents per ton per year shall be allocated to the department of natural resources for the following purposes:

(i) Twenty-five cents per ton per year shall be used to develop and implement demonstration projects for landfill alternatives to solid waste disposal including recycling programs.

(ii) No more than ten cents of the thirty-five cents per year may be used for the administration of a groundwater monitoring program and other required programs which are related to solid waste management, if the amount of funds generated for administrative costs in this fiscal period is less than the amount generated for the costs in the fiscal year beginning July 1, 1988.

(b) Fifteen cents per ton per year shall be allocated to local agencies for use as provided by law.

(10) Cities, counties, and private agencies subject to fees imposed under section 455B.310 may use the funds collected in accordance with the provisions of this section and the conditions of this subsection. The funds used from the account may only be used for any of the following purposes:

(a) Development and implementation of an approved comprehensive plan.

(b) Development of a closure or postclosure plan.

(c) Development of a plan for the control and treatment of leachate which may include a facility plan or detailed plans and specifications.

(d) Preparation of a financial plan, but these funds may not be used to actually contribute to any fund created to satisfy financial requirements, or to contribute to the purchase of any instrument to meet this need.

On January 1 of the year following the first year in which the funds from the account are used, and annually thereafter, the agency shall report to the department as to the amount of the funds used, the exact nature of the use of the funds, and the projects completed. The report shall include an audit report which states that the funds were, in fact, used entirely for purposes authorized under this subsection.

(11) If moneys appropriated to the portion of the solid waste account to be used for the administration of groundwater monitoring programs and other required programs that are related to solid waste management remain unused at the end of any fiscal year, the moneys remaining shall be allocated to the portion of the account used for abatement and cleanup of threats to the public health, safety, and the environment, resulting from sanitary landfills. If the balance of the moneys in the portion of the account used for abatement and

cleanup exceeds three million dollars, the moneys in excess shall be used to fund the development and implementation of demonstration projects for landfill alternatives to solid waste disposal including recycling.

The agriculture management account shall be used for the following purposes:

(1) Nine thousand dollars of the account is appropriated to the Iowa department of public health for carrying out the departmental duties under section 135.11, subsections 20 and 21, and section 139.35.

(2) Of the remaining moneys in the account:

(a) Thirty-five percent is appropriated annually for the Leopold center for sustainable agriculture at Iowa State University of science and technology.

(b) Two percent is appropriated annually to the department of natural resources for the purpose of administering grants to counties and conducting oversight of county-based programs relative to the testing of private water supply wells and the proper closure of private abandoned wells. Not more than twenty-three percent of the moneys is appropriated annually to the department of natural resources for grants to counties for the purpose of conducting programs of private, rural water supply testing, not more than six percent of the moneys is appropriated annually to the state hygienic laboratory to assist in well testing, and not more than twelve percent of the moneys is appropriated annually to the department of natural resources for grants to counties for the purpose of conducting programs for properly closing abandoned, rural water supply wells.

(c) The department shall allocate a sum not to exceed seventy-nine thousand dollars of the moneys appropriated for the fiscal year beginning July 1, 1987, and ending June 30, 1988 for the preparation of a detailed report and plan for the establishment on July 1, 1988 of the center for health effects

of environmental contamination. The plan for establishing the center shall be presented to the general assembly on or before January 15, 1988. The report shall include the assemblage of all existing data relating to Iowa drinking water supplies, including characteristics of source, treatment, presence of contaminants, precise location, and usage patterns to facilitate data retrieval and use in research; and detailed organizational plans, research objectives, and budget projections for the anticipated functions of the center in subsequent years. The department may allocate annually a sum not to exceed nine percent of the moneys appropriated to the center, beginning July 1, 1988.

(d) Thirteen percent of the moneys is appropriated annually to the department of agriculture and land stewardship for financial incentive programs related to agricultural drainage wells and sinkholes, for studies and administrative costs relating to sinkholes and agricultural drainage wells programs, and not more than two hundred thousand dollars of the moneys is appropriated for the demonstration projects regarding agricultural drainage wells and sinkholes. Of the thirteen percent allocated for financial incentive programs, not more than fifty thousand dollars is appropriated for the fiscal year beginning July 1, 1987 and ending June 30, 1988, to the department of natural resources for grants to county conservation boards for the development and implementation of projects regarding alternative practices in the remediation of noxious weed or other vegetation within highway rights-of-way.

(e) A household hazardous waste account. The moneys collected pursuant to section 455F.7 shall be deposited in the household hazardous waste account. Two thousand dollars is appropriated annually to the Iowa department of public health to carry out departmental duties under section 135.11, subsections 20 and 21, and section 139.35, eighty thousand dollars is appropriated to the department of natural resources

for city, county, or service organization project grants relative to recycling and reclamation events, and eight thousand dollars is appropriated to the department of transportation for the period of October 1, 1987 through June 30, 1989 for the purpose of conducting the used oil collection pilot project. The remainder of the account shall be used to fund Toxic Cleanup Days programs, education programs, and other activities pursuant to chapter 455F, including the administration of the household hazardous materials permit program by the department of revenue and finance.

(f) A storage tank management account. All fees collected pursuant to section 455B.473, subsection 4, and section 455B.479, shall be deposited in the storage tank management account. Funds shall be expended for the following purposes:

(1) One thousand dollars is appropriated annually to the Iowa department of public health to carry out departmental duties under section 135.11, subsections 20 and 21, and section 139.35.

(2) Seventy percent of the moneys deposited in the account annually are appropriated to the department of natural resources for the administration of a state storage tank program pursuant to chapter 455B, division IV, part 8, and for programs which reduce the potential for harm to the environment and the public health from storage tanks.

(3) For the fiscal year beginning July 1, 1987, and ending June 30, 1988, twenty-five thousand dollars is appropriated from the account to the division of insurance for payment of costs incurred in the establishment of the plan of operations program regarding the financial responsibility of owners and operators of underground storage tanks which store petroleum.

(4) The remaining funds in the account are appropriated annually to the department of natural resources for the funding of state remedial cleanup efforts.

(g) An oil overcharge account. The oil overcharge moneys distributed by the United States department of energy, and approved for the energy related components of the groundwater protection strategy available through the energy conservation trust fund created in section 93.11, shall be deposited in the oil overcharge account as appropriated by the general assembly. The oil overcharge account shall be used for the following purposes:

(1) The following amounts are appropriated to the department of natural resources to implement its responsibilities pursuant to section 455E.8:

(a) For the fiscal year beginning July 1, 1987 and ending June 30, 1988, eight hundred sixty thousand dollars is appropriated.

(b) For the fiscal year beginning July 1, 1988 and ending June 30, 1989, six hundred fifty thousand dollars is appropriated.

(c) For the fiscal year beginning July 1, 1989 and ending June 30, 1990, six hundred thousand dollars is appropriated.

(d) For the fiscal year beginning July 1, 1990 and ending June 30, 1991, five hundred thousand dollars is appropriated.

(e) For the fiscal year beginning July 1, 1991 and ending June 30, 1992, five hundred thousand dollars is appropriated.

(2) For the fiscal year beginning July 1, 1987 and ending June 30, 1988, five hundred sixty thousand dollars is appropriated to the department of natural resources for assessing rural, private water supply quality.

(3) For the fiscal period beginning July 1, 1987 and ending June 30, 1989, one hundred thousand dollars is appropriated annually to the department of natural resources for the administration of a groundwater monitoring program at sanitary landfills.

(4) The following amounts are appropriated to the Iowa state water resources research institute to provide

competitive grants to colleges, universities, and private institutions within the state for the development of research and education programs regarding alternative disposal methods and groundwater protection:

(a) For the fiscal year beginning July 1, 1987 and ending June 30, 1988, one hundred twenty thousand dollars is appropriated.

(b) For the fiscal year beginning July 1, 1988 and ending June 30, 1989, one hundred thousand dollars is appropriated.

(c) For the fiscal year beginning July 1, 1989 and ending June 30, 1990, one hundred thousand dollars is appropriated.

(5) The following amounts are appropriated to the department of natural resources to develop and implement demonstration projects for landfill alternatives to solid waste disposal, including recycling programs:

(a) For the fiscal year beginning July 1, 1987 and ending June 30, 1988, seven hundred sixty thousand dollars is appropriated.

(b) For the fiscal year beginning July 1, 1988 and ending June 30, 1989, eight hundred fifty thousand dollars is appropriated.

(6) For the fiscal period beginning July 1, 1987 and ending June 30, 1988, eight hundred thousand dollars is appropriated to the Leopold center for sustainable agriculture.

(7) Seven million five hundred thousand dollars is appropriated to the agriculture energy management fund created under chapter 467E for the fiscal period beginning July 1, 1987 and ending June 30, 1992, to develop nonregulatory programs to implement integrated farm management of farm chemicals for environmental protection, energy conservation, and farm profitability; interactive public and farmer education; and applied studies on best management practices and best appropriate technology for chemical use efficiency and reduction.

(8) The following amounts are appropriated to the department of natural resources to continue the Big Spring demonstration project in Clayton county.

(a) For the fiscal period beginning July 1, 1987 and ending June 30, 1990, seven hundred thousand dollars is appropriated annually.

(b) For the fiscal period beginning July 1, 1990 and ending June 30, 1992, five hundred thousand dollars is appropriated annually.

(9) For the fiscal period beginning July 1, 1987 and ending June 30, 1990, one hundred thousand dollars is appropriated annually to the department of agriculture and land stewardship to implement a targeted education program on best management practices and technologies for the mitigation of groundwater contamination from or closure of agricultural drainage wells, abandoned wells, and sinkholes.

Sec. 112. Section 455B.172, subsection 2, Code 1987, is amended by striking the subsection and inserting in lieu thereof the following:

2. The department shall carry out the responsibilities of the state related to private water supplies and private sewage disposal systems for the protection of the environment and the public health and safety of the citizens of the state.

Sec. 113. Section 455B.172, Code 1987, is amended by adding the following new subsections after subsection 2 and renumbering the subsequent subsections:

NEW SUBSECTION. 3. Each county board of health shall adopt standards for private water supplies and private sewage disposal facilities. These standards shall be at least as stringent but consistent with the standards adopted by the commission. If a county board of health has not adopted standards for private water supplies and private sewage disposal facilities, the standards adopted by the commission shall be applied and enforced within the county by the county board of health.

NEW SUBSECTION. 4. Each county board of health shall regulate the private water supply and private sewage disposal facilities located within the county board's jurisdiction, including the enforcement of standards adopted pursuant to this section.

NEW SUBSECTION. 5. The department shall maintain jurisdiction over and regulate the direct discharge to a water of the state. The department shall retain concurrent authority to enforce state standards for private water supply and private sewage disposal facilities within a county, and exercise departmental authority if the county board of health fails to fulfill board responsibilities pursuant to this section.

The commission shall make grants to counties for the purpose of conducting programs for the testing of private, rural water supply wells and for the proper closing of abandoned, rural, private water supply wells within the jurisdiction of the county. Grants shall be funded through allocation of the agriculture management account of the groundwater protection fund. Grants awarded, continued, or renewed shall be subject to the following conditions:

a. An application for a grant shall be in a form and shall contain information as prescribed by rule of the commission.

b. Nothing in this section shall be construed to prohibit the department from making grants to one or more counties to carry out the purpose of the grant on a joint, multicounty basis.

c. A grant shall be awarded on an annual basis to cover a fiscal year from July 1 to June 30 of the following calendar year.

d. The continuation or renewal of a grant shall be contingent upon the county's acceptable performance in carrying out its responsibilities, as determined by the director. The director, subject to approval by the commission, may deny the

awarding of a grant or withdraw a grant awarded if, by determination of the director, the county has not carried out the responsibilities for which the grant was awarded, or cannot reasonably be expected to carry out the responsibilities for which the grant would be awarded.

