STATEMENT OF ADOPTION

On January 3, 2023, the Mayor and Governing Body of the City of Leon, Kansas, at an official business meeting adopted the City of Leon's Source Water Protection Plan and will file a copy of the plan with the Watershed Management Section, Bureau of Water, Kansas Department of Health and Environment.

Copies of said plan will also be filed with--

1. Butler County Conservation District
2. City Clerk of the City of Leon

Copies of the plan can be obtained from--

City Clerk
City of Leon
111 South Main Street
Leon, Kansas 67074
(316) 742-3438

The service and assistance of the members of the Source Water Protection Planning Committee in preparation of the plan is acknowledged and greatly appreciated.

Committee Members

By our signatures, we acknowledge the above statements to be true, and that we are authorized by the Governing Body of the City of Leon, Kansas, to make such representation.

Kris Semisch — 1-3-23
Kristina "Kris" Semisch, Mayor — date

ATTEST:

Jodie Laidler — 1-3-23
Jodie Laidler, City Clerk — date

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Kristina "Kris" Semisch, Mayor — date

ATTEST:

Jodie Laidler — 1-3-23
Jodie Laidler, City Clerk — date

CITY OF LEON
BUTLER COUNTY KANSAS
SOURCE WATER PROTECTION PLAN

Approved by the Governing Body and Signed by the Mayor (2023)

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1. SOURCE WATER PROTECTION AREA DESCRIPTION

City of Leon Well Locations and Information:

Identification Name or Number	Well No. 2
Legal Description	(SW¼ NE¼ NW¼) 22 - 27S - 6E
County	Butler
Distance from SE Corner	990' N and 1350' W
DWR File Number	BU 006
Authorized Quantity (m.g.y.) and Rate (g.p.m.)	22.0 m.g.y. and 135 g.p.m.
Additional Quantity and Rate Limitation	None
Status	Active

Identification Name or Number	Well No. 5
Legal Description	(NW¼ SE¼ NW¼) 22-27S-6E
County	Butler
Distance from SE Corner	3551' North and 3763' West
DWR File Number	34692
Authorized Quantity (m.g.y.) and Rate (g.p.m.)	3.2 m.g.y. and 17 g.p.m.
Additional Quantity and Rate Limitation	Quantity and Rate shared with Well No. 8
Status	Active

Identification Name or Number	Well No. 10
Legal Description	(NW¼ NE¼ NW¼) 22-27S-6E
County	Butler
Distance from SE Corner	4717' North and 3648' West
DWR File Number(s)	BU 006 and 46998
Authorized Quantity (m.g.y.) and Rate (g.p.m.)	18.0 m.g.y. and 100 g.p.m.
Additional Quantity and Rate Limitation	None
Status	Active

Basis of Source Water Protection Area:

Many factors were considered before a determination was made of the area that should be designated as the source water protection area. The full 2-mile "circle" of the Kansas Department of Health and Environment's Source Water Assessment, completed in 2003, was the starting point of the discussion. An evaluation of the unconfined properties of the aquifer, well construction, pumping rates, volumes, and estimated drawdown of the wells was made. The areas which are believed to have very little to no chance of impacting the groundwater quality at the wells were removed from consideration. Additionally, the boundaries chosen for the protection area were placed on physical features readily observable in the field, such as roads and fence lines, which contain the areas that could impact the groundwater quality of the water wells.

1. Source Water Assessment and Source Water Protection Area (cont.)

The city of Leon obtains its drinking water supply from three (3) drilled wells completed to various depths in the range of 100 feet to 125 feet. While these wells are situated in the alluvium and adjacent to Little Walnut Creek, they are also developed into the deeper Chase Group of rocks, composed of alternating beds of limestones and shales of the Lower Permian, which appears to be in direct contact with the alluvium in this location. The deeper deposits of fractured limestones and shales can produce moderate supplies of groundwater where encountered.

The alluvium consists mainly of silt, clay and fine sand. In some areas along the Little Walnut River, the alluvium is in contact with deposits of chert gravels, which can contribute recharge to the aquifer. The alluvium generally provides small to moderate yields of water to wells that are 30 to 50 feet deep in the principal valley areas. The alluvium is overlain by Quaternary loess deposits which provides protection from activities happening at the ground surface.

The Permian deposits are a significant source of usable groundwater in this area, from which many nearby domestic and stock wells also derive water. However, they do not yield adequate supplies of groundwater for large scale agriculture or irrigation. The quantity and quality of the water available differ with both the location and the method of construction of a well. Wells finished in the weathered zones can be subject to failure during prolonged droughts, and when water is available from them, high nitrate content in the water can be a problem.

The city's wells are located approximately one and a half (1.5) miles east of town. Water pumped from the wells is chlorinated and piped to town. The greatest threat to the water supply for the City of Leon is the low yield of the aquifer. The limited supply of groundwater is not necessarily due to a regional decline in water levels, or lack of recharge, rather it is due to the limited thickness of saturated material and the low permeability of those deposits, making the city vulnerable to drought.

In this part of Kansas, recharge occurs to local aquifers primarily in response to local precipitation. Precipitation recharge to that portion of the alluvial aquifer and deeper deposits used by Leon's wells likely occurs in the immediate vicinity of their wells and in areas that drain to the creek valleys just upstream from their wells. The area averages about 31 or 32 inches of precipitation annually. The amount of the precipitation that becomes groundwater recharge is not known, but has been estimated to be about 10 percent of the precipitation or about 3 inches annually. Some recharge also appears to originate from surface water flows of the Little Walnut River. There is a low-head dam on the Little Walnut River downstream from the water wells, which likely allows for greater localized recharge and a slightly increases the potentiometric surface in the vicinity of the wells, decreasing the potential for discharge from the upper portion of the alluvial aquifer during dry conditions. Most of the Little Walnut Creek watershed upstream from the City's wells is grassland, cropland or woodland. There are no large scale (>1000 animal units) confined animal feeding operations upstream or industrial waste lagoons.

1. Source Water Assessment and Source Water Protection Area (cont.)

A number of domestic livestock wells and household wells were noted in the area of the City's public water supply wells, including at least one domestic well that appears to be used to water livestock. Well drillers in Kansas were not required to file water well completion (WWC-5) records with the state of Kansas for domestic wells until the mid-1970s and there currently are no permitting or inspection requirements. As a result, the number of domestic wells and their locations and condition of those wells is not known. Poorly constructed or poorly maintained water wells can be a direct conduit for surface contamination of the source of supply shared by the city of Leon's well.

Based on the above observations, it was decided to include all of the areas of Zones A & B of the earlier source water assessment (the area within 100 feet and within 2,000 feet of the wells) in the protection area. The boundary of Zone C, however, will be redrawn on section or half-section lines (or fence lines), since those features are more readily identifiable in the field, by both the general public and city staff than the arbitrary 2-mile circle boundaries originally identified in the 2003 source water assessment.

Maps of the City of Leon's Source Water Assessment Areas and Source Water Protection Areas may be found in Appendix 1. The entire protection area comprises approximately six square miles.

The following narrative describes the local factors and circumstances unique to the Source Water Assessment / Source Water Protection Area:

The City of Leon has three sources of water (3 wells) authorized to divert water by three certified water rights. Lithologic well logs could not be found for all three (3) water production wells. Several of the wells were drilled before 1974, after which Water Well Completion (WWC-5) records would have been required to have been submitted to the State of Kansas. The files located at the Kansas Department of Agriculture's (KDA) Division of Water Resources were also reviewed but contained no lithologic well logs. However, the Division's files did contain a document submitted to them by the city, which indicated that Well No. 12 was drilled to a depth of 61 feet, and Well No. 13 was drilled to a depth of 63 feet. Original well logs for Well Nos. 11 and 14 are included in the plan along with copies of more recently drilled monitoring wells adjacent to production wells in the city's wellfield.

1. Source Water Assessment and Source Water Protection Area (cont.)

The City and its wells are situated on the northwestern edge of the Kramer-Stern Oil Field, with the Leon Oil Field and the Reynolds Oil Field in close proximity. There remains significant oil and gas well production in the general vicinity of the city's wells, with several nearby active and inactive oil wells and disposal or injection wells. Oil and gas production in the area dates back to the early twentieth century. Historically, there had been widespread use of unlined saltwater disposal ponds before the 1950s, which caused localized chloride contamination. Disposal or injection wells also were drilled to shallow depths for saltwater disposal. While many of those wells have since been plugged, many other wells are likely abandoned, not documented, and difficult to locate on private property through the contaminant source inventory process. While no recent notices of intent to drill have been filed to drill new oil wells in the vicinity of the city's wells, several older active oil wells were noted to be operating within the potential area of influence for the city's wells. The oil wells in the area often are accompanied by tank batteries for storage of both crude oil and produced water brine and are often connected by above-ground and underground pipelines, which can be a source of contamination.

For water right purposes, the wells are designated by the KDA Division of Water Resources to be located within the Walnut River Drainage Basin. The United States Geological Survey (USGS) designates the area in which the wells are located as Hydrologic Unit Code (HUC) 110300180203 (Stern Land Company Dam-Little Walnut River).

As indicated, the city's wellfield is located east and hydraulically upgradient from the corporate city limits of Leon. Therefore, the city is not within the identified protection areas. The land within the Source Water Protection Area has a variety of agricultural uses, including cultivated crops and pastured livestock. As mentioned, a paved county road passes directly through the protection area. Oil was discovered in Butler County, beginning in the early 1900s and petroleum production continues to this day from several locally active oil fields. Oil wells were identified as being active within the proposed protection areas. The city possesses long-term leases to all well sites.

2. CONTAMINANT SOURCE INVENTORY

The pollutant source inventory was developed using the checklist found at Appendix 2. Analysis of the protection area was accomplished with a drive-through survey of the protection area. The drive-through survey and inventory were conducted by Kenneth A. Kopp, P.G., Kansas Rural Water Association, on June 13, 2022.

Kansas Source Water Assessment Program Plan - Contaminant Source Inventory
Name of Public Water Supply: City of Leon
Water Supply Diversion Point: Well Nos. 2, 5 and 10
Inventory Prepared by: Kenneth A. Kopp, P.G. - Kansas Rural Water Association
Date Inventory Completed: June 13, 2022

Code	Description	Present	Comments
116	Soybeans	x	Zones A, B and C
BC	CRP Grassland	x	Zones A, B and C
AF	Electric Power Lines	x	Zones A, B and C
BN	Native Grass Land (not CRP)	x	Zones A, B and C
F	Range & Pasture	x	Zones A, B and C
211	Cattle Farm	x	Zones B and C
AH	Farmstead	x	Zones B and C
BF	Gravel Road	x	Zones B and C
BH	Grazing Livestock	x	Zones B and C
BM	Milo Field	x	Zones B and C
BQ	Pond	x	Zones B and C
BU	Riparian Land	x	Zones B and C
4441	River	x	Zones B and C
N	Rural Homestead	x	Zones B and C
N	Septic Tank- Lateral Field	x	Zones B and C
D	Sorghum	x	Zones B and C
115	Corn Field	x	Zones B and C
AP	Telephone Lines	x	Zones B and C
AP	Telephone Lines	x	Zones B and C
BA	Wells	x	Zones B and C
111	Wheat Field	x	Zones B and C
BL	Interstate Highway	x	Zones B and C (Paved County Road)
1389	Oil or Gas Well	x	Zones C
	Irrigation Well	x	Zones C (Inactive)

2. CONTAMINANT SOURCE INVENTORY

In the Kansas Source Water Assessment Program, the assessment areas were divided into three zones: Zone A, Zone B and Zone C. These zones were developed for the purpose of determining assessment scores. In theory, the presence a contaminant source in Zone A has a greater risk than a similar contaminant source in Zone B, etc. The zones for water systems using groundwater were defined in this manner:

Zone A = Land within 100 feet of the wells
Zone B = Land within 2,000 feet of the wells
Zone C = Land within 2 miles of the wells

A general description of the contaminant sources found in the protection area, with emphasis on Zones A and B, as shown in the Source Water Assessment, is as follows:

-Within 100 feet of the City's wells (Zone A) are:

1. Cultivated Cropland (Soybeans)
2. CRP Grassland
3. Electric Power Lines
4. Native Grass Land (not CRP)
5. Range & Pasture

-Within 2,000 feet City's wells (Zone B) are:

1. Cattle Farm
2. Farmstead
3. Gravel Road
4. Grazing Livestock
5. Milo Field
6. Pond
7. Riparian Land
8. River
9. Rural Homestead
10. Septic Tank- Lateral Field
11. Sorghum
12. Soybeans
13. Telephone Lines
14. Wells
15. Wheat Field
16. Interstate Highway (County Road)

Within the protection area, 23 categories of potential pollutant sources were identified. The inventory worksheet identifying the potential pollutant sources may be found in Appendix 2.

