Kansas Department of Health and Environment
Division of Environment
Bureau of Water

REGULATORY IMPACT STATEMENT

Pursuant to K.S.A. 77-416

PROPOSED NEW AND AMENDED REGULATIONS:

K.A.R. 28-16-56c and 56d (Amended)

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K.A.R. 28-18-1, 2, 4, 8, 9, 11 through 14 (Amended)

K.A.R. 28-18-16 and 17 (New)

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K.A.R. 28-18a-1, 2, 4, 8, 9, 11, 12, 19, 21, 22, and 26 (Amended)

K.A.R. 28-18a-32 (Revoked)

K.A.R. 28-18a-33 (New)

State FY 2007

Executive Summary of Proposed and Amended Regulations

The Livestock Waste Management Program is based upon statutes and regulations addressing general water pollution and specific statutes and regulations addressing water pollution from concentrated animal feeding operations. Kansas statutes establishing requirements for confined animal feeding operations were created in the late 1960's. In the 1990's the statutes and regulations underwent significant revisions primarily addressing location requirements and swine feeding operations. The statutes divided the requirements into portions specific to swine and other portions applying to all other confined feeding operations.

The Kansas statutes and regulations require a permit if a facility 1) has a significant potential to pollute rivers and streams, or 2) contains or stores wastewater, or 3) if the capacity of the facility or feedlot is over 1,000 animal units (the term animal unit is defined in statute, K.S.A. 65-171d.).

In the 1970's the Environmental Protection Agency (EPA), a federal agency, also developed a program to address water pollution from concentrated animal feeding operations. The EPA program primarily addressed those facilities and feedlots with 1,000 or more head or animal units. On April 14, 2003, EPA completed a revision of their requirements for concentrated animal feeding operations. In Kansas, the Kansas Department of Health and Environment (KDHE) administers the EPA requirements through an agreement with EPA.

The proposed regulations and amendments can be categorized into three key areas:

1. Proposals/amendments based on recently completed research by Kansas State University (KSU) addressing waste-retention lagoons or ponds. These proposals/amendments primarily establish standards, which KSU has shown to be achievable using most Kansas soils, and standards addressing siting and design considerations in order to reduce the possibility for groundwater contamination from such facilities as animal waste management systems;

2. Reference the revised minimum standards of design for animal waste management systems; and

3. Amendments to update the adoption of EPA requirements by KDHE. The adoption by KDHE of the new EPA requirements will ensure a state agency will continue to manage the EPA requirements in Kansas rather than EPA doing so.

A summary of the proposals and amendments for each of the three categories follows:

1. For each new or expanding animal waste-retention lagoon or pond:

   A. change the current animal waste lagoon liner requirements (the bottom of animal waste-retention lagoons or ponds are lined with soil to minimize wastewater seepage from the lagoon) from a 'one size fits all' approach to a

three tiered system of requirements for soil and plastic liners. The degree of protection increases with each tier based on the relative vulnerability and amount of use of the groundwater. The three tiers are generally based upon the three most common groundwater systems in Kansas: areas along rivers and streams where groundwater is close to the surface (Sensitive Groundwater Areas); a physiographic area with very sandy soils and groundwater close to the surface (Equus Beds); and all other areas in Kansas where groundwater is deeper below the surface and the soils are more silty and clayey;

B. ensure there is a minimum of ten feet between the floor of the lagoon and groundwater;

C. highlight the existing variance process which allows concentrated feeding facility operators to propose other equivalent alternatives to those which would be required. The variance process is necessary to address site specific conditions not able to be addressed in a broader regulatory approach; and

D. ensure there is a plan for closure of the larger waste-retention lagoons or ponds if they are located over the Equus Beds. The closure planning requirement would apply to those facilities collecting waste from facilities with 1,000 or more animal units that are also located over the Equus Beds.

2. The existing minimum standards of design are proposed to be revised to clarify the standards and to distinguish between what is *required* in the design or operation of the animal waste-retention lagoon or pond and what is intended to be a *factor to be considered* and appropriately addressed in the design or operation of the facility. The design standards include a variance process to ensure there is flexibility to address unusual or unforeseen conditions.

3. Update the adoption of the 2003 EPA requirements, based on the 2005 court ruling remanding some of the requirements, in order to ensure KDHE will continue to manage the EPA permitting program in Kansas instead of EPA. EPA recently revised their 1974 federal CAFO requirements to clarify portions, which were commonly mis-applied, and to address utilization and management of the animal and process wastes from concentrated animal feeding operations.

Environmental Benefit Statement

1. Need for proposed rules and amendments and environmental benefit likely to accrue.

The proposed regulations and amendments are needed in order to apply the findings of the lagoon seepage research conducted by KSU. As part of the research project KSU also studied the relationship between site selection and design and the relative degree of potential groundwater pollution. The KSU studies indicate most Kansas soils are capable of meeting a more protective permeability standard than current KDHE requirements, but the depth to groundwater and soil types used to line the lagoons and found below the lagoons play an important role in reducing the potential for groundwater contamination to occur. Additionally the KSU research indicates that when an animal waste lagoon or pond is no longer utilized or maintained, the potential for groundwater contamination increases unless steps are taken to remove all the waste and any contaminated liner materials.

Other modifications to the existing program regulations such as: making updates to continue the implementation of EPA requirements for concentrated animal feeding operations by Kansas, incorporating rewritten design standards, clarifying requirements, and incorporating other research findings, are needed to clarify program requirements and improve the efficiency of the program.

Some of the benefits expected include: a reduced potential for nitrate contamination of sensitive groundwater resources in Kansas including the Equus Beds; improved utilization of animal waste as a nutrient source for field crops; and improved water quality in streams and lakes as a result of reduced runoff of contaminants from crop fields where animal wastes are utilized as a crop nutrient.

Nitrate in concentrations greater than 10 mg/l in drinking water has been found to be toxic to infants when consumed (Blue Baby Syndrome). Nitrate moves rapidly in groundwater and protection of groundwater from contamination is less expensive than removing contaminants once they are in groundwater. Nitrate is relatively difficult to remove from groundwater.

The federal Clean Water Act has addressed wastes from concentrated sources such as direct feedlot runoff as well as other water pollution such as discharges from municipal sanitary sewer systems, industrial and commercial facilities, etc. However the goals of the Clean Water Act have not been achieved as planned. Significant portions of streams and lakes remain too polluted for swimming or to supporting fish. Stream sampling has indicated that dilute but widespread pollutant sources such as urban runoff, agricultural runoff, and atmospheric deposition continue to contribute significant quantities of pollutants preventing the attainment of goals of the Clean Water Act.