Sec. 114. Section 455B.173, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 10. Adopt, modify, or repeal rules relating to the awarding of grants to counties for the purpose of carrying out responsibilities pursuant to section 455B.172 relative to private water supplies and private sewage disposal facilities.

Sec. 115. Section 455B.311, unnumbered paragraph 1, Code 1987, is amended to read as follows:

The director, with the approval of the commission, may make grants to cities, counties, or central planning agencies representing cities and counties or combinations of cities, counties, or central planning agencies from funds reserved under and for the purposes specified in section ~~455B.309~~ ~~subsection 4~~ 455E.11, subsection 2, paragraph "a", subject to all of the following conditions:

Sec. 116. Section 455B.309, Code 1987, is repealed.

PART TWO -- PESTICIDES AND FERTILIZER

Sec. 201. Section 89B.4, subsection 1, Code 1987, is amended to read as follows:

1. Except for section 89B.9, this chapter does not apply to a person engaged in farming as defined in this section; or a pesticide, as defined in section 206.2, subsection 1, used, stored, or available for sale by a ~~commercial applicator as defined in section 206.2, subsection 12, a certified applicator as defined in section 206.2, subsection 17,~~ a certified private applicator as defined in section 206.2, subsection 18; ~~a certified commercial applicator as defined in section 206.2, subsection 19, a pesticide dealer as defined~~

~~in section 206.2, subsection 24,~~ or to activities which are covered under the federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 135 et seq.~~, provided, however,~~ ~~that~~ However, such persons shall comply with the requirements of the regulations for the federal Insecticide, Fungicide, and Rodenticide Act, 40 C.F.R. § 170, and the requirements of and rules adopted under chapter 206 where applicable to ~~such~~ the persons. As used in this section, "farming" means the cultivation of land for the production of agricultural crops, the raising of poultry, the production of eggs, the production of milk, the production of fruit or other horticultural crops, grazing or the production of livestock, spraying, or harvesting. The department of agriculture and land stewardship shall cooperate with the division in an investigation of an agricultural employee's complaint filed pursuant to section 89B.9.

Sec. 202. Section 135.11, Code 1987, is amended by adding the following new subsections:

NEW SUBSECTION. 20. Establish, publish, and enforce rules requiring prompt reporting of methemoglobinemia, pesticide poisoning, and the reportable poisonings and illnesses established pursuant to section 139.35.

NEW SUBSECTION. 21. Collect and maintain reports of pesticide poisonings and other poisonings, illnesses, or injuries caused by selected chemical or physical agents, including methemoglobinemia and pesticide and fertilizer hypersensitivity; and compile and publish, annually, a statewide and county-by-county profile based on the reports.

Sec. 203. NEW SECTION. 139.35 REPORTABLE POISONINGS AND ILLNESSES.

1. If the results of an examination by a public, private, or hospital clinical laboratory of a specimen from a person in Iowa yield evidence of or are reactive for a reportable poisoning or a reportable illness from a toxic agent,

including methemoglobinemia, the results shall be reported to the Iowa department of public health on forms prescribed by the department. If the laboratory is located in Iowa, the person in charge of the laboratory shall report the results. If the laboratory is not in Iowa, the health care provider submitting the specimen shall report the results.

2. The physician or other health practitioner attending a person infected with a reportable poisoning or a reportable illness from a toxic agent, including methemoglobinemia, shall immediately report the case to the Iowa department of public health. The Iowa department of public health shall publish and distribute instructions concerning the method of reporting. Reports shall be made in accordance with rules adopted by the Iowa department of public health.

3. A person in charge of a poison control or poison information center shall report cases of reportable poisoning, including methemoglobinemia, about which they receive inquiries to the Iowa department of public health.

4. The Iowa department of public health shall adopt rules designating reportable poisonings, including methemoglobinemia, and illnesses which must be reported under this section.

5. The Iowa department of public health shall establish and maintain a central registry to collect and store data reported pursuant to this section.

Sec. 204. Section 177.2, subsection 1, Code 1987, is amended to read as follows:

1. To encourage the use of good agricultural practices in crop production, including best management practices for applying fertilizer and pesticide, and to conserve, maintain, and improve soil productivity.

Sec. 205. Section 200.4, Code 1987, is amended to read as follows:

200.4 LICENSES.

1. Any person who manufactures, mixes, blends, ~~or~~ mixes to customers order, offers for sale, sells, or distributes any fertilizer or soil conditioner ~~offered for sale, sold, or distributed~~ in Iowa must first obtain a license from the secretary of agriculture and shall pay a ten-dollar license fee for each ~~plant or~~ place of manufacture, or distribution from which fertilizer or soil conditioner products are sold or distributed in Iowa. Such license fee shall be paid annually on July 1 of each year ~~and the manufacturer, blender or mixer shall at the same time, list the name and address of each such plant or place of manufacture, from which sale or distribution is made.~~

~~This subsection shall not apply to a manufacturer who manufactures "specialty fertilizer" only, as defined in section 200.3, subsection 5, in packages of twenty five pounds or less.~~

2. Said licensee shall at all times produce an intimate and uniform mixture of fertilizers or soil conditioners. When two or more fertilizer materials are delivered in the same load, they shall be thoroughly and uniformly mixed unless they are in separate compartments.

Sec. 206. Section 200.8, Code 1987, is amended to read as follows:

200.8 INSPECTION FEES.

1. There shall be paid by the licensee to the secretary for all commercial fertilizers and soil conditioners sold, or distributed in this state, an inspection fee to be fixed annually by the secretary of agriculture at not more than twenty cents per ton. ~~Except sales.~~ Sales for manufacturing purposes only are hereby exempted from fees but must still be reported showing manufacturer who purchased same. Payment of said inspection fee by any licensee shall exempt all other persons, firms or corporations from the payment thereof.

On individual packages of specialty fertilizer containing twenty-five pounds or less, there shall be paid by the manufacturer in lieu of the ~~annual license fee and the~~ semiannual inspection fee as set forth in this chapter, an annual registration and inspection fee of ~~twenty-five~~ one hundred dollars for each brand and grade sold or distributed in the state. In the event that any ~~person~~ manufacturer sells specialty fertilizer in packages of twenty-five pounds or less and also in packages of more than twenty-five pounds, this annual registration and inspection fee shall apply only to that portion sold in packages of twenty-five pounds or less, and that portion sold in packages of more than twenty-five pounds shall be subject to the same inspection fee as fixed by the secretary of agriculture as provided in this chapter.

Any person other than a manufacturer who offers for sale, sells, or distributes specialty fertilizer in packages of twenty-five pounds or less or applies specialty fertilizer for compensation shall be required to pay an annual inspection fee of fifty dollars in lieu of the semiannual inspection fee as set forth in this chapter.

2. Every licensee and any person required to pay an annual registration and inspection fee under this chapter in this state shall:

a. File not later than the last day of January and July of each year, on forms furnished by secretary, a semiannual statement setting forth the number of net tons of commercial fertilizer or soil conditioners distributed in this state by grade for each county during the preceding six months' period; and upon filing such statement shall pay the inspection fee at the rate stated in subsection 1 of this section. However, in lieu of the semiannual statement by grade for each county, as hereinabove provided for, the registrant, on individual packages of ~~commercial~~ specialty fertilizer containing twenty-five pounds or less, shall file not later than the last day of

July of each year, on forms furnished by the secretary, an annual statement setting forth the number of net tons of ~~commercial~~ specialty fertilizer distributed in this state by grade during the preceding twelve-month period~~, but no inspection fee shall be due thereon~~.

b. If the tonnage report is not filed or the payment of inspection fees, or both, is not made within ten days after the last day of January and July of each year as required in paragraph "a" of this subsection, a penalty amounting to ten percent of the amount due, if any, shall be assessed against the licensee. In any case, the penalty shall be no less than fifty dollars. The amount of fees due, if any, and penalty shall constitute a debt and become the basis of a judgment against the licensee.

3. If there is an unencumbered balance of funds in the fertilizer fund on June 30 of any fiscal year equal to or exceeding three hundred fifty thousand dollars, the secretary of agriculture shall reduce the per ton fee provided for in subsection 1 and the annual license fee established pursuant to section 201.3 for the next fiscal year in such amount as will result in an ending estimated balance for the June 30 of the next fiscal year of three hundred fifty thousand dollars.

Sec. 207. Section 200.8, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 4. In addition to the fees imposed under subsection 1, a groundwater protection fee shall be imposed upon nitrogen-based fertilizer. The fee shall be based upon the percentage of actual nitrogen contained in the product. An eighty-two percent nitrogen solution shall be taxed at a rate of seventy-five cents per ton. Other nitrogen-based product formulations shall be taxed on the percentage of actual nitrogen contained in the formulations with the eighty-two percent nitrogen solution serving as the base. The fee shall be paid by each licensee registering to sell fertilizer

to the secretary of agriculture. The fees collected shall be deposited in the agriculture management account of the groundwater protection fund. The secretary of agriculture shall adopt rules for the payment, filing, and collection of groundwater protection fees from licensees in conjunction with the collection of registration and inspection fees. The secretary shall, by rule allow an exemption to the payment of this fee for fertilizers which contain trace amounts of nitrogen.

Sec. 208. Section 200.9, Code 1987, is amended to read as follows:

200.9 FERTILIZER FUND.

Fees collected for licenses and inspection fees under sections 200.4 and 200.8, with the exception of those fees collected for deposit in the agriculture management account of the groundwater protection fund, shall be deposited in the treasury to the credit of the fertilizer fund to be used only by the department for the purpose of inspection, sampling, analysis, preparation, and publishing of reports and other expenses necessary for administration of this chapter. The secretary may assign moneys to the Iowa agricultural experiment station for research, work projects, and investigations as ~~may be~~ needed for the specific purpose of improving the regulatory functions for enforcement of this chapter.

Sec. 209. Section 206.2, subsection 12, Code 1987, is amended to read as follows:

12. ~~The term "commercial~~ "Commercial applicator" ~~shall~~ mean means any person, ~~or~~ corporation, or employee of a person or corporation who enters into a contract or an agreement for the sake of monetary payment and agrees to perform a service by applying any pesticide or servicing any device but shall not include a farmer trading work with another, a person employed by a farmer not solely as a pesticide applicator who

applies pesticide as an incidental part of the person's general duties, or a person who applies pesticide as an incidental part of a custom farming operation.

Sec. 210. Section 206.2, subsection 17, Code 1987, is amended to read as follows:

17. "Certified applicator" means any individual who is certified under this chapter as authorized to use ~~or supervise the use of~~ any pesticide ~~which is classified for restricted use~~.

Sec. 211. Section 206.2, subsection 18, Code 1987, is amended to read as follows:

18. "Certified private applicator" means a certified applicator who uses ~~or supervises the use of~~ any pesticide which is classified for restricted use ~~for purposes of producing any agricultural commodity~~ on property owned or rented by the applicator or the applicator's employer or, if applied without compensation other than trading of personal services between producers of agricultural commodities, on the property of another person.

Sec. 212. Section 206.2, subsection 19, Code 1987, is amended to read as follows:

19. "Certified commercial applicator" means a pesticide applicator or individual who applies or uses a ~~restricted use~~ pesticide or device ~~for the purpose of producing any agricultural commodity or~~ on any property of another for compensation.