3. WATER QUALITY PROTECTION MEASURES

The City of Leon has identified measures to assure protection of the quality of its source of water. These Water Quality Protection Measures are described in Appendix 3 of this document.

4. SUSCEPTIBILITY ANALYSIS

The purpose of a susceptibility analysis is to identify risks. It is a systematic procedure for determining the likelihood that a public water supply's raw water will contain contaminants at concentrations of concern. Using this information, a water system can direct water quality protection efforts in the most effective manner, thereby reducing contamination risks to its drinking water source.

The Source Water Protection Planning Committee used the susceptibility analysis procedure developed by the Kansas Department of Health and Environment for use in the Kansas Source Water Assessment Program. The following is a quote from the Kansas Source Water Assessment Report that describes in part the susceptibility analysis process:

> *"This analysis was based on a decision tree framework consisting of a series of yes and no questions. These questions considered the proximity of contaminant sources to the water supply intake, the type of contaminant, and the application of pollution prevention or water quality protection practices to sources of contamination. As the evaluator moved through the analytical framework, susceptibility points were accumulated based on the presence of contaminant sources in the assessment area (AA)."*
>
> *"After all the questions were answered, the susceptibility likelihood score (SLS) was calculated for each contaminant of concern category. The SLS was determined by counting the number of contaminant risk factors found to occur in the delineated AA and applying a multiplier to this number. Because the number of contaminant category risk factors is not equal, the multiplier is used to establish a common scale for the SLS of each contaminant category."*

The process described above was used to determine the susceptibility of the City of Leon's wells. For this activity, the protection area for each well was separated into three zones: Zone A – 100-foot radius around the wells; Zone B – 2000-foot radius around the wells; Zone C – two-mile radius around the wells. The decision tree procedure of questions was used to assess the circumstances pertinent to each zone and the scores were recorded using the Kansas Department of Health and Environment's Automated Source Water Assessment Tool (ASWAT).

4. Susceptibility Analysis (cont.)

The resulting SLS scores do not indicate whether the wells are at high or low risk of contamination, but rather the scores are intended to help the water system identify the types of contaminants that are most likely to impact the wells. With this information in hand, the water system can then direct water quality protection efforts towards addressing (and hopefully lowering) the highest contamination risks to a well. All risk factors should be addressed in a wellhead protection plan, but the use of a susceptibility analysis helps focus the protection activities.

The decision tree procedure and ASWAT scoring used to tally the Susceptibility Likelihood Score (SLS) for the city's wells may be found in Appendix 4 of this document. The Susceptibility Likelihood Score (SLS) for the City of Leon's wells are as follows:

Susceptibility Likelihood Score (SLS)						
Susceptibility Likelihood Score – SLS	**A**	**B**	**B***	**C**	**C***	**D**
Well Nos. 2, 5 and 10 (Assessment Area 189)	25	28	27	32	27	34
SLS Range	Low	Low	Low	Low	Low	Low

Contaminant Risk Factors

A – Microbiological
B – Inorganic Compounds (IOC's)
B* – Nitrates
C – Synthetic Organic Compounds (SOC's)
C* – Pesticides
D – Volatile Organic Compounds (VOC's)

The Susceptibility Likelihood Score (SLS) can range from 0 to 100. The greater the number, the greater the susceptibility of the water supply to contamination by the contaminant of concern. While the SLS is intended to reflect the relative susceptibility of the water supply to contamination by a particular contaminant group, there is no quantitative or value scale intended. Therefore, an SLS below a certain value is not intended to represent no problem to the water supply. There is also no intent to develop an overall or single "susceptibility score" for the water supply. The SLS is most useful for helping the public water supply direct water quality protection actions towards a contaminant category of concern. For example, if the SLS for microbiological contamination is high relative to volatile organic compounds, water supply protection planners would conclude that attention should be directed towards microbiological contaminant sources rather than VOC sources.

Based on the Susceptibility Likelihood Scores shown above, there is no one category of contamination threat to the City of Leon water supply. All efforts to reduce the risks from all contaminant sources will be beneficial, including those not addressed by the assessment tool.

4. Susceptibility Analysis (cont.)

In the opinion of the Source Water Protection Planning committee, the most significant potential risks to the quality and supply of the source water to the City of Leon, ranked highest to lowest, are:

1. Cultivated crops with potential for overuse of fertilizers and pesticides near the well sites.
2. Animal waste.
3. Septic Systems.
4. Abandoned nearby water wells or wells in a state of poor maintenance.
5. Oilfield activity.
6. Vandalism.

A listing of other potential pollutant sources that may pose a risk can be found in Appendix 3.

5. INFORM PUBLIC OF SOURCE WATER PROTECTION PLAN

In accordance with the 1996 Safe Drinking Water Act Amendments, the results of the Source Water Assessment portion of the City of Leon Source Water Protection Plan were previously made public. The Source Water Assessment requirements are: delineation of the protection area, an inventory of the potential contaminant sources, and a susceptibility analysis to determine the risk of contamination to the water source. The Kansas Department of Health and Environment has provided this information to the public.

The City of Leon should provide information to the public regarding the Source Water Protection Plan in the following manner:

> Upon approval of the Source Water Protection Plan, a summary will be prepared and provided to the water systems patrons. This will be accomplished by incorporating it into the Consumer Confidence Report prepared each year by the City of Leon. Notices will also be sent to property owners in the source water protection area that are not customers of the water system and to oil lease operators.

6. SOURCE WATER PROTECTION STRATEGY

The Source Water Protection Strategy describes the actions necessary to minimize the risk to the quality of the source water utilized by the City of Leon.

1. The following actions will be taken to implement Water Quality Protection Measures:

   a. The Butler County Sheriff, Butler County Fire District No. 1, the Butler County Commissioners, and the Butler County Departments of Emergency Management, Appraiser, Zoning, Noxious Weeds, and Highways, the Butler County Conservation District, the Butler County USDA Office, the Butler County Research & Extension Office, the Kansas Corporation Commission (KCC) Environmental Protection Section and District Office, and the Kansas Department of Health and Environment (KDHE) Bureaus of Watershed Management, Water and Environmental Remediation along with specific sections of those bureaus and the South-Central District Office, will be contacted and informed of the location of the City of Leon's Source Water Protection Area and the development of the Source Water Protection Plan.

   b. The Butler County Sheriff will be asked to add the well locations and the protection area to the list of facilities that are regularly patrolled for suspicious activity and general crime prevention.

   c. The opportunity to install agricultural buffers and other projects will be explored through the Butler County USDA. The USDA will be asked to "tag" the files of land potentially eligible for Continuous Conservation Reserve Program practices.

   d. A program to educate landowners of the dangers of abandoned and poorly maintained water wells and to promote the plugging of these hazards will be established with the Butler County Health Department, K-State Research & Extension and the Butler County Conservation Districts. Previously drilled domestic wells within the protection areas, with no filed plugging reports, will be specifically investigated. Known domestic wells within the protection area will be checked at least annually to ensure they are being maintained. The City of Leon will encourage landowners to plug abandoned wells.

   e. All wells nearing the end of their useful design life should be re-drilled as soon as possible, and as funding becomes available. The city will continue to prioritize efforts to re-drill Well Nos. 13 and 14, which provide a majority of the water production for the city, are operating with original pumps, and have been found to have rusted and corroded steel well casings and screens, with holes beginning to develop in them.

6. Source Water Protection Strategy (cont.)

f. The Kansas Corporation Commission Environmental Protection/Remediation Section will be notified of the establishment of the source water protection area, with a request that regulated petroleum production equipment in this area be inspected on a frequent basis. The Environmental Protection/Remediation Section will be asked to provide the names and mailing addresses of the petroleum companies operating in the source water protection area in order that they can be informed of the adoption of this plan. In addition to this notification, the companies will be asked to conduct inspections and maintenance of their wells and pipelines to the highest degree possible and to use herbicides on their easements in the safest manner possible. Moreover, all new oil wells will be drilled with the proper equipment and safeguards to prevent the degradation of the freshwater aquifer.

2. The following actions will be taken to assure continued maintenance of Water Quality Protection Measures presently in place:

a. Each year the Source Water Assessment and Protection Plan will be re-evaluated. (This will occur at about the same time of the year that the water systems Consumer Confidence Reports are due.) At this time, progress and continued completion of the protection goals will be evaluated. If any new potential pollutant sources are identified, the potential risk they may pose to the water supply will be evaluated and the plan revised to reflect the change.

b. Efforts will be made to maintain good communication with the landowners within the protection area and local agencies that serve the landowners, to provide beneficial information concerning recommended Water Quality Protection Measures.

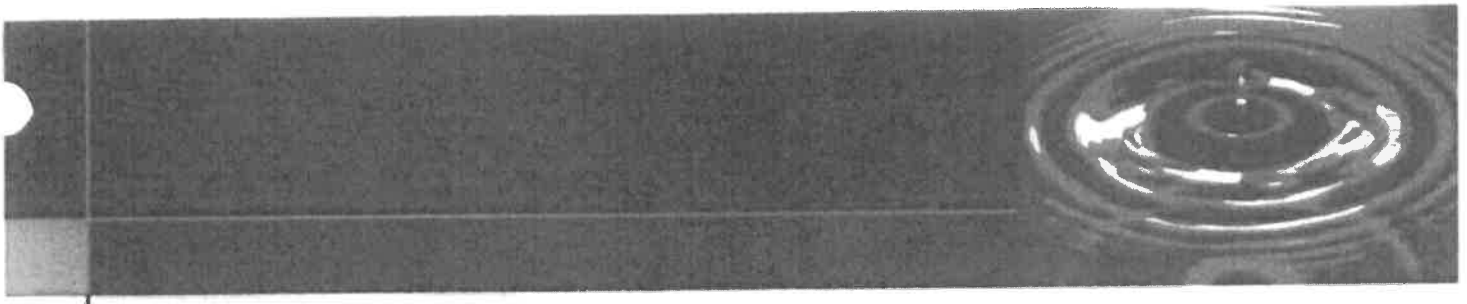
3. The following actions will be taken to assure that persons responsible for future potential pollutant sources are aware of the expectations and requirements of the City of Leon's Source Water Protection Plan:

a. The source water will be tested regularly and the reports reviewed and compared to ensure no significant change to water quality. The results will be made available to the customers and area landowners through the Consumer Confidence reports.

b. Efforts will be made to stay alert to any future activities that could potentially affect the water quality of City of Leon's groundwater supply.

c. Efforts will be made to educate new landowners, operators and contractors concerning the recommended Water Quality Protection Measures by making available information concerning the Source Water Protection Plan once a year. This will be done at the same time that the Consumer Confidence Report is made available to all water users. Information concerning educational materials and resources available through the Butler County Conservation District, Butler County K-State Extension Office and the Butler County Local Environmental Protection Program will be provided.

7. EMERGENCY WATER SUPPLY PLAN AND WATER CONSERVATION PLAN



MUNICIPAL WATER CONSERVATION PLAN FOR THE CITY OF LEON

August 2021

Municipal Water Conservation Plan
For the City of Leon

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INTRODUCTION

The primary objectives of the Water Conservation Plan for the City of Leon are to develop long-term water conservation plans (Long-Term Water Use Efficiency Section) and short-term water emergency plans (Drought Response Section) to assure the City customers of an adequate water supply to meet their needs. The efficient use of water also has the beneficial effect of limiting or postponing water distribution system expansion and thus limiting or postponing the resultant increases in costs, in addition to conserving the limited water resources of the State of Kansas.

The City of Leon has undertaken a number of steps to ensure a dependable water supply for our customers during the past 45 years. The original water supply for our City was obtained from wells in the Little Walnut River drainage area. Our water distribution system was constructed in 1923. At that time six wells were in use. Since that time, four additional wells have been constructed in the Little Walnut River drainage area. Five wells have been abandoned. Today three wells are in use and tew wells are available for a backup supply. Chlorination is the only treatment provided. Construction of a new 100,000-gallon elevated treated water storage tank was completed in 1985. In 1986, a connection was made to Rural Water District No. 6, Butler County Rural, for an additional backup water supply source. Our City water supply and distribution system have ample capacity to meet current customers demands and future projected demands for several years, except during drought periods. The City of Leon believes that our Municipal Water Conservation Plan represents an additional major step in ensuring our customers of a dependable water supply in future years.

LONG-TERM WATER USE EFFICIENCY

Water Use Conservation Goals

The City of Leon used 80 gallons per person per day (GPCD) in 2017. This GPCD figure included:

Water sold to residential/commercial customers;
Water distributed for free public services (parks, cemeteries, swimming pools etc.); and
Water lost by leaks in the water distribution system.