As more of the nitrogen and phosphorus nutrients in the animal wastes are managed to keep the plant nutrients on the land where field crops can utilize the nutrients, there will be reduced levels of

nitrogen and phosphorus to be found in streams and lakes and available to cause algae and aquatic plant growth. Algae growth causes fish kills when the algae dies and decays. When the algae decay the remaining bacteria utilize the oxygen in the water needed by fish, the dead algae and bacteria byproducts also contribute to taste and odor problems in drinking water. Additionally the remaining pollutants continue to add to the cost of purifying the water for drinking and to the quantities of some water treatment byproducts, which can cause health problems in individuals sensitive to the byproducts as well as health problems for the general public from long-term exposure to the byproducts.

The measures to keep pollutants such as nitrogen and phosphorus from reaching water resources will preserve dwindling groundwater resources, improve usability of streams and lakes, reduce costs to treat water for drinking, and reduce the potential for adverse health effects in sensitive individuals as well as the general public.

Description of amendment or new requirement and environmental benefit.

K.A.R. 28-16-56c and 56d. Sewage permit fees; definitions and schedules.
The proposed modifications define new terms that have been introduced and revise the permit fee schedule by adding certain types of facilities. The amendments do not provide a direct environmental benefit.

K.A.R. 28-18-1 and 28-18a-1. Definitions.
The proposed modifications to K.A.R. 28-18-1 and 28-18a-1 update references to other regulations and define terms used in other proposed regulations and amendments. The revisions include a definition of Equus Beds and Sensitive Groundwater Areas, which are two of the more common groundwater resources in Kansas. The amendments also include definitions or changes to definitions for the following terms, Closure plan, Groundwater, Impermeable synthetic membrane liner, Nutrient management plan, Public livestock market, Salt solution mining well, Truck-washing facility for animal wastes, Waste management plan, and Whole pond seepage test. The amendments and additions do not directly provide any environmental benefit.

K.A.R. 28-18-2 and 28-18a-2. Registration and application requirements.
The proposed amendments to K.A.R. 28-18-2 and 28-18a-2 will clarify which public livestock markets are required to apply for a permit. This modification is a result of recent statutory changes (L. 2003, ch.18, sec. 2). The amendments do not directly provide any environmental benefit.

K.A.R. 28-18-4 and 28-18a-4. Filing of applications and payment of fees.

These modifications reflect proposed amendments to the contents of permit applications for confined feeding facilities in order address current program requirements. The modifications do not directly provide any environmental benefit.

K.A.R. 28-18-8 and 28-18a-8. Permit; terms and conditions.
There will be no direct environmental benefit from the proposed modifications. Modifications to K.A.R. 28-18-8 and 28-18a-8 will remove requirements having the same purpose or effect as requirements found in other sections of the existing regulations. Subsection (e) is eliminated since reporting of changes or modifications to individual farming plans is unnecessary. Agronomic use of wastes is required by other regulations, specifically K.A.R. 28-18-13 and 28-18a-19 and EPA requirements in 40 C.F.R. 122.42.

K.A.R. 28-18-9 and 29-18a-9. Certification; terms and conditions.
K.A.R. 28-18-9 and 28-18a-9 address the terms and conditions to be included in each certification (a document whereby KDHE acknowledging the animal feeding operation, as it existed on the date of evaluation does not need a permit) or permit. Modification has been made to clarify that the issuance of a permit is of itself not an enforcement action. There will be no direct environmental benefit from this change.

K.A.R. 28-18-11 and 28-18a-11. Confined feeding facilities; federal requirements.
K.A.R. 28-18-11 and 28-18a-11 are proposed to be modified to adopt, by reference, some of the EPA concentrated animal feeding operation requirements that became effective on April 14, 2003. A lawsuit was brought against EPA challenging the 2003 requirements. The court reached a decision on February 28, 2005. The court ruling vacated some of the 2003 EPA requirements. As a result of the court ruling, KDHE modified the proposed revisions to the regulations that KDHE proposed in January 2005. The EPA regulations to be adopted are updates to the previous EPA requirements, which KDHE had adopted and is currently implementing. The incorporation of the revised EPA rules is necessary in order for Kansas to continue to manage the federal permitting program in Kansas rather than EPA. The revised EPA requirements primarily address management and utilization of the manure from concentrated animal feeding operations. The measures will provide an environmental benefit by requiring detailed planning for the agronomic use of animal wastes and the implementation of the planned management practices to minimize pollutant discharges and contaminated runoff from fields, where the animal waste is utilized, to Kansas surface waters.

K.A.R. 28-18-12 and 28-18a-12. Design and construction of animal waste and swine waste management and swine pollution control systems.
K.A.R. 28-18-12 and 28-18a-12 are to be modified to: 1) correct references to other regulations; 2) clarify that only construction changes that affect the scope, boundaries, collection, handling, treatment, utilization, or disposal of the animal waste; require the changed plans to be amended and approved by the department; 3) incorporate minimum design standards which have been rewritten to distinguish between requirements and guidance; and 4) allow KDHE to focus its review of post

construction information to the site-specific concerns or risks presented by each facility. There will be no direct environmental benefit from these changes, although they are expected to create efficiencies for feedlots seeking changes to their approved plans and for implementation of the requirements by KDHE.

K.A.R. 28-18-13 and 28-18a-19. Operation of animal waste and swine waste management and swine pollution control systems.
The modifications to K.A.R. 28-18-13 and 28-18a-19 address the protection of groundwater resources located in Sensitive Groundwater Areas. The amendments require soil sampling focused upon the areas where there is an increased probability of affecting groundwater if animal wastes are over applied to crops. The modifications will provide an environmental benefit. Information on soil nutrient status can be monitored to determine if: 1) sub-soil nitrogen levels are increasing, and thereby increasing the risk of nitrates being leached into groundwater and contaminating a source of water supply; and if 2) phosphorus levels are elevated to the point where runoff from the field will contain phosphorus thereby increasing eutrophication of streams and lakes and the subsequent impacts previously described.

K.A.R. 28-18-14 and 28-18a-21. Inspections.
K.A.R. 28-18-14 and 28-18a-21 address the compliance of KDHE inspectors with the bio-security plans of those confined feeding facilities and swine facilities that enforce a bio-security plan at their facility. The section has been amended to remove references to deadlines that have passed. There is no environmental benefit from this change.