Sec. 213. Section 206.2, subsection 24, Code 1987, is amended to read as follows:

24. The term "pesticide dealer" means any person who distributes any restricted use pesticides ~~which, by regulation, are restricted to application only by certified applicators;~~ pesticide for use by commercial or public pesticide applicators; or general use pesticides labeled for agricultural or lawn and garden use with the exception of

dealers whose gross annual pesticide sales are less than ten thousand dollars for each business location owned or operated by the dealer.

Sec. 214. Section 206.5, Code 1987, is amended to read as follows:

206.5 CERTIFICATION REQUIREMENTS.

~~No person shall~~ A commercial or public applicator shall not apply any pesticide and a person shall not apply any restricted use pesticide without first complying with the certification requirements of this chapter and such other restrictions as determined by the secretary ~~or being under the direct supervision of a certified applicator~~.

The secretary shall adopt, by rule, requirements for the examination, re-examination and certification of applicants ~~and set a fee of not more than ten dollars for the certification program of commercial applicators and not more than five dollars for the certification program of private applicators~~.

~~The secretary may adopt rules for the training of applicators in co-operation with the co-operative extension service at Iowa State University of science and technology.~~

~~The secretary shall not require applicants for certification as private applicators to take and pass a written test, if the applicant instead shows proof that the applicant has attended an informational course of instruction approved by the secretary. The secretary shall provide for temporary certification for emergency purchases of restricted use products by requiring the purchaser to sign an affidavit, at the point of purchase, that the purchaser has read and understands the information on the label of the restricted use product being purchased.~~

Commercial and public applicators shall choose between one-year certification for which the applicator shall pay a twenty-five dollar fee or three-year certification for which

the applicator shall pay a seventy-five dollar fee. Public applicators who are employed by a state agency shall be exempt from the twenty-five and seventy-five dollar certification fees and instead be subject to a five-dollar annual certification fee or a fifteen dollar fee for a three-year certification. The commercial or public applicator shall be tested prior to certification annually, if the applicator chooses a one-year certification or each three years if the applicator chooses three-year certification. A private applicator shall be tested prior to initial certification. The test shall include, but is not limited to, the area of safe handling of agricultural chemicals and the effects of these chemicals on groundwater. A person employed by a farmer not solely as a pesticide applicator who applies restricted use pesticides as an incidental part of the person's general duties or a person who applies restricted use pesticides as an incidental part of a custom farming operation is required to meet the certification requirements of a private applicator.

The secretary may adopt rules to provide for license and certification adjustments, including fees, which may be necessary to provide for an equitable transition for licenses and certifications issued prior to January 1, 1989. The rules shall also include a provision for renewal of certification through the administering of an approved exam, and a provision for a thirty-day renewal grace period.

Sec. 215. Section 206.6, subsection 3, Code 1987, is amended to read as follows:

3. EXAMINATION FOR COMMERCIAL APPLICATOR LICENSE. The secretary of agriculture shall not issue a commercial applicator license until the individual engaged in or managing the pesticide application business and employed by the business to apply pesticides is ~~qualified~~ certified by passing an examination to demonstrate to the secretary the individual's knowledge of how to apply pesticides under the

classifications the individual has applied for, and the individual's knowledge of the nature and effect of pesticides the individual may apply under such classifications. The applicant successfully completing ~~this examination~~ the certification requirement shall be a licensed commercial applicator.

Sec. 216. Section 206.6, subsection 4, Code 1987, is amended to read as follows:

4. RENEWAL OF APPLICANT'S LICENSE. The secretary of agriculture shall renew any applicant's license under the classifications for which such applicant is licensed, provided that ~~a program of training of~~ all of the applicant's personnel who apply pesticides ~~has been established and maintained by the licensee~~ are certified commercial applicators. ~~Such a program may include attending training sessions such as co-operative extension short courses or industry trade association training seminars.~~

Sec. 217. Section 206.6, subsection 6, paragraph b, Code 1987, is amended to read as follows:

b. Public applicators for agencies listed in this subsection shall be subject to ~~examinations~~ certification requirements as provided for in this section~~, however, the secretary shall issue a limited license without a fee to such public applicator who has qualified for such license~~. The public applicator license shall be valid only when such applicator is acting as an applicator applying ~~or supervising the application of~~ pesticides used by such entities. Government research personnel shall be exempt from this licensing requirement when applying pesticides only to experimental plots. ~~Individuals~~ Public agencies or municipal corporations licensed pursuant to this section shall be licensed public applicators.

Sec. 218. Section 206.7, subsection 1, Code 1987, is amended to read as follows:

1. REQUIREMENT FOR CERTIFICATION. ~~No~~ A commercial or public applicator shall not apply any ~~restricted use~~ pesticide without first complying with the certification standards ~~or being under the direct supervision of a certified applicator~~.

Sec. 219. Section 206.8, subsections 2 and 3, Code 1987, are amended to read as follows:

2. ~~Application for a license shall be accompanied by a twenty five dollar~~ A pesticide dealer shall pay a minimum annual license fee of twenty-five dollars or an annual license fee ~~for the primary business location and an additional five dollar annual license fee for each other location or outlet within the state, and shall be on a form prescribed by the secretary and shall include the full name of the person applying for such license~~ based on one-tenth of one percent of the gross retail sales of all pesticides sold by the pesticide dealer in the previous year. The annual license fee shall be paid to the department of agriculture and land stewardship, beginning July 1, 1988, and July 1 of each year thereafter. A licensee shall pay a fee of twenty-five dollars for the period July 1, 1987 through June 30, 1988.

The initial twenty-five dollars of each annual license fee shall be retained by the department for administration of the program, and the remaining moneys collected shall be deposited in the agriculture management account of the groundwater protection fund.

3. Provisions of this section shall not apply to a pesticide applicator who sells pesticides as an integral part of the applicator's pesticide application service, or any federal, state, county, or municipal agency which provides pesticides only for its own programs.

Sec. 220. Section 206.8, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 4. Application for a license required for manufacturers and distributors who are not engaged in the

retail sale of pesticides shall be accompanied by a twenty-five dollar fee for each business location within the state required to be licensed, and shall be on a form prescribed by the secretary.

Sec. 221. Section 206.9, Code 1987, is amended to read as follows:

206.9 CO-OPERATIVE AGREEMENTS.

The secretary may co-operate, receive grants-in-aid and enter into agreements with any agency of the federal government, of this state or its subdivisions, or with any agency of another state, or trade associations to obtain assistance in the implementation of this chapter and to do all of the following:

1. Secure uniformity of regulations.

2. Co-operate in the enforcement of the federal pesticide control laws through the use of state or federal personnel and facilities and to implement co-operative enforcement programs.

~~3.--Develop-and-administer-state-programs-for-training-and certification-of-certified-applicators-consistent-with-federal standards;~~

~~4.--Contract-for-training-with-other-agencies-including federal-agencies-for-the-purpose-of-training-certified applicators;~~

5 3. Contract for monitoring pesticides for the national plan.

6 4. Prepare and submit state plans to meet federal certification standards~~;-and~~.

~~7~~ 5. Regulate certified applicators.

6. Develop, in conjunction with the Iowa cooperative extension service in agriculture and home economics, courses available to the public regarding pesticide best management practices.

Sec. 222. Section 206.12, subsection 3, Code 1987, is amended to read as follows:

3. The registrant, before selling or offering for sale any pesticide in this state, shall register each brand and grade of such pesticide with the secretary upon forms furnished by the secretary, and~~,-for-the-purpose-of-defraying-expenses connected-with-the-enforcement-of-this-chapter,~~ the secretary shall set the registration fee annually at ~~no-more-than-twenty~~ one-fifth of one percent of gross sales within this state with a minimum fee of two hundred fifty dollars and a maximum fee of three thousand dollars for each and every brand and grade to be offered for sale in this state. The secretary shall adopt by rule exemptions to the minimum fee. ~~The-fees~~ Fifty dollars of each fee collected shall be deposited in the treasury to the credit of the pesticide fund to be used only for the purpose of enforcing the provisions of this chapter and the remainder of each fee collected shall be placed in the agriculture management account of the groundwater protection fund.

Sec. 223. Section 206.12, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 7. Each licensee under section 206.6 or 206.8 shall file an annual report with the secretary of agriculture listing the amount and type of all pesticides sold, offered for sale, or distributed at retail for use in this state, or applied in this state during each month of the previous year. This report shall be filed at the time of payment for licensure or annually on or before July 1. The secretary, by rule, may specify the form of the report and require additional information deemed necessary to determine pesticide use within the state. The information required shall include the brand names and amounts of pesticides sold, offered for sale, or distributed at retail for use in this state for each business location owned or operated by the

retailer, but the information collected, if made public, shall be reported in a manner which does not identify a specific brand name in the report.

Sec. 224. Section 206.19, Code 1987, is amended by adding the following new subsections:

NEW SUBSECTION. 3. Determine in cooperation with municipalities, the proper notice to be given by a commercial or public applicator to occupants of adjoining properties in urban areas prior to or after the exterior application of pesticides, establish a schedule to determine the periods of application least harmful to living beings, and adopt rules to implement these provisions. Municipalities shall cooperate with the department by reporting infractions and in implementing this subsection.

NEW SUBSECTION. 3A. Adopt rules providing guidelines for public bodies to notify adjacent property occupants regarding the application of herbicides to noxious weeds or other undesirable vegetation within highway rights-of-way.

NEW SUBSECTION. 4. Establish civil penalties for violations by commercial applicators.

Sec. 225. Section 206.21, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 3. The secretary of agriculture, in cooperation with the advisory committee created pursuant to section 206.23, shall designate areas with a history of concerns regarding nearby pesticide applications as pesticide management areas. The secretary shall adopt rules for designating pesticide management areas.

Sec. 226. NEW SECTION. 206.24 AGRICULTURAL INITIATIVE.

A program of education and demonstration in the area of the agricultural use of fertilizers and pesticides shall be initiated by the secretary of agriculture on July 1, 1987. The secretary shall coordinate the activities of the state regarding this program.

Education and demonstration programs shall promote the widespread adoption of management practices which protect groundwater. The programs may include but are not limited to programs targeted toward the individual farm owner or operator, high school and college students, and groundwater users, in the areas of best management practices, current research findings, and health impacts. Emphasis shall be given to programs which enable these persons to demonstrate best management practices to their peers.

Sec. 227. NEW SECTION. 206.25 PESTICIDE CONTAINERS DISPOSAL.

The department of agriculture and land stewardship, in cooperation with the environmental protection division of the department of natural resources, shall develop a program for handling used pesticide containers which reflects the state solid waste management policy hierarchy, and shall present the program developed to the general assembly by February 1, 1988.

Sec. 228. NEW SECTION. 263.14 CENTER FOR HEALTH EFFECTS OF ENVIRONMENTAL CONTAMINATION.

1. The state board of regents shall establish and maintain at Iowa City as an integral part of the State University of Iowa the center for health effects of environmental contamination, having as its object the determination of the levels of environmental contamination which can be specifically associated with human health effects.

2. a. The center shall be a cooperative effort of representatives of the following organizations:

(1) The State University of Iowa department of preventative medicine and environmental health.

(2) The State University of Iowa department of pediatrics of the college of medicine.

(3) The state hygienic laboratory.

(4) The institute of agricultural medicine.

(5) The Iowa cancer center.

(6) The department of civil and environmental engineering.

(7) Appropriate clinical and basic science departments.

(8) The college of law.

(9) The college of liberal arts and sciences.

(10) The Iowa department of public health.