However, the GPCD figure does not include municipally supplied water for industries that use over 200,000 gallons per year. According to the publication Municipal Water Use in Kansas, 2017, our City is located in Region 7M. From this publication it was determined that our City GPCD water use was 80, which was 13 percent below the regional average of 92 GPCD among public water suppliers in Region 7M during 2017. The City desires to set a water use conservation goal for usage not to exceed 92.4 GPCD based on the regional average of the last five years (2013-2017). Our City anticipates not exceeding this goal by carrying out the specific actions that are outlined in our plan.

Water Conservation Practices

This subsection of the plan summarizes the current education, management and regulation efforts that relate to the long-term conservation of water in the City. Specific practices that will be undertaken to conserve water are listed and a target date to begin each practice is also shown.

Education

The City water bills show the total gallons of water used during the billing period and the amount of the bill. Water conservation tips are not normally provided with the water bills. The City has not

provided information on water conservation to the local news media on a regular basis and has not encouraged the Board of Education and teachers to become involved in water conservation presentations in schools.

The City has chosen the following conservation practices and target dates for the Education Component of the Long-Term Water Use Efficiency Section of our Water Conservation Plan.

Education Conservation Practices to be Taken	Target Date
1. Water bills will show the amount of water used in gallons and the cost of the water.	Implemented
2. The City will post on water bills semi-annually to look on website to for water conservation tips.	September 2021
3. Will post information on the website of water conserving landscape practices. At the start of hot weather will send out a website alert to all that are signed up to reference the website for conservation tips.	September 2021

Management

The City of Leon has water meters on all water supplies and water pumped to the distribution system. Any new supply will have an individual meter on each source of supply. These meters are read daily unless weather prohibits.

Water meters were installed for all residential/commercial customers by 1965; these meters were replaced in 1999. The amount of water provided to the High School for their football field and to the city government buildings and grounds are metered. Customer meters are scheduled for an accuracy check and possible repair or replacement upon receiving a request to do so from the customer.

The City of Leon reads each customer's water meter and mails a monthly water bill to each customer. Customer water meters are generally read approximately the 3rd week of the month; however, the meter reader sometimes deviates from the scheduled time period.

Water leaks from the City public water distribution system are repaired when customers report significant leaks from the water mains or leaks are located by City Personnel. Water pressure is not checked unless customers complain that their water pressure is too low.

The water rate structure for the City was passed on March 4, 2013. The minimum monthly water bill is $10.00 for residential customers, which allows each customer to use up to 1,000 gallons of water each month. Water use in excess of 1,000 gallons is charged $4.00 per 1,000 gallons. The next 3,000 gallons of water used per month the sum of $5.00 per 1,000 gallons. For 5,000 gallons and over of water used in the month is charged in the sum of $10.00 The sewer rate for all customers is $40.40, this is a base rate and does not vary.

The Governing Body of the City of Leon adopted an ordinance on August 9, 2021, to change the water rate structure, upon publishing in the Butler County Times Gazette. The water rate structure for the City as passed on August 9, 2021 will be the minimum monthly water bill is $20.00 for residential customers, which allows each customer to use up to 1,000 gallons of water each month. Water use in

excess of 1,000 gallons is charged $4.50 per 1,000 gallons. The next 3,000 gallons of water used per month the sum of $5.50 per 1,000 gallons. For 5,000 gallons and over of water used in the month is charged in the sum of $11.00. The sewer rate for all customers is $40.40, this is a base rate and does not vary.

The City of Leon realizes that much greater emphasis must be placed on obtaining accurate measurement of water use at our source and at customer meters and that a water use records system must be developed that can be used to more effectively and efficiently manage the City public water distribution system. For that reason, the City of Leon has chosen the following conservation practices and target dates for the Management component of the Long-Term Water Use Efficiency Section of our Water Conservation Plan.

Management Conservation Practices to be Taken	Target Date
1. All source water will have meters installed and the meters will be repaired or replaced within two weeks when malfunctions occur.	Implemented
2. Meters for source water will be tested for accuracy at least once every three years. Each meter will be repaired or replaced if its test measurements are not within industry standards (such as AWWA standards).	Implemented
3. Meters will be installed at all residential service connections and at all other service connections whose annual water use may exceed 300,000 gallons, including separate meters for municipally operated irrigation systems which irrigate more than one acre of turf.	December of 2021
4. All meters for source water will be read at least on a monthly basis and meters at individual service connections will be read at least once every two months.	Implemented
5. A reading will be taken at each source water meter at the same time that meters for individual service connections are read.	Implemented
6. A water utility will implement a water management review, which will result in a specified change in water management practices or implementation of a leak detection and repair program or plan, whenever the amount of unsold water (amount of water provided free for public service, used for treatment purposes, water loss, etc.) exceeds 20 percent of the total source water for a four month time period.	December 2021
7. Water sales will be based on the amount of water used.	Implemented
8. A water rate structure designed to curb excessive use of water will be evaluated.	April 2022

Regulation

The City of Leon does not have any water conservation regulations in effect at the present time. Because of our ability to supply water during normal periods, regulatory controls on water use are

included only in the Drought/Emergency Response section of this plan and water drought/emergency ordinance where they constitute the primary means for conserving water during a supply shortage.

Leon does not have a plumbing code and has not felt the need to for a plumbing code, the enforcement of any regulation to require use of any water conservation plumbing measures would be very difficult. Most new homes and/or remodeling projects do include the use of water conservation toilets and faucets.

DROUGHT RESPONSE

The City of Leon addresses its short-term water shortage problems through a series of stages based on conditions of supply and demand with accompanying triggers, goals and actions. Each stage is more stringent in water use than the previous stage since water supply conditions are more deteriorated. The Mayor is authorized by ordinance to implement the appropriate conservation measures.

Stage 1: Water Watch

Goals

The goals of this stage are to heighten awareness of the public on water conditions and to maintain the integrity of the water supply system.

Triggers

This stage is triggered by any one of the following conditions:

1. The City's storage has fallen below 85 percent capacity, and will not recover;
2. Groundwater levels have fallen five feet below the normal seasonal level;
3. Demand for one day is in excess of 0.125 thousand gallons per day;
4. Provider of purchased water has issued a Stage 1 Water Watch.

Education Actions

1. The City will make occasional news releases to the local media describing present conditions and indicating the water supply outlook for the upcoming season.
2. Previous months summaries of precipitation, temperature, water levels and storage will be made public at the beginning of each month.
3. Water-saving tips will be included in billings to water utility customers.

Management Actions

1. The City wells will be cleaned and flushed to maintain them at their most efficient condition.
2. Leaks will be repaired within 48 hours of detection.
3. The City will monitor its use of water and will curtail activities such as hydrant flushing and street cleaning.

Regulation Actions

The public will be asked to curtail some outdoor water use and to make efficient use of indoor water, i.e. wash full loads, take short showers, don't let faucets run, etc.

Stage 2: Water Warning

Goals

The goals of this stage are to reduce peak demands by 20% percent and to reduce overall weekly consumption by 10% percent.

Triggers

This stage is triggered by any one of the following conditions:

1. The City's storage has fallen below 70 percent capacity, and will not recover.
2. Pumping lowers water level to within 10 feet of the top of the well screens.
3. Demand for one day is in excess of 0.15 thousand gallons per day.
4. Provider of purchased water has issued a Stage 2 Water Warning.

Education Actions

1. The City will make weekly news releases to the local media describing present conditions and indicating the water supply outlook for the upcoming week.
2. Previous week summaries of precipitation, temperature, water levels and storage will be made public each week.
3. Water conservation articles will be provided to the local newspaper.
4. Water-saving tips will be included in billings to water utility customers.

Management Actions

1. The City water supplies will be monitored daily.
2. Leaks will be repaired within 24 hours of detection.
3. Pumpage at wells will be reduced to decrease drawdown and to maintain water levels over well screens.
4. The City will curtail its water usage, including operation of fountains, watering of City grounds and washing of vehicles.
5. Reserve supplies, such as standby well fields or lakes, will be prepared for use.
6. Intakes will be adapted to operate with low flows.

Regulation Actions

1. An odd/even lawn watering system will be imposed on City residents. Residents with odd-numbered addresses will water on odd days; even addresses will water on even days.
2. Outdoor water use, including lawn watering and car washing will be restricted to before 10:00 am and after 9:00 pm..
3. Refilling of swimming pools will be allowed one day a week after sunset.

4. Outdoor watering will be restricted to use of a hand-held hose or bucket only.
5. Excess water use charges for usage of water over the amount used in the winter will be considered.
6. Waste of water will be prohibited.

Stage 3: Water Emergency

Goals

The goals of this stage are to reduce peak demands by 50 percent and to reduce overall weekly consumption by 25 percent.

Triggers:

This stage is triggered by any one of the following conditions:

1. The City's storage has fallen below 50 percent capacity;
2. Pumping lowers water level to within 5feet of the top of the well screens;
3. Groundwater levels have fallen 15 feet below the normal seasonal level;
4. Demand for one day is in excess of 80 thousand gallons per day
5. Provider of purchased water has issued a Stage 3 Water Emergency.
6. Emergency conditions related to repairs or water quality.

Education Actions

1. The City will make daily news releases to the local media describing present conditions and indicating the water supply outlook for the next day.
2. Previous days summaries of precipitation, temperature, water levels and storage will be made public each day.
3. The City will hold public meetings to discuss the emergency, the status of the City water supply and further actions, which need to be taken.

Management Actions

1. The City water supplies will be monitored daily.
2. Leaks will be repaired within 24 hours of detection.
3. Pumpage at wells will be reduced to decrease drawdown and to maintain water levels over well screens.
4. The City will seek additional emergency supplies from other users, the state or the federal government.

Regulation Actions

1. Outdoor water use will be banned.
2. Waste of water will be prohibited.

PLAN REVISION, MONITORING & EVALUATION

The City of Leon will establish a management practice of reviewing monthly totals for water production, residential/commercial sales, water provided free-of-charge, and "unaccounted for water". Problems noted during the monthly review will be solved as soon as possible.

The City of Leon Municipal Water Conservation Plan will be reviewed during the month of April each year and on a more frequent basis during drought or other water shortage conditions. If the water conservation GPCD goals for the previous year are not met, then the City will review the data collected from the previous year in relationship to the status and effectiveness of the conservation practices that are outlined in our plan and will provide a status report to the Kansas Department of Agriculture, Division of Water Resources, which will also include any additional water conservation practices that may need to be taken in order for the city to achieve and maintain its water use conservation GPCD goals.

Kristina Semisch
Mayor-Print

Kristina Semisch
Mayor-Signature

Jodie Sandles
City Clerk-Signature

Aug 9, 2021
Date

WATER DROUGHT/EMERGENCY ORDINANCE

Ordinance No. 2021-06

AN ORDINANCE AMENDING THE CODE OF THE CITY OF LEON PERTAINING TO THE WATER DROUGHT/EMERGENCY ORDINANCE

NOW THEREFORE, BE IT ORDAINED by the Governing Body of the City of Leon:

SECTION 1: Chapter XV Article 5 of the City Code is amended to read as follows:

An ordinance authorizing the declaration of one of three progressive stages of a water supply conservation and / or water supply shortage which shall conserve or curtail the use of water within the City of Leon ("the City"); establishing three stages of water conservation measures for the City; a water watch, warning or emergency; establishing procedures and voluntary and mandatory conservation measures; authorizing the issuance of administrative regulations; and prescribing certain penalties.

Be it Ordained by the Governing Body of the City of LEON.

Section 1. Purpose. The purpose of this ordinance is to provide for a progressive water supply conservation program, including the declaration of a water supply watch, warning or emergency and the implementation of voluntary and mandatory water conservation measures throughout the city in the event such a watch, warning or emergency is declared by the governing body of the City.

Section 2. Definitions.

(a) "Water", as used in this ordinance, shall mean water available to the City of Leon for treatment by virtue of the City's water rights, water supply, water supply contracts or any treated water introduced by the City into its water distribution system, including water offered for sale at any coin-operated site.

(b) "Customer", as used in this ordinance, shall mean the customer of record using water for any purpose from the City's water distribution system and for which either a regular charge is made or, in the case of coin sales, a cash charge is made at the site of delivery.

(c) "Waste of water", as used in this ordinance, includes, but is not limited to:
(1) permitting water to escape down a, street, roadway or other surface intended for vehicle driving purposes, and / or any gutter, ditch, or other surface drain; or
(2) failure to repair a controllable leak of water due to defective plumbing.

(d) The following classes of uses of water are established for the purposes of this ordinance:

Class 1:

Water used for outdoor watering; either public or private, for gardens, lawns, trees, shrubs, plants, parks, golf courses, playing fields, swimming pools or other recreational areas; or the washing of motor vehicles, boats, trailers, or the exterior of any building or structure.

Class 2:

Water used for any commercial, agricultural, or industrial purposes, except water actually necessary to maintain the health and personal hygiene of bona fide employees of such businesses or interests while such employees are engaged in the performance of their duties at

their place of employment.