K.A.R. 28-18-16 and 28-18a-22. Animal waste-retention lagoon or pond and swine facility closure requirements.
K.A.R. 28-18-16 is newly proposed and will be similar to K.A.R. 28-18a-22 that is specific to swine and is currently effective. K.A.R. 28-18a-22 requires the development and implementation of a closure plan for those swine facilities with 3,725 or more animal units. It is proposed to also amend K.A.R. 28-18a-22 to require swine facilities located over the Equus Beds with 1,000 or more animal units to develop a closure plan and to implement the plan when the swine facility ceases operation.

Proposed K.A.R. 28-18-16 would apply to non-swine concentrated animal feeding operations and would require the development of a closure plan for just those non-swine facilities with 1,000 or more animal units located over the Equus Beds and the implementation of the plan when the facility ceases to operate.

The closure requirements will provide an environmental benefit by reducing the risk of nitrate contamination of groundwater by ensuring the planning for closure of any waste-retention lagoon or pond located over the Equus Beds has been completed prior to placing waste into the lagoon and by requiring the animal feeding operator or site owner to implement the closure plan when feeding operations cease at the facility.

K.A.R. 28-18-17 and 28-18a-33 Groundwater protection requirements for animal waste and swine waste-retention lagoons or ponds. The proposed new regulations, K.A.R. 28-18-17, and K.A.R. 28-18a-33, will establish a siting requirement related to distance of the waste lagoon floor to groundwater and will establish a three tiered approach to requirements for lining waste-retention lagoons or ponds. The tiers are based on the three most common groundwater systems in Kansas, the relative degree of vulnerability to pollution of each of the groundwater systems and the relative degree of public dependence on the groundwater systems for water supplies.

New or expanding portions waste-retention lagoons or ponds and swine waste-retention lagoons or ponds are required to be located so the lagoon floor is a minimum of 10 feet above groundwater. Additionally the proposed regulations require the liner of new or expanded portions of waste-retention lagoon or pond or swine waste-retention lagoon or pond to be designed to minimize seepage to the greatest extent practicable and establishes site-specific seepage rates which are not be exceeded.

The proposed rules will have an environmental benefit by establishing requirements to reduce the level of seepage in proportion to the vulnerability and degree of use of the groundwater resource at the location of the animal waste-retention lagoon or pond or swine waste-retention lagoon or pond. The reduced levels of seepage will reduce the quantity of ammonium moving into the soils surrounding the waste-retention lagoon or pond. The reduced ammonium movement will result in reduced risk of nitrate contamination (ammonium is readily converted to nitrate in the environment) of groundwater and thereby a reduced risk of infants or adults contracting nitrate toxicity.

K.A.R. 28-18a-26. Requirements for swine facility operator certification.
K.A.R. 28-18a-26 implements the statutory requirement for swine facilities with 1,000 or more animal units to be operated by a certified swine facility operator. The proposed amendment removes references to deadlines that have passed. There is no environmental benefit from this change.

K.A.R. 28-18a-32. Swine waste-retention lagoons or ponds in sensitive groundwater areas.
K.A.R. 28-18a-32 addresses swine waste-retention lagoon or pond liner requirements. This regulation is proposed to be revoked. The terms defined in this regulation have been incorporated into 28-18a-1, Definitions. Swine waste-retention lagoon or pond liner requirements have been more clearly delineated in K.A.R. 28-18a-33. There will be no environmental benefit from this revocation.

In summary proposed or amended Articles 28-18-11, 13, 16, 17 and 18; and 28-18a-11, 19, 22, 33 and 34 would provide an environmental benefit.

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2) When applicable, a summary of the research or data indicating the level of risk to the public health or the environment being removed or controlled by the proposed regulations or amendments.

The proposed amendments and regulations do not promulgate or amend contaminant specific standards or program requirements for which a risk analysis might be completed. The regulations are primarily focused on reducing a generally acknowledged risk of contamination of 1) groundwater from ammonium and nitrate associated with the wastes stored in animal or swine waste-retention lagoons or ponds; and 2) the risk of contamination of surface water from precipitation runoff from fields where the nitrate and phosphorus in the animal or swine waste is utilized as a crop nutrient.

In 1998 Kansas State University (KSU) began a series of research projects focused on evaluating animal waste storage lagoons. KSU issued interim reports in 1998, 1999, and 2000 and issued a final report in 2001 to the Kansas Legislature. One of the primary concerns evaluated by KSU was the potential movement of various forms of nitrogen through the soil liner of the swine or animal waste-retention lagoon or pond and into groundwater.

KSU found that ammonia is the most prevalent form of nitrogen in animal waste lagoons. The research indicated that ammonia has an affinity for negatively charged soil particles as found in most silty and clayey soils used for lining waste-retention lagoons or ponds. Once attached to the soil particles below the lagoon, the ammonia tends to stay attached because the absence of free oxygen at the bottom of the waste-retention lagoon does not allow the bacteria, necessary to change the ammonia into nitrate, to thrive. Therefore active lagoons have a predisposition to keep organic ammonia, the primary pollutant of animal waste, contained. In fact, the researchers found that the accumulation of ammonia in the soil immediately beneath the atypical swine or animal waste-retention lagoon or pond could exceed 100,000 pounds of ammonia per acre. Typical quantities of ammonia applied to corn are 150 pounds per acre per year.

However once the swine or animal waste-retention lagoon or pond no longer receives wastes or becomes inactive, the soils with the attached ammonium can be exposed to significant amounts of oxygen which will allow the bacteria capable of converting the ammonia to nitrate to thrive and begin the conversion process from ammonium to nitrate. Nitrate is much more mobile in the environment than ammonium and can readily be leached into the groundwater if the amount of nitrate is greater than what can be use by plants. Nitrate is known to cause health problems in children and adults. For drinking water, the standard, not to be exceeded, for nitrate is 10 milligrams per liter. Ten milligrams per liter is comparable to 10 inches in a distance of 15.8 miles. The large quantities of ammonia stored in the soil liner of a animal or swine waste-retention lagoon or pond and the health effects caused by small amounts of nitrate in drinking water results in a high potential for pollution to occur.

KSU investigated how the ammonia in swine and animal waste moves in the environment surrounding a swine or animal waste-retention lagoon or pond.. The researchers found that movement of the ammonia beneath a swine or animal waste-retention lagoon or pond depends on several factors including: soil liner thickness, cation exchange capacity (CEC) of the liner materials, rate of movement of the animal or swine waste liquid through the soil liner, and the same factors as they apply to the natural soils beneath the man made liner of soil. Higher CEC values (typically associated with silty and clayey soils), increased liner thickness, and lower seepage values yielded reduced movement of ammonia in soil liners. The KSU studies found that a six-fold increase in liner thickness from 6 inches to 3 feet resulted in thirteen-fold increase (65 years versus 5 years) in the theoretical time for the ammonium to move through the liner.