(11) The department of natural resources.

(12) The department of agriculture and land stewardship.

b. The active participation of the national cancer institute, the agency for toxic substances and disease registries, the national center for disease control, the United States environmental protection agency, and the United States geological survey, shall also be sought and encouraged.

3. The center may:

a. Assemble all pertinent laboratory data on the presence and concentration of contaminants in soil, air, water, and food, and develop a data retrieval system to allow the findings to be easily accessed by exposed populations.

b. Make use of data from the existing cancer and birth defect statewide recording systems and develop similar recording systems for specific organ diseases which are suspected to be caused by exposure to environmental toxins.

c. Develop registries of persons known to be exposed to environmental hazards so that the health status of these persons may be examined over time.

d. Develop highly sensitive biomedical assays which may be used in exposed persons to determine early evidence of adverse health effects.

e. Perform epidemiologic studies to relate occurrence of a disease to contaminant exposure and to ensure that other factors known to cause the disease in question can be ruled out.

f. Foster relationships and ensure the exchange of information with other teaching institutions or laboratories in the state which are concerned with the many forms of environmental contamination.

g. Implement programs of professional education and training of medical students, physicians, nurses, scientists, and technicians in the causes and prevention of environmentally induced disease.

h. Implement public education programs to inform persons of research results and the significance of the studies.

i. Respond as requested to any branch of government for consultation in the drafting of laws and regulations to reduce contamination of the environment.

4. An advisory committee consisting of one representative of each of the organizations enumerated in subsection 2, paragraph "a", a representative of the Iowa department of public health, and a representative of the department of natural resources is established. The advisory committee shall:

a. Employ, as a state employee, a full-time director to operate the center. The director shall coordinate the efforts of the heads of each of the major divisions of laboratory analysis, epidemiology and biostatistics, biomedical assays, and exposure modeling and shall also coordinate the efforts of professional and support staff in the operation of the center.

b. Submit an annual report of the activities of the center to the legislative council of the general assembly by January 15 of each year.

5. The center shall maintain the confidentiality of any information obtained from existing registries and from participants in research programs. Specific research projects involving human subjects shall be approved by the State University of Iowa institutional review board.

6. The center may solicit, accept, and administer moneys appropriated to the center by a public or private agency.

Sec. 229. NEW SECTION. 266.37 SOIL TEST INTERPRETATION.

The Iowa cooperative extension service in agriculture and home economics shall develop and publish material on the

interpretation of the results of soil tests. The material shall also feature the danger to groundwater quality from the overuse of fertilizers and pesticides. The material shall be available from the service at cost and any person providing soil tests for agricultural or horticultural purposes shall provide the material to the customer with the soil test results.

Sec. 230. NEW SECTION. 266.38 LEOPOLD CENTER FOR SUSTAINABLE AGRICULTURE.

1. For the purposes of this section, "sustainable agriculture" means the appropriate use of crop and livestock systems and agricultural inputs supporting those activities which maintain economic and social viability while preserving the high productivity and quality of Iowa's land.

2. The Leopold center for sustainable agriculture is established in the Iowa agricultural and home economics experiment station at Iowa State University of science and technology. The center shall conduct and sponsor research to identify and reduce negative environmental and socio-economic impacts of agricultural practices. The center also shall research and assist in developing emerging alternative practices that are consistent with a sustainable agriculture. The center shall develop in association with the Iowa cooperative extension service in agriculture and home economics an educational framework to inform the agricultural community and the general public of its findings.

3. An advisory board is established consisting of the following members:

a. Three persons from Iowa State University of science and technology, appointed by its president.

b. Two persons from the State University of Iowa, appointed by its president.

c. Two persons from the University of Northern Iowa, appointed by its president.

d. Two representatives of private colleges and universities within the state, to be nominated by the Iowa association of independent colleges and universities, and appointed by the Iowa coordinating council for post-high school education.

e. One representative of the department of agriculture and land stewardship, appointed by the secretary of agriculture.

f. One representative of the department of natural resources, appointed by the director.

g. One man and one woman, actively engaged in agricultural production, appointed by the state soil conservation committee.

The terms of the members shall begin and end as provided in section 69.19 and any vacancy shall be filled by the original appointing authority. The terms shall be for four years and shall be staggered as determined by the president of Iowa State University of science and technology.

4. The Iowa agricultural and home economics experiment station shall employ a director for the center, who shall be appointed by the president of Iowa State University of science and technology. The director of the center shall employ the necessary research and support staff. The director and staff shall be employees of Iowa State University of science and technology. No more than five hundred thousand dollars of the funds received from the agriculture management account annually shall be expended by the center for the salaries and benefits of the employees of the center, including the salary and benefits of the director. The remainder of the funds received from the agriculture management account shall be used to sponsor research grants and projects on a competitive basis from Iowa colleges and universities and private nonprofit agencies and foundations. The center may also solicit additional grants and funding from public and private nonprofit agencies and foundations.

The director shall prepare an annual report.

5. The board shall provide the president of Iowa State University of science and technology with a list of three candidates from which the director shall be selected. The board shall provide an additional list of three candidates if requested by the president. The board shall advise the director in the development of a budget, on the policies and procedures of the center, in the funding of research grant proposals, and regarding program planning and review.

Sec. 231. NEW SECTION. 317.26 ALTERNATIVE REMEDIATION PRACTICES.

The director of the department of natural resources, in cooperation with the secretary of agriculture and county conservation boards or the board of supervisors, shall develop and implement projects which utilize alternative practices in the remediation of noxious weeds and other vegetation within highway rights-of-way.

Sec. 232. Section 467E.1, subsection 2, Code 1987, is amended to read as follows:

2. An agricultural energy management advisory council is established which shall consist of the secretary of agriculture and the chief administrator of each of the following organizations or the administrator's designee:

a. The energy and geological resources division of the department of natural resources.

b. The environmental protection division of the department of natural resources.

c. Iowa state university of science and technology college of agriculture.

d. Iowa state university of science and technology college of engineering.

e. Iowa state water resource research institute.

f. State university of Iowa department of preventative medicine and environmental health.

g. Division of soil conservation of the department of agriculture and land stewardship.

h. Iowa cooperative extension service in agriculture and home economics.

i. The university of northern Iowa.

j. The state hygienic laboratory.

The secretary of agriculture shall coordinate the appointment process for compliance with section 69.16A.

The secretary of agriculture shall be the chairperson of the council. The presiding officers of the senate and house shall each appoint two nonvoting members, not more than one of any one political party, to serve on the advisory council for a term of two years. The council may invite the administrators of the United States geological survey and the federal environmental protection agency to each appoint a person to meet with the council in an advisory capacity. The council shall meet quarterly or upon the call of the chairperson. The council shall review possible uses of the ~~funds~~ fund and the effectiveness of current and past expenditures of the fund. The council shall make recommendations to the department of agriculture and land stewardship on the uses of the fund.

Sec. 233. PESTICIDE DEALER EXEMPTION. The secretary may adopt rules to provide for license and certification fee adjustments that may be necessary to provide an equitable transition from fees required prior to July 1, 1988.

Sec. 234. APPROPRIATION. For the fiscal year beginning July 1, 1987, and ending June 30, 1988, the increased fee revenues resulting to the fertilizer fund and to the pesticide fund from the increases in fees and expansion of coverage of fee requirements provided in this Act are appropriated to the department of agriculture and land stewardship for the administration and implementation of chapters 200 and 206, as amended by this Act.

PART THREE -- WELLS, SINKHOLES, WATERSHEDS, AND WETLANDS

Sec. 301. NEW SECTION. 108.11 AGRICULTURAL DRAINAGE WELLS -- WETLANDS -- CONSERVATION EASEMENTS.

The department shall develop and implement a program for the acquisition of wetlands and conservation easements on and around wetlands that result from the closure or change in use of agricultural drainage wells upon implementation of the programs specified in section 159.29 to eliminate groundwater contamination caused by the use of agricultural drainage wells. The program shall be coordinated with the department of agriculture and land stewardship. The department may use moneys appropriated for this purpose from the agriculture management account of the groundwater protection fund in addition to other moneys available for wetland acquisition, protection, development, and management.

Sec. 302. NEW SECTION. 159.28 SINKHOLES -- CONSERVATION EASEMENT PROGRAMS.

The department shall develop and implement a program for the prevention of groundwater contamination through sinkholes. The program shall provide for education of landowners and encourage responsible chemical and land management practices in areas of the state prone to the formation of sinkholes.

The program may provide financial incentives for land management practices and the acquisition of conservation easements around sinkholes. The program may also provide financial assistance for the cleanup of wastes dumped into sinkholes.

The program shall be coordinated with the groundwater protection programs of the department of natural resources and other local, state, or federal government agencies which could compensate landowners for resource protection measures. The department shall use moneys appropriated for this purpose from the agriculture management account of the groundwater protection fund.

Sec. 303. NEW SECTION. 159.29 AGRICULTURAL DRAINAGE WELLS.

1. An owner of an agricultural drainage well shall register the well with the department of natural resources by January 1, 1988.

2. An owner of an agriculture drainage well and a landholder whose land is drained by the well or wells of another person shall develop, in consultation with the department of agriculture and land stewardship and the department of natural resources, a plan which proposes alternatives to the use of agricultural drainage wells by July 1, 1991.

a. Financial incentive moneys may be allocated from the financial incentive portion of the agriculture management account of the groundwater protection fund to implement alternatives to agricultural drainage wells.

b. An owner of an agricultural drainage well and a landholder whose land is drained by the well or wells of another person shall not be eligible for financial incentive moneys pursuant to paragraph "a" if the owner fails to register the well with the department of natural resources by January 1, 1988 or if the owner fails to develop a plan for alternatives in cooperation with the department of agriculture and land stewardship and the department of natural resources.

3. The department shall:

a. On July 1, 1987 initiate a pilot demonstration and research project concerning elimination of groundwater contamination attributed to the use of agricultural chemicals and agricultural drainage wells. The project shall be established in a location in North Central Iowa determined by the department to be the most appropriate. A demonstration project shall also be established in Northeast Iowa to study techniques for the cleanup of sinkholes.

agricultural drainage well pilot project shall be designed to identify the environmental, economic, and social problems presented by continued use or closure of agricultural drainage wells and to monitor possible contamination caused by agriculture land management practices and agricultural chemical use relative to agricultural drainage wells.

b. Develop alternative management practices based upon the findings from the demonstration projects to reduce the infiltration of synthetic organic compounds into the groundwater through agricultural drainage wells and sinkholes.

c. Examine alternatives and the costs of implementation of alternatives to the use of agricultural drainage wells, and examine the legal, technical, and hydrological constraints for integrating alternative drainage systems into existing drainage districts.

4. Financial incentive moneys expended through the use of the financial incentive portion of the agriculture management account may be provided by the department to landowners in the project areas for employing reduced chemical farming practices and land management techniques.

5. The secretary may appoint interagency committees and groups as needed to coordinate the involvement of agencies participating in department sponsored projects. The interagency committees and groups may accept grants and funds from public and private organizations.

6. The department shall publish a report on the status and findings of the pilot demonstration projects on or before July 1, 1989, and each subsequent year of the projects. The department of agriculture and land stewardship shall develop a priority system for the elimination of chemical contamination from agricultural drainage wells and sinkholes. The priority system shall incorporate available information regarding the significance of contamination, the number of registered wells in the area, and the information derived from the report

prepared pursuant to this subsection. The highest priority shall be given to agricultural drainage wells for which the above criteria are best met, and the costs of necessary action are at the minimum level.