Class 3:

Domestic usage, other than that which would be included in either classes 1 or 2.

Class 4:

Water necessary only to sustain human life and the lives of domestic livestock pets and maintain standards of hygiene and sanitation.

Section 3. In the event that the governing body of the City or the City's designated official determines that the City's water supply may be in subject to a shortage in supply or the governing body of the City determines there is need for conservation of City's water resources for any reason, the City may begin the progressive three (3) stage water conservation program by declaring a water watch as described in section 3(a) or, in times of need and / or duress, the governing body of the City may choose to declare any section of the program described in section 3 in effect at any time:

(a) Stage 1: Declaration of Water Watch. Whenever the governing body of the City finds that conditions indicate that the probability of a drought or some other condition causing a major water supply shortage is rising, it shall be empowered to declare, by resolution, that a water watch exists and that it shall take steps to inform the public and ask for voluntary reductions in water use. Such a watch shall be deemed to continue until it is declared by resolution of the governing body to have ended. The resolutions declaring the existence and end of a water watch shall be effective upon their publication in the official city newspaper.

(b). Stage 2: Declaration of Water Warning. Whenever the governing body of the City finds that drought conditions or some other condition causing a major water supply shortage are present and supplies are starting to decline, it shall be empowered to declare by resolution that a water warning exists and that it will recommend restrictions on nonessential uses during the period of warning. Such a warning shall be deemed to continue until it is declared by resolution of the governing body to have ended. The resolutions declaring the beginning and ending of the water warning shall be effective upon their publication in the official city newspaper. Pursuant to the approval of the Chief Engineer, Division of Water Resources, Kansas Department of Agriculture, the recommended restrictions on nonessential uses may be extended to private wells within the City limits.

(c). Stage 3: Declaration of Water Emergency. Whenever the governing body of the City finds that an emergency exists by reason of a shortage of water supply needed for essential uses, it shall be empowered to declare by resolution that a water supply emergency exists and that it will impose mandatory restrictions on water use during the period of the emergency. Such an emergency shall be deemed to continue until it is declared by resolution of the governing body to have ended. The resolutions declaring the existence and end of a water supply emergency shall be effective upon their publication in the official city newspaper. Pursuant to the approval of the Chief Engineer, Division of Water Resources, Kansas Department of Agriculture, the mandatory restrictions on water use may be extended to private wells within the City limits.

Section 4. Voluntary Conservation Measures. Upon the declaration of a water watch or water warning as provided in Sections 3(a) or 3(b), the mayor (or the city manager) is authorized to call on all water consumers to employ voluntary water conservation measures to limit or eliminate nonessential water uses including, but not limited to, limitations on the following uses:

(a) Class 1 uses of water.

(b) Waste of water.

Section 5. Mandatory Conservation Measures. Upon the declaration of a water supply emergency as provided in Section 3(c), the mayor (or the city manager or authorized city official) is also authorized to implement certain mandatory water conservation measures, including, but not limited to, the following conservation measures:

(a) Suspension of new connections to the City's water distribution system, except connections of fire hydrants and those made pursuant to agreements entered into by the City prior to the effective date of the declaration of the emergency;
(b) Restrictions on the uses of water in one or more classes of water use as described in section 2(d), wholly or in part;
(c) Restrictions on the sales of water at coin-operated facilities or sites;
(d) The imposition of water rationing based on any reasonable formula including, but not limited to, the percentage of normal use and per capita or per consumer restrictions;
(e) Complete or partial bans on the waste of water; and
(f) Any combination of the measures in sections 5(a-e) as the governing body of the City or authorized city official may deem appropriate and / or necessary.

Section 6. Emergency Water Rates. Upon the declaration of a water supply emergency as provided in Section 3(c), the governing body of the City shall have the power to adopt emergency water rates by ordinance designed to conserve water supplies. Such emergency rates may provide for, but are not limited to:

(a) Higher charges for increasing usage per unit of use (increasing block rates);
(b) Uniform charges for water usage per unit of use (uniform unit rate); or
(c) Extra charges in excess of a specified level of water use (excess demand surcharge).

Section 7. Regulations. During the effective period of any water supply emergency as provided for in Section 3(c), the mayor (or city manager or water superintendent or other authorized city official) is empowered to promulgate such regulations as may be necessary to carry out the provisions of this ordinance, any water supply emergency resolution, or emergency water rate ordinance. Such regulations shall be subject to the approval of the governing body at its next regular or special meeting.

Section 8. Violations, Disconnections and Penalties.

(a) If the mayor, city manager, water superintendent, or other authorized city official or officials charged with implementation and enforcement of this ordinance or a water supply emergency resolution learn of any violation of any water use restrictions imposed pursuant to Sections 5 or 7 of this ordinance, a written notice of the violation shall be affixed to the property where the violation occurred and the customer of record and/ or any other person known to the City to be responsible for the violation and / or the correction of said violation shall be provided with either actual or mailed notice. Said notice shall describe the violation(s) and order that the noted violation(s) be corrected, cured or abated immediately or within such specified time as the City determines is reasonable for such correction, cure or abatement under the circumstances. In the event the order is not cured within the time period given in the notice, the City may terminate water service to the customer subject to the following procedures:

(1) The City shall give the customer notice by mail or actual notice that water service will be discontinued within a specified time due to the violation(s) and that the customer will have the opportunity to appeal the termination by requesting a hearing scheduled before the City governing body or a city official designated as a hearing officer by the City governing body;
(2) If such a hearing is requested by the customer charged with the violation, the customer shall be given a full opportunity to be heard by the City governing body or the city official designated as a hearing officer by the City governing body before termination is ordered; and

The City governing body or the city official designated as a hearing officer by the City governing body shall make findings of fact and order whether service should continue or be terminated.

(b) A fee of $50.00 shall be paid for the reconnection of any water service terminated pursuant to subsection (a). In the event of subsequent violations, the reconnection fee shall be $200 for the second reconnection and $300 for any subsequent additional reconnections within a 1-year period.

(c) Violations of this ordinance shall be a municipal offense and may be prosecuted in Municipal Court. Any person so charged and found guilty in Municipal court of violating the provisions of this ordinance shall be guilty of a municipal offense. Each calendar day in which a violation is observed shall constitute a separate offense. The penalty for an initial violation shall be a mandatory fine of $100. In addition, such customer may be required by the Court to serve a definite term of confinement in the city or county jail which shall be fixed by the Court and which shall not exceed 30 days. The penalty for a second or subsequent conviction shall be a mandatory fine of not less than $200. In addition, such customer shall serve a definite term of confinement in the city or county jail which shall be fixed by the Court and which shall not exceed 30 days.

Section 9. Emergency Termination. Nothing in this ordinance shall limit the ability of any properly authorized city official from terminating the supply of water to any or all customers upon the determination of such city official that emergency termination of water service is required to protect the health and safety of the public or for any other emergency as required or authorized by ordinance or as deemed necessity of the City by such city official or the governing body of the City.

Section 10. Severability. If any provision of this ordinance is declared unconstitutional, or the application thereof to any person or circumstance is held invalid, the constitutionality of the remainder of the ordinance and its applicability to other persons and circumstances shall not be affected thereby.

Section 11. This ordinance shall become effective upon its publication in the official city newspaper.

Passed by the governing body this 9 day of August, 2021.

Kristina Semisch

Kristina Semisch, Mayor

ATTEST:

Jodie Laidler

Jodie Laidler, City Clerk

CITY OF LEON

EMERGENCY WATER SUPPLY PLAN

2017

THE CITY OF LEON EMERGENCY WATER SUPPLY PLAN

Pursuant to the requirements of K.A.R. 28-15-18 the City of Leon has compiled the following information, guildelines, and ordinance for the purpose of originating an Emergency Water Supply Plan.

Section I	Purpose	Pg. 1
Section II	Description	Pg. 1
Section III	Disaster Organization	Pg. 1
Section IV	Mutual Aid Agreement	Pg. 2
Section V	Inventory of Emergency Equipment Available	Pg. 2
Section VI	Vulnerability of System (Disaster Response)	Pg. 3
Section VII	Water Rationing Ordinance	Pg. 4
Section VIII	List of Key Personnel	Pg. 5
Addendum 1	Ordinance No. 447 Moved to Drought Plan Section 9	

SECTION 1. PURPOSE

To isolate and conserve an adequate supply of potable water during emergency conditions that will be used only to sustain human life and the lives of pets and maintain standards of hygiene and sanitation.

SECTION 2. DESCRIPTION

The water supply for the City of Leon is obtained from 3 wells located East of Fleming Feed, North and South of the Railroad Tracks. The wells are designated as Well 2, Well 5, and Well 10 respectively. All wells are approximately 100 feet and produce sufficient volume for the needs when combined. The City of Leon also purchases water from KRWD 6. Chlorine is injected into the water supply for bacterial disinfection as water is pumped into the distribution system. The City maintains a 120,000 gallon above ground storage facility. The original system consisted primarily of 4 inch and 2 inch lines. New 6 inch and 4 inch additional lines have been constructed with PVC.

SECTION I. PURPOSE

To isolate and conserve an adequate supply of potable water during emergency conditions that will be used only to sustain human life and the lives of pets and maintain standards of hygiene and sanitation.

SECTION II. DESCRIPTION

3 wells
2,5x10 well

The water supply for the City of Leon is obtained from wells located East of Fleming Feed, North and South of the Railroad tracks. The wells are designated as Well #5, and Well #2 respectively. All wells are approximately 100 feet and produce sufficient volume for the City needs when combined at 56 psi. Chlorine is injected into the water supply for bacterial disinfection as water is pumped into the distribution system. The City maintains a 120,000 gallon above ground storage facility. The original system consisted of primarily 4 inch and 2 inch lines. New 6 inch and 4 inch additional lines have been constructed with PVC.

Revised 2014

SECTION III. DISASTER ORGANIZATION - CHAIN OF COMMAND AND DEPARTMENTAL RESPOSIBILITIES.

A. Mayor - In charge overall

1. Mayor shall establish communication within governing body, local news media, and general public.

   a. The Mayor may declare a state of emergency and exercise emergency powers upon making the declaration. Emergency powers may continue until the Mayor declares that an emergency no longer exists.

   b. This action is authorized by K.S.A. 48-932 et seq.

   c. Mayor shall determine the necessity of meeting with the City Council if a state of emergency exists.

2. Mayor shall coordinate efforts of City work force in the repairs of damaged infra-structure.

   a. City Council shall assist in assessing damages to infra-structure and determining if additional work force is needed.

   b. The Governing Body and City Maintenance Superintedent shall work closely with City Office/Clerk to assess financial responsibilities.

3. The Mayor and City Council shall establish and locate command posts, medical posts, shelters, traffic control, etc., while working with guidance from the following:

   a. Butler County Emergency Manangement Department of Operations.

   b. Butler County Fire District #9.

   c. Butler County Emergency Medical Service.

B. City Superintendent of Public Works or Assistant.

1. The City Superintendent shall assess damages and establish communications with Mayor and Council.

2. Upon direction from the Mayor, the City Clerk shall notify KDHE District Engineer, or Bureau of Water Supply, and request assistance if determined to be necessary.

3. The City Superintendent shall determine any needed repairs or alterations from the wells to the treatment plant and throughout the distribution system.

    a. The City Superintendent shall report these repairs to the Mayor, City Council and/or Command Post.

4. The City Superintendent will request emergency equipment/supplies if needed.

5. The City Superintendent will request work force assistance from the Mayor and Council if needed.

6. The City Office/Clerk will contact power companies as to any loss of power.

7. City Office/Clerk shall contact electricians from R&D Electric or other contractors to restore electical power at wells upon direction from Mayor.

8. Command Post shall coordinate with City Office personnel, the acquisition of supplies or materials and list the incoming emergency equipment or supplies.

    a. The City Office/Clerk shall keep an inventory of rented/leased/borrowed emergency equipment.

    b. The City Office/Clerk along with the command post shall coordinate volunteer organizations and their efforts.

SECTION IV. MUTUAL AID AGREEMENT

A. A cooperative arrangement for water supply replenishing with Rural Water District #6 will exist. Their office will assist the City in supplying potable water until our system is safely on line again.