The studies also indicated that contamination occurred less frequently when the soil at the swine or animal waste-retention lagoon or pond site was clayey or fine textured and contamination occurred more frequently when the soils at the animal or swine waste-retention lagoon or pond site was sandy or coarsely textured. Another finding was that typically in Kansas approximately 90% of the ammonia is trapped in the first 12 feet of soil located immediately beneath a typical animal waste lagoon.

The ammonia concentration in animal waste lagoons is generally ten to forty times the amount found in typical household sewage lagoons. The KSU review of literature regarding contamination from animal waste lagoons indicated that for lagoons located over sandy soils there is appreciable nitrogen contamination of groundwater. Based upon research to date, KSU notes that proposed lagoon locations with sandy soils, low CEC, and small distances from the surface of the ground to the static groundwater level may require low seepage soil liners or the use of impermeable synthetic liners to protect groundwater resources.

The proposed changes and additions also address surface water contamination from intestinal bacteria and nutrient enrichment due to contaminated runoff from sites where animal or swine wastes are utilized as nutrients for crops. Intestinal bacteria represent a risk to the general public when they utilize Kansas surface waters for recreation such as swimming, wading, and boating. Nutrient enrichment of Kansas surface waters also causes aquatic vegetation and algae to proliferate in the surface water. High concentrations of algae and bacteria: 1) increase the cost of treating surface water for drinking use; 2) can cause taste and odor problems in drinking water; 3) result in higher concentrations of water treatment byproducts such as halomethanes which are toxic to humans when consumed over long periods of time; 4) and fish kills when the algae die and decay causing the oxygen in the surface water to be depleted thereby suffocating fish.

The Kansas Water Quality Assessment Reports (305b Reports) indicate upgrades to municipal and industrial waste treatment systems continue to result in notable improvements to Kansas water quality. However, for streams in Kansas, agricultural activities such as concentrated animal feeding operations and the management of wastes from such operations as a crop nutrient, are noted to

continue to be a significant factor in why bacteria and nutrient overloading are two of the pollutants keeping Kansas streams from meeting standards established to protect Kansans as they utilize Kansas groundwater and surface waters.

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3) If specific contaminants are to be controlled by the proposed regulation or amendment, a description indicating the level at which the contaminants are considered harmful according to current available research.

The amended and proposed regulations do not promulgate or amend a contaminant specific standard. A primary purpose of the proposals and amendments is to further reduce the potential for releases of contaminants, primarily ammonia, into three of the major groundwater systems in Kansas by enhancing the existing practices which have been found, through trial and error, over time, and also by employing findings of subsequent research which defined the factors which reduce the risk of groundwater contamination.

EPA has changed their requirements, from the EPA requirements which KDHE currently administers in Kansas, to requirements designed to address bacterial and nutrient contamination of surface waters from runoff of fields where swine and animal wastes are utilized for crop nutrients. KDHE administers the EPA requirements in Kansas in order to ensure a state agency responsive to Kansans manages the required federal program rather than a federal agency. The adoption of the revised EPA requirements will ensure a state agency rather than a federal agency continues to manage the program in Kansas.

The proposed and amended regulations are in conformance with the current surface water quality standards established in K.A.R. 28-16-28. The surface water quality regulations establish a standard of 10 milligrams per liter for nitrate in water sources used for drinking and also establish general criteria applicable for all uses of water (criteria such as water: shall not cause disease, shall be free of the effects of harmful substances, free of taste and odor producing compounds, etc.). The proposed amendments and regulations do not amend the current surface water quality standards or requirements. However, by establishing criteria to minimize or control the seepage of wastes from animal waste-retention lagoons or ponds and criteria to address utilization of the animal waste, the regulations indirectly control a variety of contaminants listed in the Kansas Water Quality Standards.

The proposed modifications, requiring soil sampling when animal wastes are applied to fields located over Sensitive Groundwater Areas, do not control or affect existing requirements for specific contaminants or pollutants. In those instances where soil sampling is required the intent is to provide an indication as to whether or not animal wastes are increasing the level of soil nitrates to levels that could leach into groundwater, or increasing the level of soil phosphorus to levels which would allow

the phosphorus to be carried to streams and lakes by precipitation runoff. The soil sampling and monitoring works indirectly to minimize nitrate contamination and thereby ensure the water quality standard of 10 milligrams per liter for sources of drinking water is maintained, and to minimize the potential for phosphorus to create violations of general surface water quality criteria.

The proposed amendments and proposed regulations requiring closure and in some instances closure planning does not affect existing requirements addressing specific contaminants or pollutants. However, as described above, by requiring removal of waste and removal or remediation of contaminated soils, the proposed regulations indirectly work toward minimizing nitrate contamination of water and thereby ensuring the water quality standard of 10 milligrams of nitrate per liter established in other regulations (K.A.R. 28-16-28b) is not exceeded.

The proposed amendments and proposed new regulations addressing groundwater protection do not promulgate or amend contaminant specific standards. However as described above, by requiring specific design and construction requirements, the proposed regulations indirectly work toward preserving the 10 milligram per liter contaminant criteria for nitrate as established by water quality standards.

The proposed update of the previously adopted federal requirements addressing utilization of the animal waste does not establish a specific contaminant level, but by requiring the employment of practices designed to minimize the potential for animal wastes to runoff of land application sites the amendments work indirectly to maintain limits for numerous pollutants established by water quality standards.

Economic Impact Statement

1) Are the proposed regulations or amendments mandated by federal law as a requirement for participating in or implementing a federally subsidized or assisted program?