7. Beginning July 1, 1990, the department shall initiate an ongoing program to meet the goal of eliminating chemical contamination caused by the use of agricultural drainage wells by January 1, 1995 based upon the findings of the report published pursuant to subsection 6.

8. Notwithstanding the prohibitions of section 455B.267, subsection 4, an owner of an agricultural drainage well may make emergency repairs necessitated by damage to the drainage well to minimize surface runoff into the agricultural drainage well, upon the approval of the county board of supervisors or the board's designee of the county in which the agricultural drainage well is located. The approval shall be based upon the following conditions:

a. The well has been registered in accordance with both state and federal law.

b. The applicant will institute management practices including alternative crops, reduced application of chemicals, or other actions which will reduce the level of chemical contamination of the water which drains into the well.

c. The owner submits a written statement that approved emergency repairs are necessary and do not constitute a basis to avoid the eventual closure of the well if closure is later determined to be required. If a county board of supervisors or the board's designee approves the emergency repair of an agricultural drainage well, the county board of supervisors or the board's designee shall notify the department of the approval within thirty days of the approval.

Sec. 304. Section 455B.187, Code 1987, is amended by adding the following new unnumbered paragraphs:

NEW UNNUMBERED PARAGRAPH. A landowner or the landowner's agent shall not drill for or construct a new water well without first obtaining a permit for this activity from the department. The department shall not issue a permit to any person for this activity unless the person first registers with the department all wells, including abandoned wells, on the property. The department may delegate the authority to issue a permit to a county board of supervisors or the board's designee. In the event of such delegation, the department shall retain concurrent authority. The commission shall adopt rules pursuant to chapter 17A to implement this paragraph.

NEW UNNUMBERED PARAGRAPH. Notwithstanding the provisions of this section, a county board of supervisors or the board's designee may grant an exemption from the permit requirements to a landowner or the landowner's agent if an emergency drilling is necessary to meet an immediate need for water. The exemption shall be effective immediately upon approval of the county board of supervisors or the board's designee. The board of supervisors or the board's designee shall notify the director within thirty days of the granting of an exemption.

NEW UNNUMBERED PARAGRAPH. In the case of property owned by a state agency, a person shall not drill for or construct a new water well without first registering with the department the existence of any abandoned wells on the property. The department shall develop a prioritized closure program and time frame for the completion of the program, and shall adopt rules to implement the program.

Sec. 305. NEW SECTION. 455B.190 ABANDONED WELLS PROPERLY PLUGGED.

All abandoned wells, as defined in section 455B.171, shall be properly plugged in accordance with the schedule established by the department. The department shall develop a prioritized closure program and a time frame for the completion of the program and shall adopt rules to implement

the program. A person who fails to properly plug an abandoned well on property the person owns, in accordance with the program established by the department, is subject to a civil penalty of up to one hundred dollars per day that the well remains unplugged or improperly plugged. The moneys collected shall be deposited in the financial incentive portion of the agriculture management account. The department of agriculture and land stewardship may provide by rule for financial incentive moneys, through expenditure of the moneys allocated to the financial-incentive-program portion of the agriculture management account, to reduce a person's cost in properly plugging wells abandoned prior to July 1, 1987.

Sec. 306. Section 465.22, Code 1987, is amended to read as follows:

465.22 DRAINAGE IN COURSE OF NATURAL DRAINAGE -- RECONSTRUCTION -- DAMAGES.

Owners of land may drain the ~~same~~ land in the general course of natural drainage by constructing or reconstructing open or covered drains, discharging the ~~same~~ drains in any natural watercourse or depression ~~whereby~~ so the water will be carried into some other natural watercourse, and ~~when such~~ if the drainage is wholly upon the owner's land the owner ~~shall~~ is not be liable in damages ~~therefor, nor shall any such~~ for the drainage unless it increases the quantity of water or changes the manner of discharge on the land of another. An owner in constructing a replacement drain, wholly on the owner's ~~own~~ land, and in the exercise of due care be, is not liable in damages to another ~~in case~~ if a previously constructed drain on the owner's own land is rendered inoperative or less efficient by ~~such~~ the new drain, unless in violation of the terms of a written contract. ~~Nothing in this~~ This section ~~shall in any manner be construed to~~ does not affect the rights or liabilities of proprietors in respect to running streams.

Sec. 307. NEW SECTION. 558.69 EXISTENCE AND LOCATION OF WELLS, DISPOSAL SITES, UNDERGROUND STORAGE TANKS, AND HAZARDOUS WASTE.

With each declaration of value submitted to the county recorder under chapter 428A, there shall also be submitted a statement that no known wells are situated on the property, or if known wells are situated on the property, the statement must state the approximate location of each known well and its status with respect to section 159.29 or 455B.190. The statement shall also state that no disposal site for solid waste, as defined in section 455B.301, which has been deemed to be potentially hazardous by the department of natural resources, exists on the property, or if such a disposal site does exist, the location of the site on the property. The statement shall additionally state that no underground storage tank, as defined in section 455B.471, subsection 6, exists on the property, or if an underground storage tank does exist, the type and size of the tank, and the substance in the tank. The statement shall also state that no hazardous waste as defined in section 455B.411, subsection 4, or listed by the department pursuant to section 455B.412, subsection 2, or section 455B.464, exists on the property, or if hazardous waste does exist, that the waste is being managed in accordance with rules adopted by the department of natural resources. The statement shall be signed by the grantors or the transferors of the property. The county recorder shall refuse to record any deed, instrument, or writing for which a declaration of value is required under chapter 428A unless the statement required by this section has been submitted to the county recorder.

If a declaration of value is not required, the above information shall be submitted on a separate form. The director of the department of natural resources shall prescribe the form of the statement and the separate form to

be supplied by each county recorder in the state. The county recorder shall transmit the statements to the department of natural resources at times directed by the director of the department.

PART FOUR -- SOLID WASTE MANAGEMENT AND LANDFILLS

Sec. 401. Section 18.3, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 9. Administering the provisions of section 18.18.

Sec. 402. Section 28F.1, unnumbered paragraph 1, Code 1987, is amended to read as follows:

This chapter provides a means for the joint financing by public agencies of works or facilities useful and necessary for the collection, treatment, purification, and disposal in a sanitary manner of liquid and solid waste, sewage, and industrial waste, facilities used for the conversion of solid waste to energy, and also electric power facilities constructed within the state of Iowa except that hydroelectric power facilities may also be located in the waters and on the dams of or on land adjacent to either side of the Mississippi or Missouri river bordering the state of Iowa, water supply systems, swimming pools or golf courses. This chapter applies to the acquisition, construction, reconstruction, ownership, operation, repair, extension, or improvement of such works or facilities, by a separate administrative or legal entity created pursuant to chapter 28E. When the legal entity created under this chapter is comprised solely of cities, counties, and sanitary districts established under chapter 358, or any combination thereof or any combination of the foregoing with other public agencies, the entity shall be both a corporation and a political subdivision with the name under which it was organized. The legal entity may sue and be sued, contract, acquire and hold real and personal property necessary for corporate purposes, adopt a corporate seal and

alter the seal at pleasure, and execute all the powers conferred in this chapter.

Sec. 403. NEW SECTION. 268.4 SMALL BUSINESS ASSISTANCE CENTER FOR THE SAFE AND ECONOMIC MANAGEMENT OF SOLID WASTE AND HAZARDOUS SUBSTANCES.

1. The small business assistance center for the safe and economic management of solid waste and hazardous substances is established at the University of Northern Iowa. The University of Northern Iowa, in cooperation with the department of natural resources, shall develop and implement a program which provides the following:

a. Information regarding the safe use and economic management of solid waste and hazardous substances to small businesses which generate the substances.

b. Dissemination of information to public and private agencies regarding state and federal solid waste and hazardous substances regulations, and assistance in achieving compliance with the regulations.

c. Advice and consultation in the proper storage, handling, treatment, reuse, recycling, and disposal methods of solid waste and hazardous substances.

d. Identification of the advantages of proper substance management relative to liability and operational costs of a particular small business.

e. Assistance in the providing of capital formation in order to comply with state and federal regulations.

2. a. An advisory committee to the center is established, consisting of a representative of each of the following organizations:

(1) The Iowa department of economic development.

(2) The small business development commission.

(3) The University of Northern Iowa.

(4) The State University of Iowa.

(5) Iowa State University of science and technology.

(6) The department of natural resources.

b. The active participation of representatives of small businesses in the state shall also be sought and encouraged.

3. Information obtained or compiled by the center shall be disseminated directly to the Iowa department of economic development, the small business development centers, and other public and private agencies with interest in the safe and economic management of solid waste and hazardous substances.

4. The center may solicit, accept, and administer moneys appropriated to the center by a public or private agency.

Sec. 404. Section 455B.301, Code 1987, is amended by adding the following new subsections:

NEW SUBSECTION. 7. "Closure" means actions that will prevent, mitigate, or minimize the threat to public health and the environment posed by a closed sanitary landfill, including, but not limited to, application of final cover, grading and seeding of final cover, installation of an adequate monitoring system, and construction of ground and surface water diversion structures, if necessary.

NEW SUBSECTION. 8. "Closure plan" means the plan which specifies the methods and schedule by which an operator will complete or cease disposal operations of a sanitary disposal project, prepare the area for long-term care, and make the area suitable for other uses.

NEW SUBSECTION. 9. "Lifetime of the project" means the projected period of years that a landfill will receive waste, from the time of opening until closure, based on the volume of waste to be received projected at the time of submittal of the initial project plan and the calculated refuse capacity of the landfill based upon the design of the project.

NEW SUBSECTION. 10. "Financial assurance instrument" means an instrument submitted by an applicant to ensure the operator's financial capability to provide reasonable and necessary response during the lifetime of the project and for

the thirty years following closure, and to provide for the closure of the facility and postclosure care required by rules adopted by the commission in the event that the operator fails to correctly perform closure and postclosure care requirements. The form may include the establishment of a secured trust fund, use of a cash or surety bond, or the obtaining of an irrevocable letter of credit.

NEW SUBSECTION. 11. "Postclosure" and "postclosure care" mean the time and actions taken for the care, maintenance, and monitoring of a sanitary disposal project after closure that will prevent, mitigate, or minimize the threat to public health, safety, and welfare and the threat to the environment posed by the closed facility.

NEW SUBSECTION. 12. "Postclosure plan" means the plan which specifies the methods and schedule by which the operator will perform the necessary monitoring and care for the area after closure of a sanitary disposal project.

NEW SUBSECTION. 13. "Manufacturer" means a person who by labor, art, or skill transforms raw material into a finished product or article of trade.

NEW SUBSECTION. 14. "Leachate" means fluid that has percolated through solid waste and which contains contaminants consisting of dissolved or suspended materials, chemicals, or microbial waste products from the solid waste.

NEW SUBSECTION. 15. "Actual cost" means the operational, remedial and emergency action, closure, postclosure, and monitoring costs of a sanitary disposal project for the lifetime of the project.

Sec. 405. NEW SECTION. 455B.301A DECLARATION OF POLICY.

1. The protection of the health, safety, and welfare of Iowans and the protection of the environment require the safe and sanitary disposal of solid wastes. An effective and efficient solid waste disposal program, protects the environment and the public, and provides the most practical

and beneficial use of the material and energy values of solid waste. While recognizing the continuing necessity for the existence of landfills, alternative methods of managing solid waste and a reduction in the reliance upon land disposal of solid waste are encouraged. In the promotion of these goals, the following waste management hierarchy in descending order of preference, is established as the solid waste management policy of the state:

a. Volume reduction at the source.

b. Recycling and reuse.

c. Combustion with energy recovery and refuse-derived fuel.

d. Combustion for volume reduction.

e. Disposal in sanitary landfills.