SECTION V. INVENTORY OF EMERGENCY EQUIPMENT AVAILABLE

A. City owned equipment.

1. Cutting torch and welder (portable).

2. Construction equipment including backhoe, grader, dump trucks, etc.

3. PVC pipe/fittings located at City Shop.

B. Locally owned equipment and supplies.

1. R&D Electric - qualified electricians that have contracted with the City on numerous occasions.

2. Hogoboom - pump trucks.

3. Water Products, McPherson, KS. - PVC piping and connections for temporary piping.

4. Butler County Fire District No. 9 - floating pump and 3 phase generator for loss of power.

5. City of El Dorado - Their equipment and expertise.

SECTION V. INVENTORY OF EMERGENCY EQUIPMENT AVAILABLE

A. CITY OWNED EQUIPMENT

1. *CUTTING TORCH AND PORTABLE WELDER*
2. *BACKHOE, ROAD GRADER, DUMP TRUCKS, TRACTOR ETC.*
3. *15 KW PORTABLE GENERATOR ON TRAILER*
4. *K-12 GAS POWERED CHOP SAW, CHAIN SAWS, POLE SAWS*
5. *PIPE FITTINGS FOR PVC, CAST, AND POLY PIPE AT SHOP*
6. *PORTABLE AIR COMPRESSOR ON TRAILER AND AIR TOOLS*
7. *(2) 2 INCH GAS POWERED WATER PUMPS AND (1) 1 INCH*

B. LOCALLY OWNED EQUIPMENT AND SUPPLIES

1. *ARROWHEAD ELECTRIC- CERTIFIED ELECTRICANS*
2. *B&B ELECTRIC- CERTIFIED ELECTRICIANS*
3. *PRESSNELL ELECTRIC- CERTIFIED ELECTRICIANS*
4. *MACKLASKEYS OIL FIELD SERVICE- TANK, PUMP AND VACCUM TRUCKS*
5. *WATER PRODUCTS- FITTINGS AND TOOLS*
6. *WICHITA WINWATER- FITTINGS AND TOOLS*
7. *HIZEYS SERVICE AND SUPPLY- FITTINGS, TOOLS, PUMPS AND MOTORS*
8. *BCFD#9- WATER PUMPS, GENERATOR, TORCH, WELDER, TOOLS, CHOP SAW, PORTABLE WATER*
9. *BCFD#2- TOOLS, PORTABLE WATER, RESCUE EQUIPMENT*
10. *TIMM BACKHOE- BACKHOE, TRACKHOE AND SKID STEER*
11. *KRWD#6- RURAL WATER FOR THIS AREA, CITY OF LEON PURCHASES WATER FROM RWD#6*
12. *KANSAS RURAL WATER- ASSISTANCE, ADVICE, TOOLS AND LEAK DETECTION EQUIPMENT*

C. Equipment avaliable through the State of Kansas.

1. Chlorinators (through KDHE).

2. Federally owned units such as portable filter plants, storage tanks, etc. (through Bureau of Water Supply and the National Guard).

3. The City Office/Clerk will assist Command Post and City Maintenance Supervisor in attaining the needed equipment, contractors, and work force as needed.

SECTION VI. VULNERABILITY OF SYSTEM (DISASTER RESPONSES)

A. Drought - As determined by the City Governing Body with authority given in Ordinance No. 447.

1. City Ordinance No. 447 will go into effect regulating the non-essential use of water during an emergency upon authorization from City Governing Body.

2. Upon direction from the Command Post, the City Office/Clerk will attempt to obtain water from Rural Water District No. 6.

B. Accidental Spills or Contamination

1. Maintenance Supervisor or City Office/Clerk shall contact 911.

2. City Maintenance Supervisor shall assess situation and upon Mayor's approval, the City Office/Clerk shall notify KDHE, Regional EPA Office or Office of Emergency Management to extent of damages.

3. The City Office/Clerk shall establish communications with Butler County Sheriff's Office, Fire, News Media, and General Public upon direction from Mayor.

4. If necessary, the City Governing Body shall enact City Ordinance No. 447 that will prohibit non-essential use of water during an emergency.

5. The City Maintenance Supervisor shall make sure that all sources of uncontaminated raw water and potable water storages are full.

6. When or if hazardous substances contaminate the water supply at the well location, the City maintenance Supervisor shall stop all raw water from being pumped.

7. The City Maintenance Supervisor shall utilize 120,000 gallon overhead, storage tank supply.

8. The City Maintenance Supervisor shall isolate the town from the wells and start supplying the town with Rural Water from Butler County Rural Water District #6.

C. Treatment Plant

1. Power outage due to natural or man-made disaster.

a. City Maintenance Supervisor will contact ~~R&D~~ Arrowhead Electric to restore electricity to high service pumps.

b. The City Office/Clerk will ascertain from Westar Energy when the power will be restored.

2. Excessive damage to Water Treatment Plant by storm, explosion, etc.

   a. City Maintenance Supervisor will assess damages and City Office/Clerk will establish communications through the City Office with news media and general public.

   b. The Governing Body will place Ordinance No. 447 into action and will prohibit the non-essential use of water during an emergency.

   c. Upon direction of the Mayor/City Council, the City Office/Clerk will notify KDHE and Bureau of Water Supply of any anticipated needs.

   d. City Maintenance Supervisor will isolate distribution system and utilize water storages.

   e. If necessary, the Command Post will authorize a City work force to repair damages to bring plant back on line.

D. Distribution System

1. Damage to water mains

   a. City Governing Body will authorize enforcement of Ordinance No. 447 for non-essential use of water.

   b. City Maintenance Superintendent and ~~crew~~ CREWS will isolate mains and repair.

2. Storage Tank Damage

   a. City Governing Body will enact Ordinance No. 447 for non-essential water use.

   b. City Maintenance Superintendent will isolate the storage tank by closing valves at base of tank or tower.

E. Terrorist Threats

1. Notify City Clerks Office of threat and coordinate civil defense personnel to provide guard protection at the wells, treatment plant and storage tank.

F. Radioactive Fallout

1. The City Clerk will contact Office of Emergency Management for information as to the possibilities of contamination to the system.

2. The City Governing Body will enact Ordinance No. 447 for non-essential use of water in an emergency situation.

3. The City Maintenance Supervisor will utilize stored water until plant can be place on again.

SECTION VII. WATER RATIONING ORDINANCE - ADDENDUM #1

A. Refer to City Ordinance No. 447

Calculate Water Requirements	Number Here	Daily Capacity	Units	Notes
Number of Distribution System Connections:	361	311,904	Gal/day	To meet the 0.6 gal per minute per connection.
Population:	704	2,816	Gal/day	To meet 4 gallons per day per person recommended for drinking, food prep, and hygiene

Critical Needs for Localized distribution centers		Drinking Only: 1 gal/person/day	Food Preparation, hygiene@ 6 gal/person per day	Non-Potable hygiene and sewerage Systems @ 10 gal/person/day	Based on Environmental Health in Emergencies (WHO)
					CDC document outlines methods for estimating critical water supply based on audits of water use for various purposes
Hospitals		0	0	0	
Schools	3	3	12	30	
Day care center		0	0	0	
Retirement Homes		0	0	0	
Recreation/ bathing center		0	0	0	
Prisons		0	0	0	
Government Building	2	2	8	20	
Shopping Center		0	0	0	
Total Emergency Supply (gal/day)		5	20	50	

Section VIII. LIST OF KEY PERSONNEL

AS FOLLOWS: LOCAL/COUNTY/STATE-CHAIN OF COMMAND AND CONTACTS, CURRENT NAMES, ADDRESS AND PHONE NUMBERS

(LOCAL) CITY OF LEON ADMINISTRATION

MAYOR
KRISTINA SEMISCH

LEON, KS 67074

POLICE CHIEF

ELDORDO, KS 67042

CITY/COURT CLERK
JODIE LAIDLER

LEON, KS 67074

MAINENANCE SUPERINTENDENT
GEORGE LAIDLER

LEON, KS 67074

COUNCIL MEMBERS
BRUCE PROCTOR-
STEVE SCHUETZ-
DANNY JIMENEZ-
REGINA ABBOTT-
DARCIE GOMEZ-

(LOCAL) OTHER AGENCIES

BU CO FIRE DIST #9

LEON, KS 67074

ARROWHEAD ELECTRIC
AUGUSTA, KS 67010
316-655-0468

PRESSNELL ELECTRIC
AUGUSTA, KS 67010
316-775-2166 BUSINESS
316-253-1712 CELL

WESTAR ENERGY
ELDORADO, KS 67042
800-794-6101

SKT (CABLE, PHONE, INTERNET)
CLEARWATER, KS 67026
620-584-2255 OFFICE

BU CO FIRE DIST #2

AUGUSTA, KS 67010

(COUNTY)

BU CO EMERGENCY MANAGEMENT
JIM SCHMIDT (DIRECTOR)
AUGUSTA, KS 67010
316-733-9796 OFFICE
316-617-6875

(STATE)

KDHE BUREAU OF WATER
TOPEKA, KS 66612
785-296-5500
785-296-0614 (24 HOUR LINE)

KS RURAL WATER
JOHN STEELE
620-931-0394 CELL

KS DIVISION OF EMERGENCY MANAGEMENT
TOPEKA, KS 66611
785-274-1401
785-296-3176 (24 HOUR LINE)

KDHE SOUTH CENTRAL DISTRICT OFFICE
WICHITA, KS 67202
316-337-6020 OFFICE
~~316-729-0748 JOHN GOETZ~~

WATER DROUGHT/EMERGENCY ORDINANCE

Ordinance No. 147

Published in the Eldorado Times, March 8, 2001

An ordinance authorizing the declaration of a water watch, warning or emergency; establishing procedures and voluntary and mandatory conservation measures; authorizing the issuance of administrative regulations; and prescribing certain penalties.

Be it Ordained by the Governing Body of the City of Leon, KS.

Section 1. Purpose. The purpose of this ordinance is to provide for the declaration of a water supply watch, warning or emergency and the implementation of voluntary and mandatory water conservation measures throughout the city in the event such a watch, warning or emergency is declared.

Section 2. Definitions:

(a) "Water", as the term is used in this ordinance, shall mean water available to the City of Leon, KS for treatment by virtue of its water rights or any treated water introduced by the City into its water distribution system, including water offered for sale at any coin-operated site.

(b) "Customer", as the term is used in this ordinance, shall mean the customer of record using water for any purpose from the City's water distribution system and for which either a regular charge is made or, in the case of coin sales, a cash charge is made at the site of delivery.

(c) "Waste of water", as the term is used in this ordinance, includes, but is not limited to: (1) permitting water to escape down a gutter, ditch, or other surface drain; or (2) failure to repair a controllable leak of water due to defective plumbing.

(d) The following classes of uses of water are established:

Class 1:

Water used for outdoor watering; either public or private, for gardens, lawns, trees, shrubs, plants, parks, golf courses, playing fields, swimming pools or other recreational areas; or the washing of motor vehicles, boats, trailers, or the exterior of any building or structure.

Class 2:

Water used for any commercial or industrial, including agricultural, purposes: except water actually necessary to maintain the health and personal hygiene of bona fide employees while such employees are engaged in the performance of their duties at their place of employment.

Class 3:

Domestic usage, other than that which would be included in either classes 1 or 2.

Class 4:

Water necessary only to sustain human life and the lives of domestic pets and maintain standards of hygiene and sanitation.

Appendix - 1.

Maps of Source Water Assessment Area,
Source Water Protection Area,
and Water Well Drilling Logs

Section 3. Declaration of Water Watch. Whenever the governing body of the City finds that conditions indicate that the probability of a drought or some other condition causing a major water supply shortage is rising, it shall be empowered to declare, by resolution, that a water watch exists and that it shall take steps to inform the public and ask for voluntary reductions in water use. Such a watch shall be deemed to continue until it is declared by resolution of the governing body to have ended. The resolutions declaring the existence and end of a water watch shall be effective upon their publication in the official city newspaper.

Section 4. Declaration of Water Warning. Whenever the governing body of the City finds that drought conditions or some other condition causing a major water supply shortage are present and supplies are starting to decline, it shall be empowered to declare by resolution that a water warning exists and that it will recommend restrictions on nonessential uses during the period of warning. Such a warning shall be deemed to continue until it is declared by resolution of the governing body to have ended. The resolutions declaring the beginning and ending of the water warning shall be effective upon their publication in the official city newspaper.

Section 5. Declaration of Water Emergency. Whenever the governing body of the City finds that an emergency exists by reason of a shortage of water supply needed for essential uses, it shall be empowered to declare by resolution that a water supply emergency exists and that it will impose mandatory restrictions on water use during the period of the emergency. Such an emergency shall be deemed to continue until it is declared by resolution of the governing body to have ended. The resolutions declaring the existence and end of a water supply emergency shall be effective upon their publication in the official city newspaper.

Section 6. Voluntary Conservation Measures. Upon the declaration of a water watch or water warning as provided in Sections 3 and 4, the mayor (or the city manager) is authorized to call on all water consumers to employ voluntary water conservation measures to limit or eliminate nonessential water uses including, but not limited to, limitations on the following uses:

(a) Sprinkling of water on lawns, shrubs or trees (including golf courses).
(b) Washing of automobiles.
(c) Use of water in swimming pools, fountains and evaporative air conditioning systems.
(d) Waste of water.