Yes. Revised concentrated animal feeding operations were promulgated by the Environmental Protection Agency (EPA) and became effective April 14, 2003. Current KDHE regulations adopted the previous EPA regulations since this allows KDHE to implement the federal requirements in Kansas as opposed to having the federal government apply the regulations to the Kansas livestock industry. KDHE is proposing to replace the previously adopted EPA regulations with the recently revised EPA concentrated animal feeding operation regulations, taking into account the court ruling dated February, 28, 2005, remanding some of the EPA regulations. Updating the KDHE adoption by reference of the EPA regulations will allow KDHE to continue to participate in the federal National Pollutant Discharge Elimination System (NPDES) program. The NPDES program is the

program under which wastes from concentrated animal feeding operations are regulated as well as other types of wastewater such as from municipal sewers, industrial plants, and commercial operations. A primary benefit of having Kansas implement the federal NPDES program in Kansas is that a state agency will be more responsive to the general public of Kansas, other units of Kansas government, and the Kansas animal feeding industry. In addition, a state agency will work more efficiently with other state agencies, which regulate other activities at concentrated animal feeding operations (e.g. Kansas Department of Agriculture, Kansas Department of Animal Health, etc.). Also there are state statutes requiring concentrated animal feeding facilities to obtain a State issued permit. Keeping the federal permitting requirements together with the State permitting requirements is more efficient then two separate programs. Finally the federal NPDES program does not just affect concentrated animal feeding operations. The NPDES program also applies to Kansas municipalities, industries, and commercial establishments. Federal statute does not allow a state to adopt portions of the NPDES program. If a state does not implement all the NPDES programs then the federal government may remove its authorization for the State to run the program. As a result, Kansas would lose most of its ability to provide local input into implementing the entire required NPDES program.

Other requirements addressing groundwater protection are not mandated or required by federal law.

Other requirements addressing public livestock markets, privately owned and operated livestock truck and trailer wash facilities, and permit fees are being adopted to address recent changes to statutes created during 2003 Legislative Session.

2) Do the proposed regulations or amendments exceed the requirements of applicable federal law?

Portions of the proposed and amended regulations exceed the requirements of federal law. Applicable federal law does not require the design of the facility to meet minimum standards other than for the volume of the waste-retention lagoon or pond. Nor do the federal requirements establish a mechanism specific to protection of groundwater in the Equus Beds or other Kansas groundwater systems. There are no federal requirements for a facility to develop and implement a closure plan if it is located over the Equus Beds. However, the duty to obtain and maintain a permit until the permittee demonstrates there is no remaining potential to discharge pollutants is an indirect closure requirement for facilities required to obtain a federal NPDES permit.

There is no federal law requiring the payment of permit fees for NPDES permits, therefore the statutory fee changes are more stringent than federal law.

3) Description of costs to agencies, to the general public and to persons who are affected by, or are subject to, the regulations:

(a) Capital and annual costs of compliance with the proposed regulations or amendments and the persons who will bear those costs.

The projected capital cost and annual compliance costs will be born by individual concentrated animal feeding operations. The costs have been estimated based upon various sources for construction costs, engineering/consulting costs, sampling and laboratory analysis costs, and monitoring well installation costs. The costs are also based upon the number applications for new or expanded facilities received each year and the distribution of those applications amongst the three Kansas groundwater systems defined by the regulations.

K.A.R. 28-16-56c and 56d. Sewage permit fees; definitions and schedules.
Costs due to statutory revisions to the method of calculating animal units for public livestock markets and further classifying truck washing facility for animal wastes: no capital costs; decreased annual costs due to lower permit fees as a result of the lower number of animal units calculated using the methods prescribed by statute, and lower annual costs to private truck washing facilities for animal wastes. Public livestock markets and private truck washing facilities for animal wastes are the affected entities. There are 51 public livestock markets in Kansas and 6 private truck washing facilities for animal wastes. All but a handful of livestock markets and all private truck washing facilities for animal waste will see reduced permit fees.

K.A.R. 28-18-1, 2, 4, and K.A.R. 28-18a-1, 2, & 4. Definitions, Registration and application requirements; and Filing of applications and payment of fees.
The proposed amendments do not subject the affected parties, concentrated animal feeding facilities, to additional direct costs.

K.A.R. 28-18-8 and K.A.R. 28-18a-8. Permit; terms and conditions.
Costs due to revisions eliminating the requirement to report changes in land application area inventories are projected to slightly decrease due to the elimination of this reporting requirement. Although there are a significant number of facilities which could benefit from the elimination of the reporting requirement, approximately 1,690 facilities, historically KDHE has not seen frequent changes in land application area inventories. The estimated cost savings are less than $1 per each permitted animal feeding operation.

K.A.R. 28-18-9 and K.A.R. 28-18a-9. Certification; terms and conditions.
The proposed amendments do not subject the affected parties, animal feeding operations to additional direct costs.

K.A.R. 28-18-11 and K.A.R. 28-18a-11. Confined feeding facilities; federal requirements.
Capital cost estimates to be borne by the concentrated animal feeding operations subject to this regulation (those with over 1,000 animal units) for the development of a Nutrient Management Plan (NMP) vary significantly depending upon the capacity of the operation, planned waste management

methods, etc. Estimates to develop a NMP range from $2,100 for 2,600 head operation, to over $40,000 for larger concentrated animal feeding operations. And the capital costs for equipment and land application system improvements to implement the plan range from $500 to several hundred thousand dollars or more and are highly variable depending upon the specific circumstances of the facility. Annual costs for the concentrated animal feeding facility to implement the NMP are estimated to range from a few hundred dollars for record keeping to 20,000 dollars or more for soil and manure sampling and analysis, crop consultation and planning, etc., depending on capacity of the feed yard, initial nutrient status of the fields to be utilized by the concentrated animal feeding operation, distance to suitable land application sites, etc..

A sense of the overall cost of the proposed amendment can be obtained from the following information. Of the estimated 1,690 permitted facilities there are approximately 430 concentrated animal feeding operations (those with over 1,000 animal units) which would be subject to the NMP requirement. Concentrated swine feeding operations are already required by state statute to conduct nutrient planning. Deducting the swine operations from the estimated 430 concentrated animal feeding operations yields approximately 315 concentrated animal feeding facilities which would be required to develop and implement an NMP. The median size of these remaining operations, which are primarily beef operations, is 5,800 animal units with minimum and maximum sizes of 1,000 and 140,000 animal units respectively.

K.A.R. 28-18-12 and 28-18a-12. Design and construction of animal waste and swine waste management and swine pollution control systems.
The proposed amendments do not subject the affected parties, the general public or any unit of government to additional direct costs, although the amendments are expected to create some efficiencies for the affected parties and KDHE by clarifying when KDHE approval is needed and providing flexibility in evaluating construction activities.

K.A.R. 28-18-13 and 28-18a-19. Operation of animal waste and swine waste management and swine pollution control systems.
There are no anticipated capital costs for sampling soils at land application sites located in Sensitive Groundwater Areas. The operations subject to this requirement are those with less than 1,000 animal units which land apply wastes to fields located in Sensitive Groundwater Areas. Annualized costs for collecting and analyzing soil samples would be $5 to $10 per field in order to sample each field once during the five year permit cycle. KDHE is unaware of any data on the number of fields located in Sensitive Groundwater Areas which are used by animal feeding operations to manage their wastes.