2. In the implementation of the solid waste management policy, the state shall:

a. Establish and maintain a cooperative state and local program of project planning, and technical and financial assistance to encourage comprehensive solid waste management.

b. Utilize the capabilities of private enterprise as well as the services of public agencies to accomplish the desired objectives of an effective solid waste management program.

Sec. 406. Section 455B.304, unnumbered paragraph 3, Code 1987, is amended to read as follows:

The commission shall adopt rules prohibiting the disposal of uncontained liquid waste in a sanitary landfill. The rules shall prohibit land burial or disposal by land application of wet sewer sludge at a sanitary landfill.

Sec. 407. Section 455B.304, unnumbered paragraph 6, Code 1987, is amended to read as follows:

The commission shall, by rule, require continued monitoring of groundwater pursuant to this section for a period of ~~twenty~~ thirty years after the sanitary disposal project is closed. The commission may prescribe a lesser period of monitoring

duration and frequency in consideration of the potential or lack thereof for groundwater contamination from the sanitary disposal project. The commission may extend the ~~twenty-year~~ thirty-year monitoring period on a site-specific basis by adopting rules specifically addressing additional monitoring requirements for each sanitary disposal project for which the monitoring period is to be extended.

Sec. 408. Section 455B.304, Code 1987, is amended by adding the following new unnumbered paragraphs:

NEW UNNUMBERED PARAGRAPH. The commission shall adopt rules which establish closure, postclosure, leachate control and treatment, and financial assurance standards and requirements and which establish minimum levels of financial responsibility for sanitary disposal projects.

NEW UNNUMBERED PARAGRAPH. The commission shall adopt rules which establish the minimum distance between tiling lines and a sanitary landfill in order to assure no adverse effect on the groundwater.

NEW UNNUMBERED PARAGRAPH. The commission shall adopt rules for the distribution of grants to cities, counties, central planning agencies, and public or private agencies working in cooperation with cities or counties, for the purpose of solid waste management. The rules shall base the awarding of grants on a project's reflection of the solid waste management policy and hierarchy established in section 455B.301A, the proposed amount of local matching funds, and community need.

NEW UNNUMBERED PARAGRAPH. By July 1, 1990, a sanitary landfill disposal project operating with a permit shall have a trained, tested, and certified operator. A certification program shall be devised or approved by rule of the department.

Sec. 409. Section 455B.305, subsection 5, Code 1987, is amended by adding the following new unnumbered paragraph:

NEW UNNUMBERED PARAGRAPH. After July 1, 1997, however, no new landfill permits shall be issued unless the applicant certifies that the landfill is needed as a part of an alternative disposal method, or unless the applicant provides documentation which satisfies the director that alternatives have been studied and are not either technically or economically feasible. The decision of the director is subject to review by the commission at its next meeting.

Sec. 410. Section 455B.305, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 6. Beginning July 1, 1992, the director shall not issue, renew, or reissue a permit for a sanitary landfill unless the sanitary landfill is equipped with a leachate control system. The director may exempt a permit applicant from this requirement if the director determines that certain conditions regarding, but not limited to, existing physical conditions, topography, soil, geology, and climate, are such that a leachate control system is unnecessary.

Sec. 411. Section 455B.306, subsection 1, Code 1987, is amended to read as follows:

1. A city, county, and a private agency operating or planning to operate a sanitary disposal project shall file with the director a comprehensive plan detailing the method by which the city, county, or private agency will comply with this part 1. The director shall review each comprehensive plan submitted and may reject, suggest modification, or approve the proposed plan. The director shall aid in the development of comprehensive plans for compliance with this part. The director shall make available to a city, county, and private agency appropriate forms for the submission of comprehensive plans and may hold hearings for the purpose of implementing this part. The director and governmental agencies with primary responsibility for the development and

conservation of energy resources shall provide research and assistance, when cities and counties operating or planning to operate sanitary disposal projects request aid in planning and implementing resource recovery systems. A comprehensive plan filed by a private agency operating or planning to operate a sanitary disposal project required pursuant to section 455B.302 shall be developed in cooperation and consultation with the city or county responsible to provide for the establishment and operation of a sanitary disposal project.

Sec. 412. Section 455B.306, subsection 2, Code 1987, is amended to read as follows:

2. The plan required by subsection 1 shall be filed with the department at the time of initial application for the construction and operation of a sanitary ~~landfill~~ disposal project and shall be updated and refiled with the department at the time of each subsequent application for renewal or reissuance of a previously issued permit.

Sec. 413. Section 455B.306, subsection 3, Code 1987, is amended to read as follows:

3. A comprehensive plan filed pursuant to this section in conjunction with an application for issuance, renewal, or reissuance of a permit for a sanitary disposal project shall incorporate and reflect the waste management hierarchy of the state solid waste management policy and shall at a minimum address the following general topics to the extent appropriate to the technology employed by the applicant at the sanitary disposal project:

a. The extent to which solid waste is or can be recycled.

b. The economic and technical feasibility of using other existing sanitary disposal project facilities in lieu of initiating or continuing the sanitary landfill for which the permit is being sought.

c. The expected environmental impact of alternative solid waste disposal methods, including the use of sanitary landfills.

d. A specific plan and schedule for implementing technically and economically feasible solid waste disposal methods that will result in minimal environmental impact.

4. In addition to the above requirements, the following specific areas must be addressed in detail in the comprehensive plan:

a. A closure and postclosure plan detailing the schedule for and the methods by which the operator will meet the conditions for proper closure and postclosure adopted by rule by the commission. The plan shall include, but is not limited to, the proposed frequency and types of actions to be implemented prior to and following closure of an operation, the proposed postclosure actions to be taken to return the area to a condition suitable for other uses, and an estimate of the costs of closure and postclosure and the proposed method of meeting these costs. The postclosure plan shall reflect the thirty-year time period requirement for postclosure responsibility.

b. A plan for the control and treatment of leachate, including financial considerations proposed in meeting the costs of control and treatment in order to meet the requirements of section 455B.305, subsection 6.

c. A financial plan detailing the actual cost of the sanitary disposal project and including the funding sources of the project. In addition to the submittal of the financial plan filed pursuant to this subsection, the operator of an existing sanitary landfill shall submit an annual financial statement to the department.

d. An emergency response and remedial action plan including established provisions to minimize the possibility of fire, explosion, or any release to air, land, or water of pollutants that could threaten human health and the environment, and the identification of possible occurrences that may endanger human health and environment.

Sec. 414. Section 455B.306, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 4. In addition to the comprehensive plan filed pursuant to subsection 1, a person operating or proposing to operate a sanitary disposal project shall provide a financial assurance instrument to the department prior to the initial approval of a permit or prior to the renewal of a permit for an existing or expanding facility beginning July 1, 1988.

a. The financial assurance instrument shall meet all requirements adopted by rule by the commission, and shall not be canceled, revoked, disbursed, released, or allowed to terminate without the approval of the department. Following the cessation of operation or closure of a sanitary disposal project, neither the guarantor nor the operator shall cancel, revoke, or disburse the financial assurance instrument or allow the instrument to terminate until the operator is released from closure, postclosure, and monitoring responsibilities.

b. The operator shall maintain closure, and postclosure accounts. The commission shall adopt by rule the amounts to be contributed to the accounts based upon the amount of solid waste received by the facility. The accounts established shall be specific to the facility.

(1) Money in the accounts shall not be assigned for the benefit of creditors with the exception of the state.

(2) Money in an account shall not be used to pay any final judgment against a licensee arising out of the ownership or operation of the site during its active life or after closure.

(3) Conditions under which the department may gain access to the accounts and circumstances under which the accounts may be released to the operator after closure and postclosure responsibilities have been met, shall be established by the commission.

c. The commission shall adopt by rule the minimum amounts of financial responsibility for sanitary disposal projects.

d. Financial assurance instruments may include instruments such as cash or surety bond, a letter of credit, a secured trust fund, or a corporate guarantee.

e. The annual financial statement submitted to the department pursuant to section 455B.306, subsection 3, paragraph "d", shall include the current amounts established in each of the accounts and the projected amounts to be deposited in the accounts in the following year.

Sec. 415. Section 455B.307, Code 1987, is amended to read as follows:

455B.307 DUMPING -- WHERE PROHIBITED.

1. ~~It shall be unlawful for any~~ A private agency or public agency ~~to~~ shall not dump or deposit or permit the dumping or depositing of any solid waste resulting from its own residential, farming, manufacturing, mining, or commercial activities at any place other than a sanitary disposal project approved by the director unless the agency has been granted a permit by the department which allows the dumping or depositing of solid waste on land owned or leased by the agency. The department shall adopt rules regarding the permitting of this activity which shall provide that the public interest is best served, but which may be based upon criteria less stringent than those regulating a public sanitary disposal project provided that the rules adopted meet the groundwater nondegradation goal specified in section 455E.4. The comprehensive plans for these facilities may be varied in consideration of the types of sanitary disposal practices, hydrologic and geologic conditions, construction and operations characteristics, and volumes and types of waste handled at the disposal site. ~~This section shall not prohibit a private agency or public agency from dumping or depositing solid waste resulting from its own residential, farming,~~

~~manufacturing, mining or commercial activities on land owned or leased by it if the action does not violate any statute of this state or rules promulgated by the commission or local boards of health, or local ordinances.~~ The director may issue temporary permits for dumping or disposal of solid waste at disposal sites for which an application for a permit to operate a sanitary disposal project has been made and which have not met all of the requirements of part 1 of this division and the rules adopted by the commission if a compliance schedule has been submitted by the applicant specifying how and when the applicant will meet the requirements for an operational sanitary disposal project and the director determines the public interest will be best served by granting such temporary permit.

~~2~~ 7. The director may issue any order necessary to secure compliance with or prevent a violation of the provisions of this part 1 of division IV or the rules ~~promulgated~~ adopted pursuant ~~thereto~~ to the part. The attorney general shall, on request of the department, institute any legal proceedings necessary in obtaining compliance with an order of the commission or the director or prosecuting any person for a violation of the provisions of ~~said~~ the part or rules issued pursuant ~~thereto~~ to the part.

~~3~~ 8. Any person who violates any provision of part 1 of this division or any rule or any order ~~promulgated~~ adopted or the conditions of any permit or order issued pursuant to part 1 of this division shall be subject to a civil penalty. The amount of the civil penalty shall be based upon the toxicity and severity of the solid waste as determined by rule, but not to exceed five hundred dollars for each day of such violation.

Sec. 416. Section 455B.310, subsection 2, Code 1987, is amended to read as follows:

2. The tonnage fee is ~~twenty-five cents~~ one dollar and fifty cents per ton of solid waste for the year beginning July 1, 1988 and shall increase annually in the amount of fifty cents per ton through July 1, 1992. The city or county providing for the establishment and operation of the sanitary landfill may charge an additional tonnage fee for the disposal of solid waste at the sanitary landfill, to be used exclusively for the development and implementation of alternatives to sanitary landfills.

Sec. 417. Section 455B.310, subsections 4 and 5, Code 1987, are amended to read as follows:

4. All tonnage fees received by the department under this section shall be ~~paid to a groundwater fund created under section 455B.309~~ deposited in the solid waste account of the groundwater protection fund created under section 455E.11.