Section 7. Mandatory Conservation Measures. Upon the declaration of a water supply emergency as provided in Section 5, the mayor (or the city manager) is also authorized to implement certain mandatory water conservation measures, including, but not limited to, the following:

(a) Suspension of new connections to the City's water distribution system, except connections of fire hydrants and those made pursuant to agreements entered into by the City prior to the effective date of the declaration of the emergency;
(b) Restrictions on the uses of water in one or more classes of water use, wholly or in part;
(c) Restrictions on the sales of water at coin-operated facilities or sites;
(d) The imposition of water rationing based on any reasonable formula including, but not limited to, the percentage of normal use and per capita or per consumer restrictions;
(e) Complete or partial bans on the waste of water; and
(f) Any combination of the foregoing measures.

Section 8. Emergency Water Rates. Upon the declaration of a water supply emergency as provided in Section 5, the governing body of the City shall have the power to adopt emergency water rates by ordinance designed to conserve water supplies. Such emergency rates may provide for, but are not limited to: (a) higher charges for increasing usage per unit of use (increasing block rates); (b) uniform charges for water usage per unit of use (uniform unit rate); or (c) extra charges in excess of a specified level of water use (excess demand surcharge).

Section 9. Regulations. During the effective period of any water supply emergency as provided for in Section 5, the mayor (or city manager or water superintendent) is empowered to promulgate such regulations as may be necessary to carry out the provisions of this ordinance, any water supply emergency resolution, or emergency water rate ordinance. Such regulations shall be subject to the approval of the governing body at its next regular or special meeting.

Section 10. Violations, Disconnections and Penalties.

(a) If the mayor, city manager, water superintendent, or other city official or officials charged with implementation and enforcement of this ordinance or a water supply emergency resolution learn of any violation of any water use restrictions imposed pursuant to Sections 7 or 9 of this ordinance, a written notice of the violation shall be affixed to the property where the violation occurred and the customer of record any other person known to the City who is responsible for the violation or its correction shall be provided with either actual or mailed notice. Said notice shall describe the violation and order that it be corrected, cured or abated immediately or within such specified time as the City determines is reasonable under the circumstances. If the order is not complied with, the City may terminate water service to the customer subject to the following procedures:

(1) The City shall give the customer notice by mail or actual notice that water service will be discontinued within a specified time due to the violation and that the customer will have the opportunity to appeal the termination by requesting a hearing scheduled before the City governing body or a city official designated as a hearing officer by the governing body;

(2) If such a hearing is requested by the customer charged with the violation, he or she shall be given a full opportunity to be heard before termination is ordered; and

(3) The governing body or hearing officer shall make findings of fact and order whether service should continue or be terminated.

(b) A fee of $50 shall be paid for the reconnection of any water service terminated pursuant to subsection (a). In the event of subsequent violations, the reconnection fee shall be $200 for the second reconnection and $300 for any additional reconnections.

(c) Violations of this ordinance shall be a municipal offense and may be prosecuted in Municipal Court. Any person so charged and found guilty in Municipal court of violating the provisions of this ordinance shall be guilty of a municipal offense. Each day=s violation shall constitute a separate offense. The penalty for an initial violation shall be a mandatory fine of $100. In addition, such customer may be required by the Court to serve a definite term of confinement in the city or county jail which shall be fixed by the Court and which shall not exceed 30 days. The penalty for a second or subsequent conviction shall be a mandatory fine of $200. In addition, such customer shall serve a definite term of confinement in the city or county jail which shall be fixed by the Court and which shall not exceed 30 days.

Section 11. Emergency Termination. Nothing in this ordinance shall limit the ability of any properly authorized city official from terminating the supply of water to any or all customers upon the determination of such city official that emergency termination of water service is required to protect the health and safety of the public.

Section 12. Severability. If any provision of this ordinance is declared unconstitutional, or the application thereof to any person or circumstance is held invalid, the constitutionality of the remainder of the ordinance and its applicability to other persons and circumstances shall not be affected thereby.

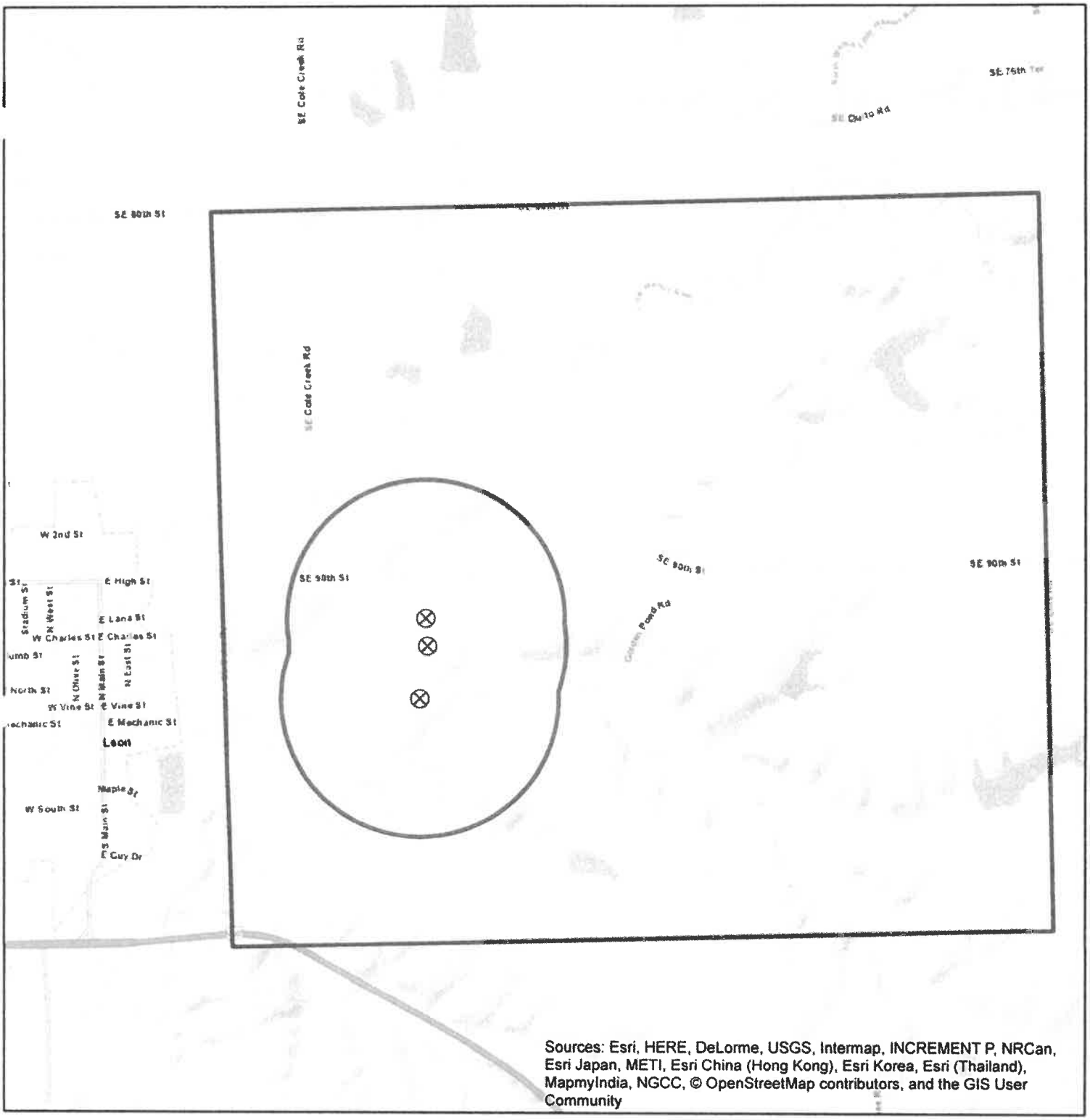
Section 13. This ordinance shall become effective upon its publication in the official city newspaper.

Passed by the governing body this 5th day of March, 2001

Marvin W Beaumont
(Mayor's Signature)

ATTEST:

Jan Long
(City Clerk's Signature)



N

0 0.5 1 Miles

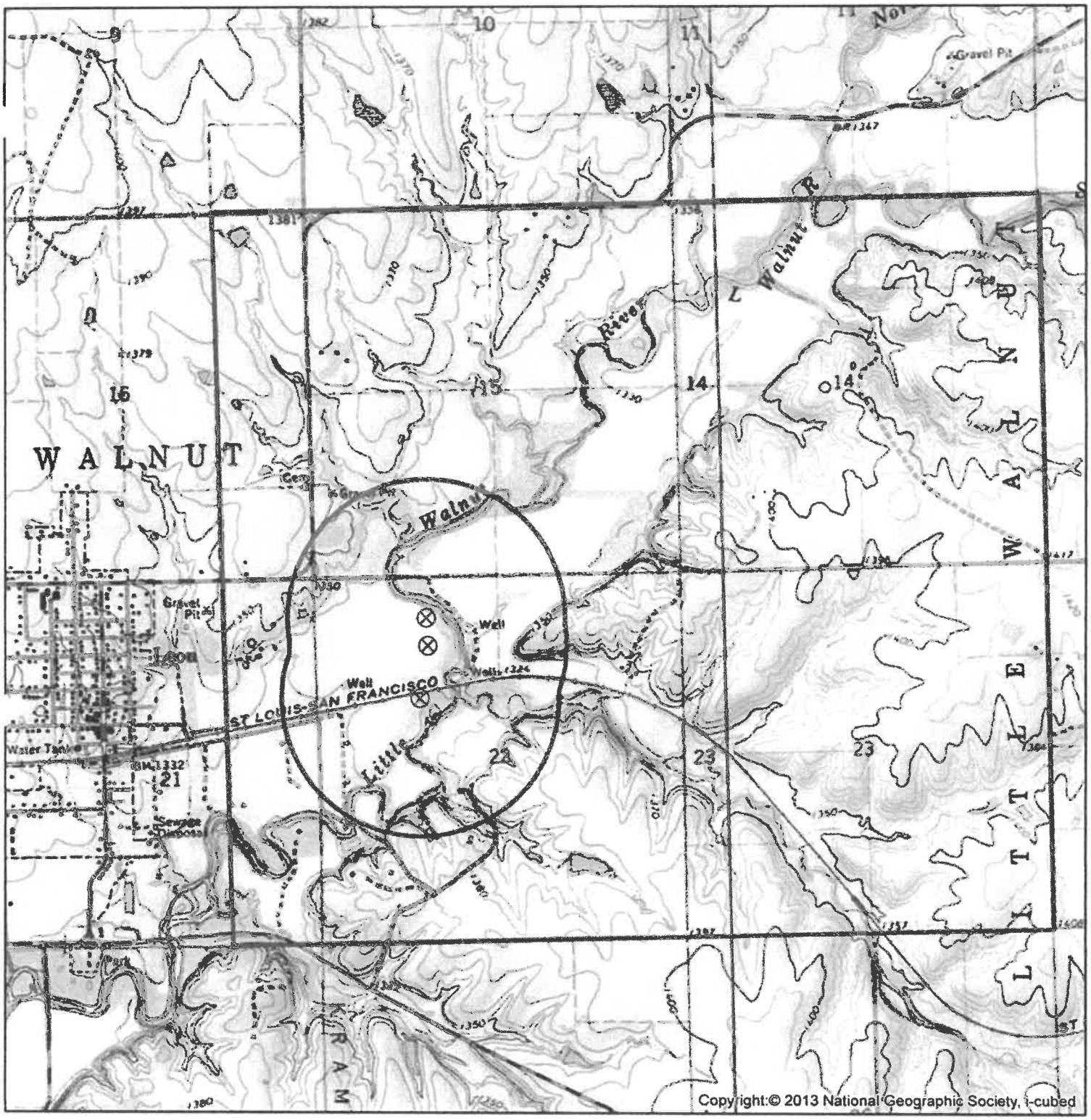
Legend

- ⊗ City Wells
- Zone B
- Zone C

City of Leon, Butler County, Kansas

Locations of currently authorized wells.and protection areas.

Map prepared by Kenneth A. Kopp, P.G., Kansas Rural Water Association, July 21, 2022. .



0 0.5 1 Miles

N

Legend

- ⊗ City Wells
- Zone B
- Zone C

City of Leon, Butler County, Kansas

Locations of currently authorized wells.and protection areas.