K.A.R. 28-18-14 and 28-18a-21. Inspections.
The proposed amendments do not subject the affected parties, the general public, or any unit of government to additional direct costs.

K.A.R. 28-18-16 and 28-18a-22. Animal waste-retention lagoon and swine facility closure requirements.
Capital costs to develop a closure plan for Equus Bed facilities with 1,000 or more animal units are estimated to range from $480 to $3,600 per facility.

K.A.R. 28-18-17 and 28-18a-33. Groundwater protection requirements for animal waste and swine waste-retention lagoons.
Concentrated animal feeding facilities could be subjected to additional capital and annual costs as a result of the proposed regulations. However, the potential costs that may be incurred from the proposed requirements for specific liner requirements for waste-retention lagoons or ponds in different groundwater regions, and the proposed requirement for a 10 foot separation distance between the floor of all new or expanded waste-retention lagoons or ponds and groundwater might be avoided through the careful selection of the location of the new or expanding waste-retention lagoon or pond. However the following estimated capital costs to the livestock feeding industry as a whole were developed to illustrate potential costs should a facility choose to work with a less suitable site or be unable to adjust the siting of the waste-retention lagoons or ponds: 1) in the event the waste-retention lagoons or ponds are located over Sensitive Groundwater Areas and cannot meet the one-tenth inch per day seepage limitation with native soils, $6,000 to $216,000; 2) cost to install a synthetic liner for new or expanded waste-retention lagoons or ponds located over the Equus Beds, $6,500 to $90,000; 3) potential capital costs associated with collecting the waste or runoff and pumping it to a location where the new waste-retention lagoons or ponds or other alternatives which can meet the required 10 foot separation distance to groundwater, $0 to several hundred thousand dollars.

The potential projected increase in annual operating costs associated with implementation of and compliance with the proposed or amended waste-retention lagoon or pond permeability and location requirements include: costs to specific feeding facilities to operate pumping equipment to meet the 10-foot groundwater separation distance, $120,000. There are no projected increases in annual operating costs for the other amendments and proposed regulations (contingent soil amendments to meet one-tenth inch per day criteria, Equus Beds synthetic liner, etc.) since the operating costs for a waste-retention lagoon or pond would be the same regardless of the type of liner or location of the waste-retention lagoon or pond.

(b) Initial and annual costs of implementing and enforcing the proposed regulations or amendments, including the estimated amount of paperwork, and the state agencies, other governmental agencies or other persons or entities who will bear the costs.

There are no projected increases in initial cost to implement and enforce the amendments and proposed regulations other than the cost to write and adopt the regulations. However, the reduced permit fees resulting from recently enacted statutes defining animal units at public livestock markets

and permit fees for private truck washing facilities for animal wastes will slightly reduce the amount collected by KDHE and sent to the State General Fund.

c) Costs which would likely accrue if the proposed regulations or amendments are not adopted, the persons who will bear the costs and those who will be affected by the failure to adopt the regulations.

The program regulations and requirements are intended to be preventative and protect both surface water and groundwater. Failure to effectively control livestock wastes can result in surface water pollution resulting in fish kills, other natural resource and human health impacts, increase costs to remove contaminants from water to be used for drinking or other uses, and loss of revenue from decreased recreational opportunities (fishing, boating, etc.). KDHE was unable to develop cost estimates for these impacts although it will in general be water users such as the general public, industries, livestock production facilities, and those who participate in recreational activities associated with water who will bear the costs.

Failure to effectively control sources of groundwater contamination can potentially affect public and private water supply sources industrial water supply sources, agricultural water uses, etc.. Potential methods to avoid contaminated water sources include purchasing bottled water, treatment of the contaminated groundwater, or finding new sources of groundwater (drilling a new well). Costs for bottled water for a typical household are estimated to be on the order of $300 per year depending upon location of the user in relation to the supplier. Costs to complete a new well for a household in the Equus Beds area are estimated at $2,000 to $3,000, while the costs to develop a public water supply well in the Equus Beds serving a city of 5,000 people is estimated to range from $21,000 to $58,000. Ultimately it is the concentrated animal feeding facility operator who is responsible to correct any damage his operation caused. However, given the cost estimates to correct the damages, there is a possibility the operator would file for bankruptcy and not correct the damages. Such an outcome would leave affected individuals with contaminated water or all state taxpayers with the burden of finding new sources of water and/or the remediation of the contamination. KDHE was unable to estimate the costs that may accrue if the groundwater also became unusable for uses other than drinking water supply (e.g. industrial water supply, livestock watering, etc.).

d) A detailed statement of the data and methodology used in estimating the costs used in the statement. Details, beyond those provided above have been provided where necessary for clarity or understanding and where it was determined the proposed amendment of regulation will or may have an impact on an affected party, the general public, or a unit of government.

K.A.R. 28-16-56c and 56d. Sewage permit fees; definitions and schedules. The Kansas Department of Animal Health 2003 Annual Livestock Market Report lists 51 public livestock markets. Under the previous method of determining the animal unit capacity of a public livestock market, 40 markets, or 79%, would have been required to pay an annual permit fee of $100 if the

facility was evaluated and determined to need a permit (Many would not be required to obtain a permit due to their location.). Under the new animal unit formula no public livestock market will be required to pay more than the minimum fee of $25. Of the 51 facilities 27 have been issued a permit or have submitted a permit application to KDHE. For this analysis KDHE assumes the remaining 24 facilities are small enough that their size and/or their location in relation to surface waters of Kansas would eliminate the need for a permit. Assuming a similar percentage, 79%, of the 27 permitted facilities would have required a permit fee of $100 under the old animal unit formula, then there would be 17 facilities where the permit fee will drop from $100 per year to $25 per year. Or a decreased annual cost to the Kansas public livestock market industry of $1,275 and a similar loss of revenue to the State General Fund.

K.A.R. 28-18-11 and 28-18a-11. Confined feeding facilities; federal requirements. As previously noted, the primary difference between the updated EPA regulations and the previous version adopted by KDHE in 1985 is the requirement for concentrated animal feeding operations to address the use of the animal wastes and land application practices in order to minimize the potential for the nitrogen and phosphorus in the animal waste to be washed off of the fields where the manure is used for fertilizer. To address the requirement each concentrated animal feeding operation with over 1,000 animal units is required to develop and implement a Nutrient Management Plan (NMP). Due to legislation passed in 1998 addressing swine feeding operations, the NMP requirment will primarily impact cattle or non-swine feeding operations. Swine feeding operations with over 2500 head are already required to develop and implement a Nutrient Utilization Plan (NUP) and Dead Swine Handling Plan. These two plans for swine facilities are equal to the EPA requirement of a NMP.