5. Fees imposed by this section beginning July 1, 1988 shall be paid to the department on ~~an annual~~ a quarterly basis. ~~Fees are due on April 15 for the previous calendar year~~ The initial payment of fees collected beginning July 1, 1988 shall be paid to the department on January 1, 1989 and on a quarterly basis thereafter. The payment shall be accompanied by a return in the form prescribed by the department.

Sec. 418. Section 455B.310, Code 1987, is amended by adding the following new subsections:

NEW SUBSECTION. 7. The department shall grant exemptions from the fee requirements of subsection 2 for receipt of solid waste meeting all of the following criteria:

a. Receipt of the solid waste is pursuant to a written contract between the owner or operator of the sanitary landfill and another person.

b. The contract was lawfully executed prior to January 1, 1987.

c. The contract expressly prohibits an increase in the compensation or fee payable to the owner or operator of the landfill and does not allow voluntary cancellation or

renegotiation of the compensation or fee during the term of the contract.

d. The contract has not been amended at any time after January 1, 1987.

e. The owner or operator of the sanitary landfill applying for exemption demonstrates to the satisfaction of the department that good faith efforts were made to renegotiate the contract notwithstanding its terms, and has been unable to agree on an amendment allowing the fee provided in subsection 2 to be added to the compensation or fee provisions of the contract.

f. Applications for exemption must be submitted on forms provided by the department with proof of satisfaction of all criteria.

g. Notwithstanding the time specified within the contract, an exemption from payment of the fee increase requirements for a multiyear contract shall terminate by January 1, 1989.

NEW SUBSECTION. 8. In the case of a sanitary disposal project other than a sanitary landfill, no tonnage fee shall apply for five years beginning July 1, 1987 or for five years from the commencement of operation, whichever is later. By July 1, 1992, the department shall provide the general assembly with a recommendation regarding appropriate fees for alternative sanitary disposal projects.

Sec. 419. Section 455B.311, subsection 2, Code 1987, is amended to read as follows:

2. Grants shall only be awarded to a city or a county; however, a grant may be made to a central planning agency representing more than one city or county or combination of cities or counties for the purpose of planning and implementing regional solid waste management facilities or may be made to private or public agencies working in cooperation with a city or county. The department shall award grants, in accordance with the rules adopted by the commission, based

upon a proposal's reflection of the solid waste management policy and hierarchy established in section 455B.301A. Grants shall be awarded only for an amount determined by the department to be reasonable and necessary to conduct the work as set forth in the grant application. Grants may be awarded at a maximum cost-share level of ninety percent with a preference given for regional or shared projects and a preference given to projects involving environmentally fragile areas which are particularly subject to groundwater contamination. Grants shall be awarded in a manner which will distribute the grants geographically throughout the state.

Sec. 420. NEW SECTION. 455B.312 WASTE ABATEMENT PROGRAM.

1. If the department receives a complaint that certain products or packaging which when disposed of are incompatible with an alternative method of managing solid waste and with the solid waste management policy, the director shall investigate the complaint. If the director determines that the complaint is well-founded, the department shall inform the manufacturer of the product or packaging and attempt to resolve the matter by informal negotiations.

2. If informal procedures fail to result in resolution of the matter, the director shall hold a hearing between the affected parties. Following the hearing, if it is determined that removal of the product or packaging is critical to the utilization of the alternative method of disposing of solid waste, the director shall issue an order setting out the requirements for an abatement plan to be prepared by the manufacturer within the time frame established in the order.

If an acceptable plan is not prepared, the plan is not implemented, or the problem otherwise continues unabated, the attorney general shall take actions authorized by law to secure compliance.

Sec. 421. NEW SECTION. 18.18 STATE PURCHASES -- RECYCLED PRODUCTS.

1. When purchasing paper products, the department of general services shall, wherever the price is reasonably competitive and the quality intended, purchase the recycled product.

2. The department of general services, in conjunction with the department of natural resources, shall review the procurement specifications currently used by the state to eliminate, wherever possible, discrimination against the procurement of products manufactured with recovered materials.

3. The department of natural resources shall assist the department of general services in locating suppliers of recycled products and collecting data on recycled content purchases.

4. Information on recycled content shall be requested on all bids for paper products issued by the state and on other bids for products which could have recycled content such as oil, plastic products, compost materials, aggregate, solvents, and rubber products.

5. The department of general services, in conjunction with the department of natural resources, shall adopt rules and regulations to carry out the provisions of this section.

6. All state agencies shall fully cooperate with the departments of general services and natural resources in all phases of implementing this section.

Sec. 422. GROUNDWATER FUND EXISTING FEES.

All tonnage fees received by the department of natural resources pursuant to section 455B.310 and deposited in the groundwater fund and existing in the groundwater fund prior to December 31, 1987, shall be used for the following purposes:

1. Six cents of the twenty-five cents per ton deposited in the fund is appropriated to the waste management authority of the department of natural resources.

2. Fifty thousand dollars of the moneys in the fund is appropriated to the University of Northern Iowa for the fiscal

year beginning July 1, 1987, and ending June 30, 1988, for the establishment of the small business assistance center for the safe and economic management of solid waste and hazardous substances at the University of Northern Iowa.

3. The remainder of the moneys in the account are appropriated to the department of natural resources for the development of guidelines for groundwater monitoring at sanitary disposal projects as defined in section 455B.301, subsection 3.

PART FIVE -- HOUSEHOLD HAZARDOUS WASTE

Sec. 501. NEW SECTION. 455F.1 DEFINITIONS.

As used in this chapter unless the context otherwise requires:

1. "Department" means the department of natural resources.

2. "Commission" means the state environmental protection commission.

3. "Manufacturer" means a person who manufactures or produces a household hazardous material for resale in this state.

4. "Wholesaler" or "distributor" means a person other than a manufacturer or manufacturer's agent who engages in the business of selling or distributing a household hazardous material within the state, for the purpose of resale.

5. "Retailer" means a person offering for sale or selling a household hazardous material to the ultimate consumer, within the state.

6. "Display area label" means the signage used by a retailer to mark a household hazardous material display area as prescribed by the department of natural resources.

7. "Residential" means a permanent place of abode, which is a person's home as opposed to a person's place of business.

8. "Household hazardous material" means a product used for residential purposes and designated by rule of the department of natural resources and may include any hazardous substance

as defined in section 455B.411, subsection 3; and any hazardous waste as defined in section 455B.411, subsection 4; and shall include but is not limited to the following materials: motor oils, motor oil filters, gasoline and diesel additives, degreasers, waxes, polishes, solvents, paints, with the exception of latex-based paints, lacquers, thinners, caustic household cleaners, spot and stain remover with petroleum base, and petroleum-based fertilizers. However, "household hazardous material" does not include laundry detergents or soaps, dishwashing compounds, chlorine bleach, personal care products, personal care soaps, cosmetics, and medications.

Sec. 502. NEW SECTION. 455F.2 POLICY STATEMENT.

It is the policy of this state to educate Iowans regarding the hazardous nature of certain household products, proper use of the products, and the proper methods of disposal of residual product and containers in order to protect the public health, safety, and the environment.

Sec. 503. NEW SECTION. 455F.3 LABELS REQUIRED.

1. A retailer shall affix a display area label, as prescribed by rule of the commission, in a prominent location upon or near the display area of a household hazardous material. If the display area is a shelf, and the price of the product is affixed to the shelf, the label shall be affixed adjacent to the price information.

2. The department shall develop, in cooperation with distributors, wholesalers, and retailer associations, and shall distribute to retailers a household hazardous products list to be utilized in the labeling of a display area containing products which are household hazardous materials.

3. A person found in violation of this section is guilty of a simple misdemeanor.

Sec. 504. NEW SECTION. 455F.4 CONSUMER INFORMATION BOOKLETS.

A retailer shall maintain and prominently display a booklet, developed by the department, in cooperation with manufacturers, distributors, wholesalers, and retailer associations and provided to retailers at departmental expense, which provides information regarding the proper use of household hazardous materials and specific instructions for the proper disposal of certain substance categories. The department shall also develop and provide to a retailer, at departmental expense, bulletins regarding household hazardous materials which provide information designated by rule of the commission. The retailer shall distribute the bulletins without charge to customers.

A manufacturer or distributor of household hazardous materials who authorizes independent contractor retailers to sell the products of the manufacturer or distributor on a person-to-person basis primarily in the customer's home, shall print informational lists of its products which are designated by the department as household hazardous materials. These lists of products and the consumer information booklets prepared in accordance with this section shall be provided by the manufacturer or distributor in sufficient quantities to each contractor retailer for dissemination to customers. During the course of a sale of a household hazardous material by a contractor retailer, the customer shall in the first instance be provided with a copy of both the list and the consumer information booklet. In subsequent sales to the same customer, the list and booklet shall be noted as being available if desired.

Sec. 505. NEW SECTION. 455F.5 DUTIES OF THE COMMISSION.

The commission shall:

1. Adopt rules which establish a uniform label to be supplied and used by retailers.

2. Adopt rules which designate the type and amount of information to be included in the consumer information booklets and bulletins.

Sec. 506. NEW SECTION. 455F.6 DUTIES OF THE DEPARTMENT.

The department shall:

1. Designate products which are household hazardous materials and, based upon the designations and in consultation with manufacturers, distributors, wholesalers, and retailer associations, develop a household hazardous product list for the use of retailers in identifying the products.

2. Enforce the provisions of this chapter and implement the penalties established.

3. Identify, after consulting with departmental staff and the listing of other states, no more than fifty commonly used household products which, due to level of toxicity, extent of use, nondegradability, or other relevant characteristic, constitute the greatest danger of contamination of the groundwater when placed in a landfill. The department may identify additional products by rule.

4. Submit recommendations to the general assembly regarding the products specified in subsection 1 which include but are not limited to the following:

a. Education of consumers regarding the danger incurred in disposal of the products, the proper disposal of the products, and the use of alternative products which do not present as great a disposal danger as the products specified.

b. Dissemination of information regarding the products specified.

c. Special labeling or stamping of the products.

d. A means for proper disposal of the products.

e. Proposed legislative action regarding implementation of recommendations concerning the products.

Sec. 507. NEW SECTION. 455F.7 HOUSEHOLD HAZARDOUS MATERIALS PERMIT.

1. A retailer offering for sale or selling a household hazardous material shall have a valid permit for each place of business owned or operated by the retailer for this activity.

All permits provided for in this division shall expire on June 30 of each year. Every retailer shall submit an annual application by July 1 of each year and a fee of ten dollars based upon gross retail sales of up to fifty thousand dollars, twenty-five dollars based upon gross retail sales of fifty thousand dollars to three million dollars, and one hundred dollars based upon gross retail sales of three million dollars or more to the department of revenue and finance for a permit upon a form prescribed by the director of revenue and finance. Permits are nonrefundable, are based upon an annual operating period, and are not prorated. A person in violation of this section shall be subject to permit revocation upon notice and hearing. The department shall remit the fees collected to the household hazardous waste account of the groundwater protection fund. A person distributing general use pesticides labeled for agricultural or lawn and garden use with gross annual pesticide sales of less than ten thousand dollars is subject to the requirements and fee payment prescribed by this section.

2. A manufacturer or distributor of household hazardous materials, which authorizes retailers as independent contractors to sell the products of the manufacturer or distributor on a person-to-person basis primarily in the customer's home, may obtain a single household hazardous materials permit on behalf of its authorized retailers in the state, in lieu of individual permits for each retailer, and pay a fee based upon the manufacturer's or distributor's gross retail sales in the state according to the fee schedule and requirements of subsection 1. However, a manufacturer or distributor which has gross retail sales of three million dollars or more in the state shall pay an additional permit fee of one hundred dollars for each subsequent increment of three million dollars of gross retail sales in the state, up to a maximum permit fee of three thousand dollars.