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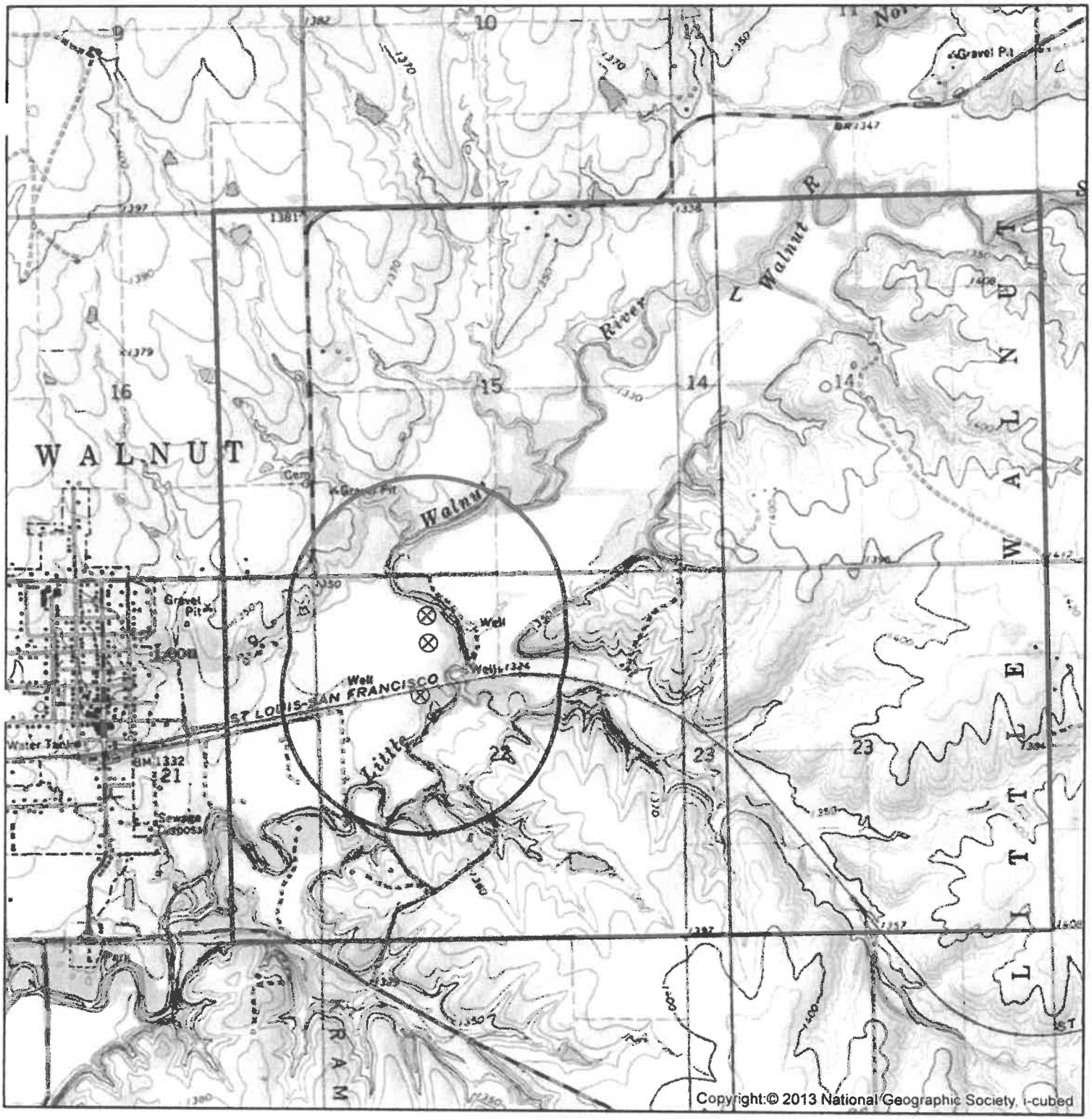


0 0.5 1 Miles

N

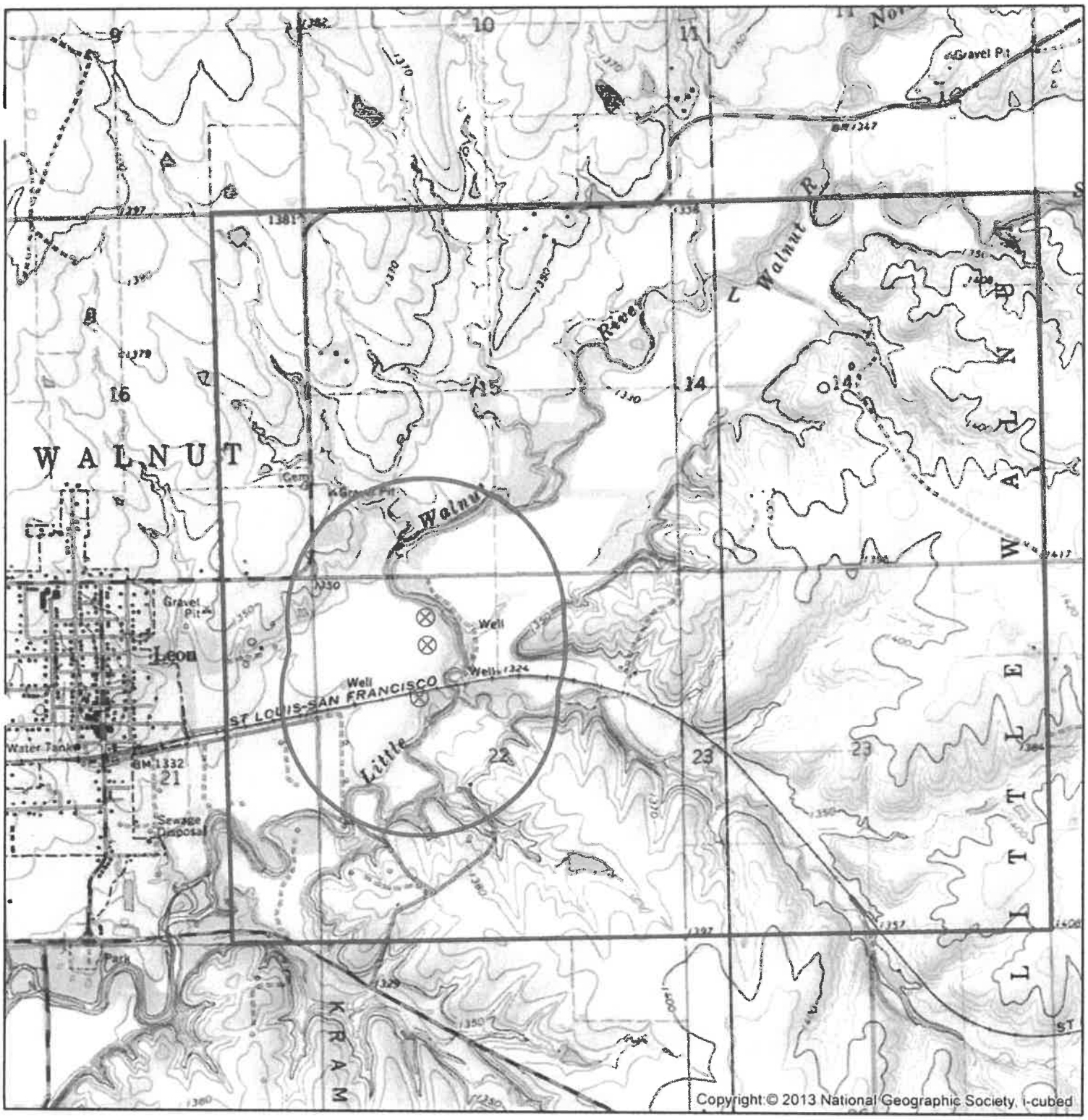
Legend

- ⊗ City Wells
- Zone B
- Zone C

City of Leon, Butler County, Kansas

Locations of currently authorized wells.and source water protection areas.

Map prepared by Kenneth A. Kopp, P.G., Kansas Rural Water Association, July 21, 2022. .



0 0.5 1 Miles

N

Legend

- ⊗ City Wells
- Zone B
- Zone C

City of Leon, Butler County, Kansas

Locations of currently authorized wells.and source water protection areas.

Map prepared by Kenneth A. Kopp, P.G., Kansas Rural Water Association, July 21, 2022. .

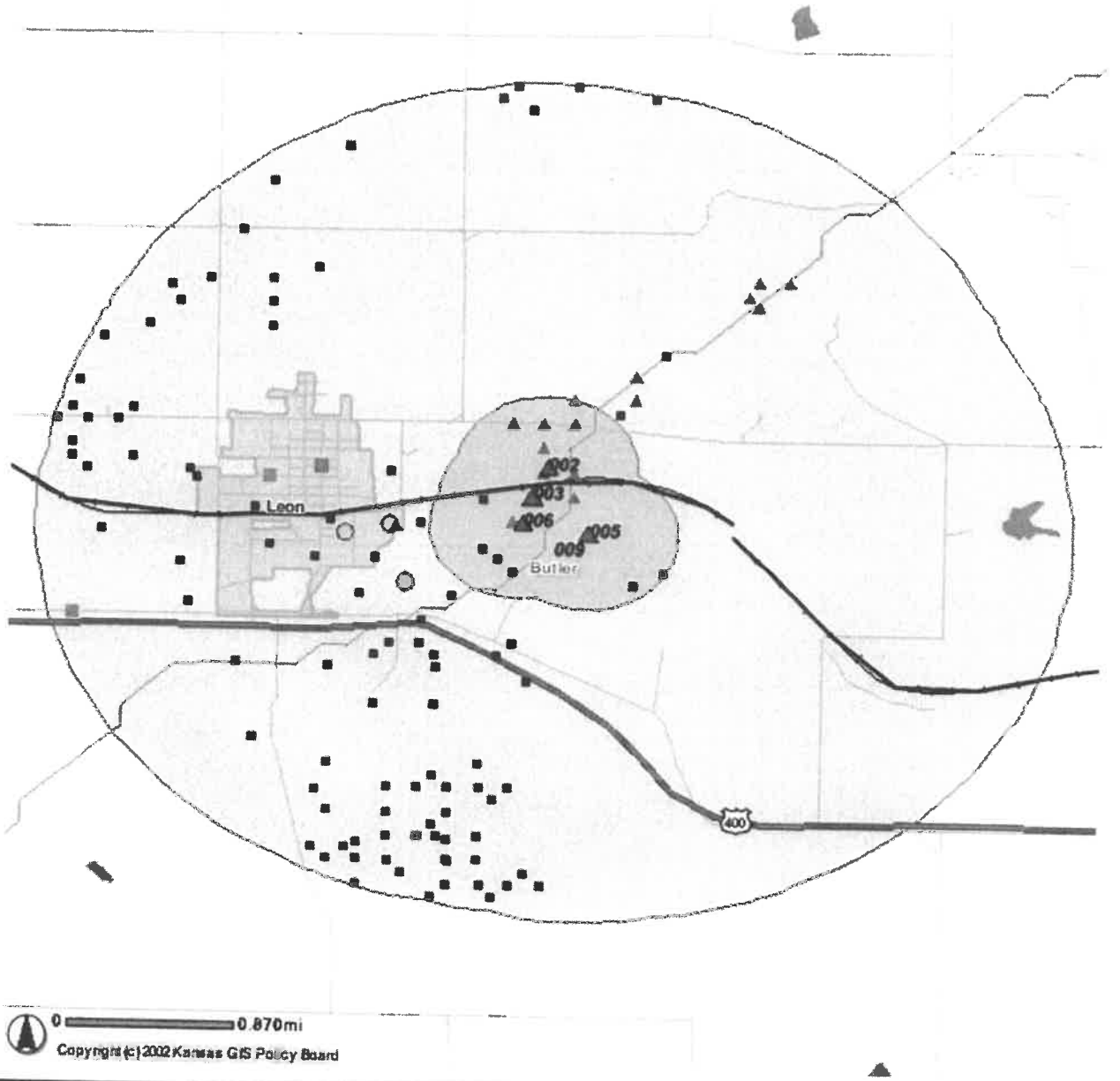
Source Water Assessment Report – Map

Public Water Supply (PWS):	**LEON, CITY OF**
Assessment Area (AA):	**4**
Well/Intake ID's:	003, 006, 009, 002, 005
Assessment Area Report Date:	March 3, 2003
Assessment Area Report Status:	Final

Section Description:
The Map section shows the entire assessment area, water supplies, potential sources of contamination, and other basemap data for locational reference. The map is only intended to give a broad overview for concentrations of potential contaminating sites in the assessment area. Due to the scale of the map, clusters could appear larger than they are from an actual perspective. It should not be used for anything other than what is specified in this report.

Source Water Assessment Report – Map

Public Water Supply: **LEON, CITY OF**
Assessment Area: **4**
Map of the Assessment Area.



Previous Report Section Return to beginning of Step 7 Next Report Section

USE TYPEWRITER OR BALL POINT PEN–PRESS FIRMLY, PRINT CLEARLY.