The scope of the tasks required to meet the Nutrient Management Planning requirement will vary from facility to facility and could vary significantly due to site specific conditions. Example scenarios could range from: 1) development of the NMP for those concentrated animal feeding operations which already have full implementation capabilities such as sufficient land application areas and adequate equipment to distribute the waste; to 2) development of the NMP for those facility which have some land and/or equipment but need to acquire additional land and/or waste application equipment to implement the plan; to 3) development of an NMP for a facility which has arrangement to give all the solid manure away and provide the liquid waste to a nearby farmer with equipment to distribute the liquid waste.

To estimate costs for the development and implementation of the NMP requirement, information sources such as EPA cost analysis, USDA NRCS cost information and interviews with consultants experienced in designing waste management and land application systems for concentrated animal feeding operations were reviewed and consulted. The analysis of the information lead KDHE to estimate that 70 hours or less would be necessary to develop a NMP for the facility described in scenario 3 to 500 or more hours for the facility described in scenario 2. The time requirement will be highly dependent upon the size of facility, availability of suitable land application sites,

availability of liquid and solid waste application equipment, number of fields necessary to manage the wastes, distances to land application sites, type of land application equipment suitable for the application sites, etc. With consultant costs including overhead ranging from $40 to $80 per hour the cost range is estimated to be from less than $2,100 to more than $40,000.

The most significant capital cost however may be the cost for any improvements necessary to develop a functional system to land apply the wastes or ensure the wastes are managed in a way which does not cause pollution. Some facilities will already have a fully functional land application or waste brokerage system while other facilities may have to invest significant amounts of capital to develop a land application system or system to ensure the wastes a managed in a way to prevent pollution. Estimates of the land application acreage necessary to manage the waste range from 474 acres for a 2,600 head beef feeding operation with land suitable for nitrogen based utilization of the waste, to 20,700 acres for a 43,800 head beef operation required to use phosphorus based application rates. Depending on the existing equipment and or agreements with surrounding land owner the capital cost for land application equipment and a waste distribution/transportation system could be significant. KDHE was unable to determine the most likely combination of equipment and agreements that would be necessary or to supplement the typical amount of equipment and agreements that currently exist at most facilities.

Annual costs to implement the NMP will primarily involve soil and/or manure sampling and analysis, re-evaluation of crop plans, record keeping, etc. Some facilities with a ready demand for the manure solids and liquids will only need to conduct manure sampling and record keeping. Other facilities with less demand for the manure as a source of fertilizer will have to do additional work such as soil sampling and analysis record keeping for land application sites, crop planning, etc. Cost estimates range from $325 ($100 for manure analysis and 15 hours at $15 per hour for record keeping) for a small facility with a ready demand for the manure solids and liquids; to $20,000 or more ($200 for manure analysis, $25 per field for soil sampling and 20 to 30 fields, 1200 or more hours at $15 to $20 per hour for crop planning and record keeping) for a large facility.

K.A.R. 28-18-13 and 28-18a-19. Operation of animal waste and swine waste management and swine pollution control systems. The costs resulting from requiring a small beef facility (less than 1,000 head) to sample the soil of any land application fields utilized by the facility and located in Sensitive Groundwater Areas commercial soil sampling laboratories provided estimates of $25 to $50 per field for sampling and analysis. Each field located in a Sensitive Groundwater Area and utilized for land application by a small feeding facility would be sampled once every five years if manure is applied to the field. Therefore the annual cost is approximately one-fifth of the estimated cost or $5 to $10 per year.

K.A.R. 28-18-16 and 28-18a-22. Animal waste-retention lagoon and swine facility closure requirements. There are currently 289 confined animal feeding facilities located over the Equus Beds. Of these thirteen have an animal unit capacity of over 1,000 and there are no swine facilities

with an animal unit capacity of more than 3,725 (these facilities are already required by statute to develop a closure plan) located over the Equus Beds. Approximately one fifth of these 13 facilities, or 2 to 3 would be required to develop a closure plan in any given year over the next five years (permits are issued on a five year renewal cycle). It is estimated that a closure plan can be developed in 6 to 15 hours. Typical consulting fees range from 40 to 80 dollars per hour. Based upon this information and estimates, an annual cost to prepare closure plans for one fifth of the facilities located over the Equus Beds with 1,000 or more animal units would total from $480 to $3600. The cost of annual updates of the closure costs are estimated to range from $100 to $500.

K.A.R. 28-18-17 and 28-18a-33. Groundwater protection requirements for animal waste and swine waste-retention lagoons. Studies by KSU indicate most facilities can meet the proposed seepage criteria especially after the lagoon has been in operation for a few months. KSU found that with many Kansas soils it is feasible to reduce initial seepage to a level where within a few months of operation the final seepage is less than one-tenth of an inch per day. Therefore it is anticipated that for most typical facilities there will be little or no additional cost to meet the one-tenth of an inch per day seepage criteria. However, a cost for the addition of bentonite is provided below for information purposes in the case where one would assume some or all of the new applications would be unable to meet the seepage criteria through careful site selection.

The cost for the addition of bentonite for a single facility to achieve the 1/10th inch seepage criteria is based upon a waste-retention lagoon capable containing the waste from a 1,000 animal unit swine facility or a 1,000 animal unit cattle facility (see discussion below regarding typical facility size). The size of lagoon for a swine facility would be 120 x 120 feet and for a cattle facility 300 x 300 feet. These are example dimensions and are based on an assumed lagoon depth of 10 feet. To achieve the lower seepage rate it is assumed the facility will use bentonite. Bentonite is a clay that swells tremendously when moistened and fills the pores of the soil liner. A typical application rate for bentonite is 2 pounds per square foot. The construction of the lagoon would be essentially the same for a lined versus unlined lagoon, therefore, the difference in cost is primarily due to the bentonite. Costs for obtaining and installing the bentonite are estimated to be $400 per ton since the quantities required are relatively small (15 and 90 tons). Therefore the cost of sealing a single lagoon for a 1,000 animal unit swine and beef facility would range from $6,000 and $36,000.

Over the past three years the Department has received approximately 80 permit applications per year for swine or cattle. Of these, each year, approximately 20 to 25 are swine and the remainder are beef or dairy cattle. The median animal unit capacities for these swine and beef permit applications are roughly 1,300 and 800, respectively, or close to 1,000 animal units in each case. Estimating ten percent of the applications would be for facilities with non-typical soils requiring sealing of the liner, then the estimated cost on an annual basis to the Kansas feedlot industry for sealing 2 swine lagoons to 4 or 5 beef lagoons would range from $12,000 (2 x $6000) to $216,000 (4.5 x 36,000). At bentonite applications above 2 pounds per square foot it may be nore cost effective to install a synthetic liner.