Sec. 508. NEW SECTION. 455F.8 HOUSEHOLD HAZARDOUS WASTE CLEANUP PROGRAM CREATED.

The department shall conduct programs to collect and dispose of small amounts of hazardous wastes which are being stored in residences or on farms. The program shall be known as "Toxic Cleanup Days". The department shall promote and conduct the program and shall by contract with a qualified and bonded waste handling company, collect and properly dispose of wastes believed by the person disposing of the waste to be hazardous. The department shall establish maximum amounts of hazardous wastes to be accepted from a person during the "Toxic Cleanup Days" program. Amounts accepted from a person above the maximum shall be limited by the department and may be subject to a fee set by the department, but the department shall not assess a fee for amounts accepted below the maximum amount. The department shall designate the times and dates for the collection of wastes. The department shall have as a goal twelve "Toxic Cleanup Days" during the period beginning July 1, 1987, and ending October 31, 1988. In any event, the department shall offer the number of days that can be properly and reasonably conducted with funds deposited in the household hazardous waste account. In order to achieve the maximum benefit from the program, the department shall offer "Toxic Cleanup Days" on a statewide basis and provide at least one "Toxic Cleanup Day" in each departmental region. "Toxic Cleanup Days" shall be offered in both rural and urban areas to provide a comparison of response levels and to test the viability of multicounty "Toxic Cleanup Days". The department may also offer at least one "Toxic Cleanup Day" at a previously serviced location to test the level of residual demand for the event and the effect of the existing public awareness on the program. The department shall prepare an annual report citing the results and costs of the program for submittal to the general assembly.

Sec. 509. NEW SECTION. 455F.9 EDUCATION PROGRAM.

In addition to the "Toxic Cleanup Days" program the department shall implement a public information and education program regarding the use and disposal of household hazardous materials. The program shall provide appropriate information concerning the reduction in use of the materials, including the purchase of smaller quantities and selection of alternative products. The department shall cooperate with existing educational institutions, distributors, wholesalers, and retailers, and other agencies of government and shall enlist the support of service organizations, whenever possible, in promoting and conducting the programs in order to effectuate the household hazardous materials policy of the state.

Sec. 510. NEW SECTION. 455F.10 PENALTIES.

Any person violating a provision of this chapter or a rule adopted pursuant to this chapter is guilty of a simple misdemeanor.

Sec. 511. COLLECTION OF USED MOTOR OIL -- PILOT PROJECT.

The state department of transportation, in cooperation with the department of natural resources and the Iowa State University of science and technology center for industrial research and service, shall institute a pilot project to collect and dispose of used motor oil from residences and farms in one urban county and one rural county by October 1, 1987.

The state department of transportation shall promote community participation; provide collection sites and facilities; prescribe procedures for each collection site, including the amount of used motor oil to be accepted from a household or farm, and measures necessary to assure maintenance of a sanitary collection site environment; arrange for proper used oil disposal; and report to the general assembly by March 1, 1988, regarding the progress on the pilot project. The report shall include the cost of the project,

the amount of used motor oil collected, and any other relevant data gathered by the participating agencies. The state department of transportation shall recommend in the report to the general assembly whether the program should be continued, expanded, modified, or discontinued.

The department of natural resources shall assist the state department of transportation in promoting the pilot project and in applying any state or federal environmental regulations to the pilot project. The Iowa State University of science and technology center for industrial research and service shall coordinate research on establishing the waste stream for used motor oil, investigate alternative disposal methods, and coordinate research with other states' research projects on used motor oil collection and disposal.

This section is repealed July 1, 1989.

Sec. 512. NEW SECTION. 455F.12 RECYCLING AND RECLAMATION PROGRAMS.

Up to eighty thousand dollars of the moneys deposited in the household hazardous waste account shall be allocated to the department of natural resources for city, county, or service organization projects relative to recycling and reclamation events. A city, county, or service organization shall submit a competitive grant to the department of natural resources by April 1 for approval by the department no later than May 15.

PART SIX -- STORAGE TANK MANAGEMENT

Sec. 601. Section 507D.3, Code 1987, is amended by adding the following new subsection:

NEW SUBSECTION. 6. An assistance program for the facilitation of insurance and financial responsibility coverage for owners and operators of underground storage tanks which store petroleum shall not be affected by the prohibitions of subsections 2 and 3.

Sec. 602. PLAN OF OPERATIONS PROGRAM. The division of insurance of the department of commerce, in conjunction with the department of natural resources and private industry, shall, no later than September 15, 1987, create a plan of operations program for the development of state or private funds to satisfy the requirements of the federal Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., regarding the financial responsibility of an owner or operator of an underground storage tank which stores petroleum.

The program shall include, but is not limited to, the following elements:

1. The establishment of a pool of insurers sufficient to manage all anticipated participants required to obtain and maintain evidence of financial responsibility in the amounts of one million dollars for corrective action and one million dollars for the compensation of third parties for property damage and bodily injury.

2. The establishment of the mechanism for election of the pool administrator by the participating industry.

3. The establishment of a plan of operations, through the administrator, including but not limited to the following items:

a. Collection of administrative expenses.

b. A claims process and defense system.

c. An actuarial review.

d. A determination of rate classifications which reflect the tank standards and monitoring devices maintained by an individual owner or operator, which in addition to a daily inventory system include but are not limited to the following:

(1) Secondary containment consisting of double wall construction and provided with a device to monitor the interstitial space between the secondary and primary containment structures.

(2) Secondary containment consisting of single wall construction and a man-made liner, and groundwater monitoring wells.

(3) Single wall construction and groundwater monitoring wells.

(4) Any type of tank construction and sniffer wells and an additional monitoring system.

e. A policyholder service system.

f. The billing, collecting, and investment of premiums.

4. The mechanism by which owners or operators who can demonstrate financial responsibility pursuant to the federal Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., may establish exempt status from participation in the program.

Sec. 603. COMMITTEE CREATED -- DUTIES. The legislative council shall create a legislative committee which shall meet within thirty days following the issuance of the plan of operations program. The committee shall be composed of two senators, one appointed by the majority leader of the senate and one appointed by the minority leader of the senate; two representatives, one appointed by the speaker of the house of representatives and one appointed by the minority leader of the house of representatives; one representative of petroleum storage tank owners and operators; and one representative of the petroleum industry.

The committee shall, on or before January 1, 1988, prepare proposed legislation for the implementation of the program to be enacted and implemented on or before May 1, 1988. The proposed legislation shall include:

1. The cost of participation of an individual owner or operator based upon the following:

a. The base premium rate determined by the actuarial data.

b. The amount of subsidization of the premium by the state, based on daily inventory and upon the storage tank

standards and inventory monitoring systems maintained by an individual owner or operator. The state subsidization of the premium shall be based upon a sliding fee schedule which may reflect the following criteria:

(1) Tanks with secondary containment consisting of double wall construction and provided with a device to monitor the interstitial space between the secondary and primary containment structures.

(2) Tanks with secondary containment consisting of single wall construction and a man-made liner, and provided with groundwater monitoring wells.

(3) Tanks with single wall construction and groundwater monitoring wells.

(4) Tanks with any type of construction and sniffer wells and an additional monitoring system.

2. The funding source for subsidization, which may be, but is not limited to, the following:

a. An increase in the annual storage tank fee.

b. An annual tank assessment fee.

c. A pump inspection fee, paid by fuel dealers.

d. Federal environmental protection agency grants.

3. The management of the plan and the funds, whether the plan is profitable or operates at a loss.

4. The mechanism by which owners or operators who can demonstrate financial responsibility pursuant to the federal Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., may establish exempt status from participation in the program.

Sec. 604. Section 455B.473, Code 1987, is amended by adding the following new subsections:

NEW SUBSECTION. 3A. An owner or operator of a storage tank described in section 455B.471, subsection 6, paragraph "a", which brings the tank into use after July 1, 1987, shall notify the department of the existence of the tank within

thirty days. The registration of the tank shall be accompanied by a fee of ten dollars to be deposited in the storage tank management account. A tank which is existing before July 1, 1987, shall be reported to the department by July 1, 1989. Tanks under this section installed on or following July 1, 1987, shall comply with underground storage tank regulations adopted by rule by the department.

NEW SUBSECTION. 8. It shall be unlawful to deposit a regulated substance in an underground storage tank which has not been registered pursuant to subsections 1 through 5.

The department shall furnish the owner or operator of an underground storage tank with a registration tag for each underground storage tank registered with the department. The owner or operator shall affix the tag to the fill pipe of each registered underground storage tank. A person who conveys or deposits a regulated substance shall inspect the underground storage tank to determine the existence or absence of the registration tag. If a registration tag is not affixed to the underground storage tank fill pipe, the person conveying or depositing the regulated substance may deposit the regulated substance in the unregistered tank provided that the deposit is allowed only in the single instance, that the person reports the unregistered tank to the department of natural resources, and that the person provides the owner or operator with an underground storage tank registration form and informs the owner or operator of the underground storage tank registration requirements. The owner or operator is allowed fifteen days following the report to the department of the owner's or operator's unregistered tank to comply with the registration requirements. If an owner or operator fails to register the reported underground storage tank during the fifteen-day period, the owner or operator shall pay a fee of twenty-five dollars upon registration of the tank.

Sec. 605. Section 455B.473, subsection 4, Code 1987, is amended to read as follows:

4. The notice of the owner or operator to the department under subsections 1 through 3 shall be accompanied by a fee of ~~five~~ ten dollars for each tank included in the notice. ~~A separate fund is created in the state treasury, the receipts of which are appropriated to pay the administrative expenses of the department incurred under this part. All fees collected by the department under this subsection shall be credited to the fund. The unobligated or unencumbered balance in the fund as of June 30 of each year shall be transferred to the hazardous waste remedial fund.~~ All moneys collected shall be deposited in the storage tank management account of the groundwater protection fund created in section 455E.11. All moneys collected pursuant to this section prior to July 1, 1987, which have not been expended, shall be deposited in the storage tank management account.

Sec. 606. Section 455B.474, subsection 2, Code 1987, is amended by adding the following new paragraph:

NEW PARAGRAPH. e. If an owner or operator is required to uncover or remove an underground storage tank based upon a determination of the department that the underground storage tank presents a hazard to the public health, safety, or the environment, and if upon inspection of the tank the determination is unfounded, the state may reimburse reasonable costs incurred in the inspection of the tank. Claims for reimbursement shall be filed on forms provided by the commission. The commission shall adopt rules pursuant to chapter 17A relating to determinations of reasonableness in approval or rejection of claims in cases of dispute. Claims shall be paid from the general fund of the state. When any one of the tanks or the related pumps and piping at a multiple tank facility are found to be leaking, the state shall not reimburse costs for uncovering or removing any of the other tanks, piping, or pumps that are not found to be leaking.

Sec. 607. NEW SECTION. 455B.479 STORAGE TANK MANAGEMENT FEE.

An owner or operator of an underground storage tank shall pay an annual storage tank management fee of fifteen dollars per tank of over one thousand one hundred gallons capacity. The fees collected shall be deposited in the storage tank management account of the groundwater protection fund.

DONALD D. AVENSON
Speaker of the House

JO ANN ZIMMERMAN
President of the Senate

I hereby certify that this bill originated in the House and is known as House File 631, Seventy-second General Assembly.

JOSEPH O'HERN
Chief Clerk of the House

Approved _____, 1987

TERRY E. BRANSTAD
Governor