For bentonite-lined lagoons the annual operating cost is assumed to be the same as the cost to operate a lagoon lined with native soils.

The estimated additional cost for those new or expanding facilities located over the Equus Beds or over areas where site specific conditions indicate the need to use an impermeable synthetic liner, ranges from $6,500 to $90,000 each year. This figure is based on the number of permit application received from facilities wanting to locate over the Equus Beds over the last few years (approximately one per year) and an estimate of one other permit application per year from a facility located in a Sensitive Groundwater Area and needing a liner to protect human health or the environment. The cost used for synthetic liner material and its installation is 33¢ to $1 per square foot and the basis for the lagoon size was for a 1,000 animal unit facility. The annual cost to the feedlot industry would vary depending on the actual animal unit capacity of the facility and the number of applications received in any given year and the location of the facilities in relation to the Equus Beds and Sensitive Groundwater Areas. The liner cost is based upon contractor bids for municipal lagoons and information provided by facilities currently employing synthetic liners. The cost for excavation of the lagoon is not included since excavation would be required for an earthen lagoon as well.

It is assumed the annual operational costs for a synthetic lined lagoon would be the same as an earthen lined lagoon.

In a few instances a facility will not be able to build a new lagoon or expand the existing lagoon due to the requirement to maintain 10 feet between static groundwater and the bottom of the lagoon. It is assumed in most of these cases, the concern regarding groundwater would be discovered early in the planning process, and the location of the new facility would be moved to a more suitable location, and therefore, there would be no increase in cost to the facility. However in a few instances it may be unfeasible or undesirable to relocate. In such instances there are a variety of possible alternatives such as:

- For swine facilities, a design that uses dry material to absorb the liquid portion of the waste and dry the semi-solid portions of the waste. These are similar to modern broiler chicken houses, however some manufacturers employ a concrete floor instead of an earthen floor as used in poultry barns, and some use earthen floors, these are commonly called 'hoop barns' and 'high-rise hog houses'; or
- For swine facilities, a design with concrete pits to store the wastes (in liquid form) until the quantity of waste, and soil, weather, and crop conditions allow the beneficial use of the nutrient value of the waste for raising crops; and
- For swine or cattle facilities, a design that collects the waste in a relatively small concrete or steel flow equalization pit or tank and then pumps it to a waste-retention lagoon or pond located where the 10 foot distance can be met.

For these alternatives (bullets one and two) the estimated costs were based upon manufacturers information or typical construction costs. For alternative swine facilities that manage the waste by using absorbing materials (dry waste management) the initial capital costs can be significantly lower than liquid collection and lagoon storage, however, the operating costs per unit of waste can be quite high because of the amount of manual labor required instead of pumping equipment to remove, stockpile or store the waste and then land apply the manure/absorbent mixture. Although the reduced volumes of waste may help to offset the higher per unit handling cost. Other dry type storage system and deep concrete pit liquid storage systems can have initial capital cost of $140 to $200 per head of swine, or roughly 110% of the cost of a typical liquid manure collection and storage lagoon and irrigation system.

For the third alternative, assuming the only difference in cost between a typical facility and one that would employ a pump station to deliver the waste to a suitable location for a lagoon is the cost of the pump station and force main, then the estimated costs could vary considerably from an enclosed swine facility, which is not subject to high inflow from precipitation and the pump station could be relatively small, to open cattle feedlots where the runoff could develop rapidly and overwhelm a small pump and require the use of larger pumps. As an example for a swine facility the cost of an 80 gallon per minute (gpm) pump station and force main is estimated to be $60,000 to $120,000, and for a beef facility the cost for a 700 gpm pump station, a medium sized concrete pit or steel tank to buffer the peak runoff, and a force main is estimated to be on the order of several hundred thousand dollars. Historical information indicates it would be rare if at all that a beef facility would choose to use the collect and pump alternative since it is often more feasible to find an alternative site.

Therefore, the annual cost to the Kansas feedlot industry is estimated to range from $0 (choose a better location) to $120,000 (discount the beef feedlot estimate due to high estimated cost) in cases where a facility must locate where the 10' groundwater separation distance cannot be met.

Estimates of the annual operational costs for these alternatives varied. A good estimate of the operational cost for swine facilities using a dry litter waste management system was not available although it could be significantly higher on a per head basis than a liquid management system due to the inefficiencies of manually moving loose solid material as opposed to pumping a liquid, and the tendency for dry waste management system to be used on small operations. However there would be some trade offs regarding volume of material to be managed.

Estimates of the annual operational costs of a deep pit storage system are considered to be slightly less than the costs for a waste storage lagoon system. However detailed operational costs were not discovered during the economic analysis. Again these type systems tend to be employed at small to medium sized facilities.

The difference in annual operational cost for a waste collection and pump station alternative are estimated to be less than $2,000 (operational costs for an 80 gallon per minute pump).

In the above lagoon liner estimates KDHE did not account for those new facilities locating in the Equus Beds Area which may choose, as provided for in the proposed regulations, to use a soil liner with a one-tenth of an inch per day cap on seepage rates in conjunction with post construction testing of seepage using the whole pond method developed by KSU in their research. Typical waste-retention lagoon costs for example facilities required to meet the one-tenth of an inch per day cap were provided above. The following is an estimate of the cost of the whole pond seepage test. Based on estimated provided by consultants who conduct whole pond seepage test using specified equipment and discussions with KSU researcher the cost to gather the data, analyze the results and write up a report will range from $2,000 to $3,000 per waste-retention lagoon or pond.

e) Description of any less costly or less intrusive methods that were considered by the agency and why such methods were rejected in favor of the proposed regulations.

There are no less costly or less intrusive methods available to the agency. Other alternatives considered but rejected included: prohibiting any new facilities in the Equus Beds area, requiring all facilities, regardless of size, over the Equus Beds to develop a closure plan, requiring some or all facilities over the Equus Beds to provide financial assurance for closure, leaving the currently minimum design standards in place as guidelines, and returning the NPDES permitting program to EPA for implementation in Kansas by the federal government.

f) Consultation with League of Kansas Municipalities, Kansas Association of Counties, and Kansas Association of School Boards.

The department does not anticipate that the proposed regulations or amendments will have any fiscal impact on the constituencies of these organizations.