WATER WELL RECORD
KSA 82a-1201-1215

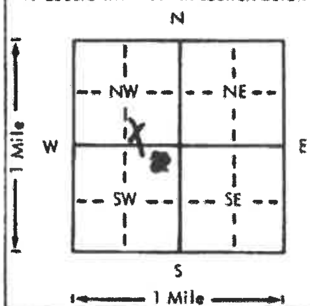
Kansas Department of Health and Environment–Division of Environment (Water well Contractors) Topeka, Kansas 66620

1. Location of well:	County: Butler	Fraction: SW 1/4 SE 1/4 NW 1/4	Section number: 22	Township number: T 27 S	Range number: R 6 E/W

2. Distance and direction from nearest town or city: East in Leon 1 milex next to RR track
Street address of well location if in city:

3. Owner of well: City of Leon Test #5
R.R. or street:
City, state, zip code: Leon, Kansas 67074

4. Locate with "X" in section below: Sketch map:



6. Bore hole dia. 20 in. Completion date 10-19-80
Well depth 100 ft.

7. X Cable tool __ Rotary __ Driven __ Dug __ Hollow rod __ Jetted __ Bored __ Reverse rotary

8. Use: __ Domestic X Public supply __ Industry __ Irrigation __ Air conditioning __ Stock __ Lawn __ Oil field water __ Other

9. Casing: Material steel Height: Above or below Surface City will install in.
Threaded ____ Welded ____ RMP ____ PVC ____ Weight ____ lbs./ft.
Dia. 16 in. to 25 ft. depth Wall Thickness: inches or gage No. 3/8 St. approved well head
Dia. ___ in. to ___ ft. depth

5. Type and color of material	From	To
Soil and clay	0	18
Gravel (possible water	18	23
Shale-green (possible water	23	25
Lime-white	25	28
Shale-blue	28	33
Lime-blue	33	37
Shale-blue	37	48
Shale-gray	48	57
Redbed (water on top of this)	57	71
Shalegreen & lime	71	79
Shale-gray	79	85
Shale-blue	85	100

(Use a second sheet if needed)

10. Screen: Manufacturer's name Abraham, Plummer, & Brown
Type Slots Dia. 16"
Slot/gauze ½ Length 5
Set between 18 ft. and 25 ft.
____ ft. and ____ ft.
Gravel pack? X Size range of material 3/4

11. Static water level: 25 ft. below land surface Date 10-18-80 mo./day/yr.

12. Pumping level below land surfaces: Comp. Draw Dn.
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.
Estimated maximum yield 1200 gph g.p.m.

13. Water sample submitted: __ Yes X No Date ____ mo./day/yr.

14. Well head completion: __ Pitless adapter ____ Inches above grade

15. Well grouted? yes
With: X Neat cement __ Bentonite __ Concrete
Depth: From 3 ft. to 18 ft.

16. Nearest source of possible contamination: ft. 1500 Direction SW Type Tank batter
Well disinfected upon completion? X Yes __ No

17. Pump: X Not installed
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. capacity ____ g.p.m.
Type: __ Submersible __ Turbine __ Jet __ Reciprocating __ Centrifugal __ Other

18. Elevation:
Topography: __ Hill __ Slope __ Upland X Valley

19. Remarks: #9 Section will determine the amount of casing

20. Water well contractor's certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Abraham, Plummer, & Brown 181A
Business name License No.
Address Leon, Kansas 67074
Signed Jay Abraham Authorized representative Date 11-?

T 27 – R 6W Sec 22 SW SE NW 1/4 1/4 1/4

Forward the white, blue and pink copies to the Department of Health and Environment

Form WWC-5

MI-1023

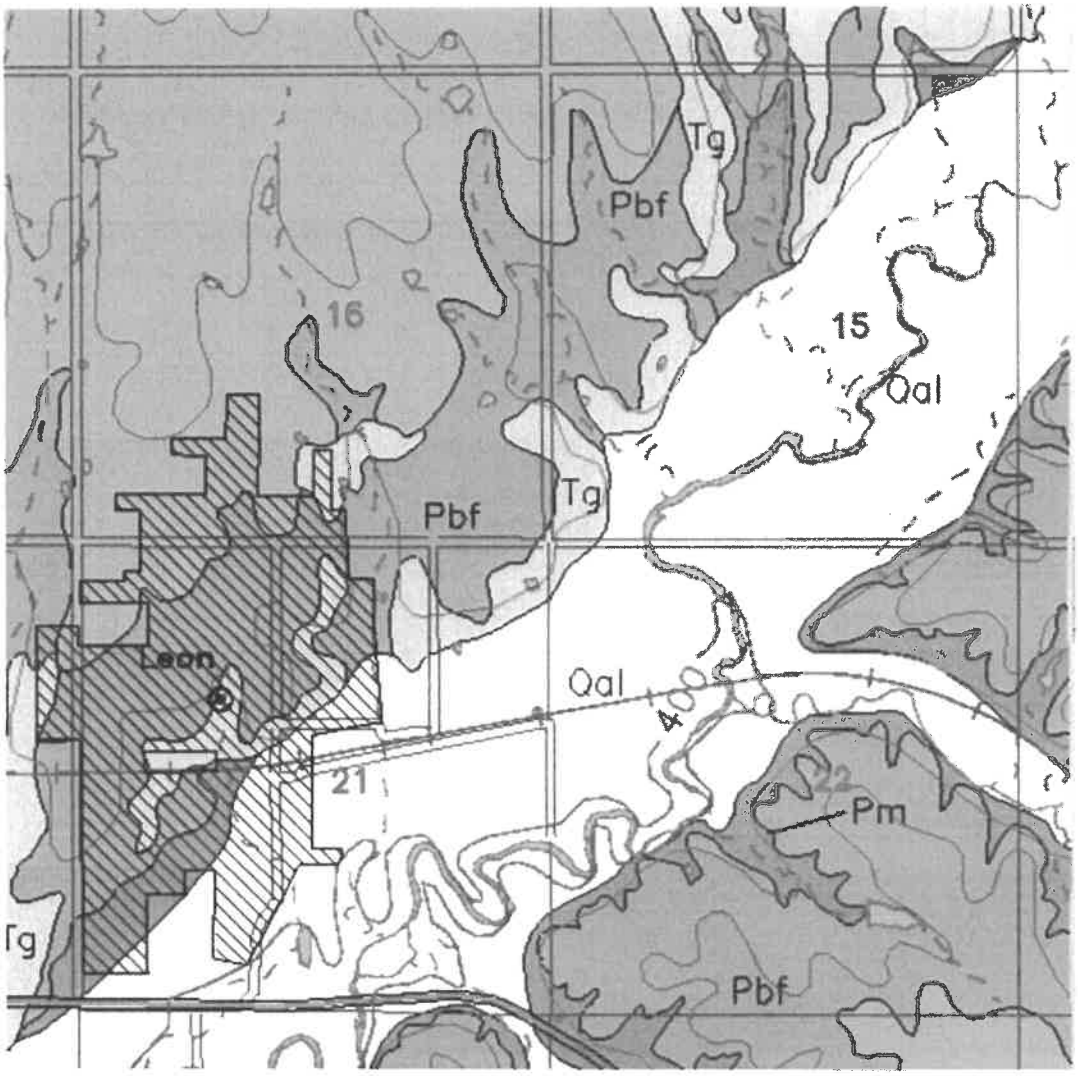
KGS Geology

Butler County
T. 27 S., R. 6 E.

Map Index

Zoom Out

N W E S



Quaternary
- Ql Loess
- Qt Terrace
- Qal Alluvium

Tertiary
- Tg Chert Gravels

Permian

Sumner Group
- Pwe Wellington Fm
- Hollenberg Ls

Chase Group
- Pn Nolans Ls
- Pwi Winfield Ls
- Pbd Doyle Sh
- Pbf Barneston Ls
- Pm Matfield Sh
- Pwr Wreford Ls

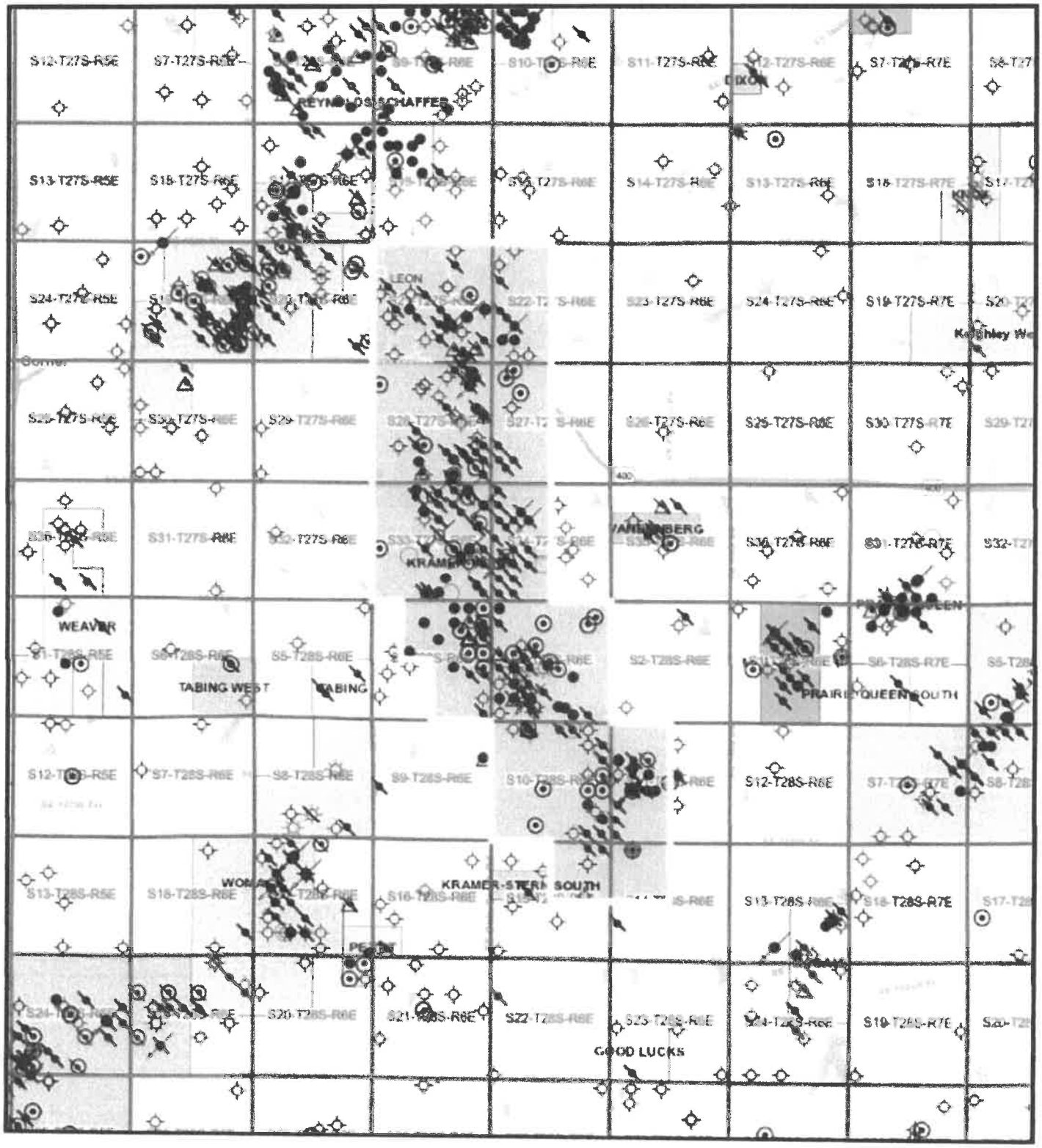
Council Grove Group
- Pf Speiser Sh, Funston Ls
- Pc Blue Rapids Sh, Crouse Ls
- Pbe Easly Creek Sh, Bader Ls, Stearns Sh, Beattie Sh
- Pe Eskridge Sh, Neva Ls

Pennsylvanian

Admire Group
- IPg Grenola Ls, Roca Sh, Red Eagle Ls

Automated Cartography Unit, Kansas Geological Survey
Updated September 2000
Comments to webadmin@kgs.ku.edu

Map of the Kramer-Stern Oilfield



Appendix - 2.

Contaminant Source Inventory

Kansas Wellhead Protection Planning
Contaminant Source Inventory

Worksheet for Conducting Initial Inventory

Name of Public Water Supply: City of Leon
Water Supply Diversion Point: City Wellfield
Inventory Prepared by: Kenneth A. Kopp, P.G.
Date Inventory Completed: June 13, 2022

Code	Description	Present	Comments
2891	Adhesives and Sealants Manufacturing		
3724	Aircraft Engines and Parts Manufacturing		
3728	Aircraft Equipment Manufacturing		
3721	Aircraft--manufacturing		
4583	Airport Terminal Services--pasengers service		
4582	Airports and Flying Fields--operation & maintenance		
E	Alfalfa Field		
3353	Aluminum Sheet, Plate, and Foil Manufacturing		
7999	Amusement and Recreation Area		
2077	Animal and Marine Fats and Oils Manufacturing		
M	Animal Feeding Operation		
6513	Apartment Building		
2952	Asphalt Felts and Coatings Manufacturing		
2951	Asphalt Pavement Production		
7531*	Auto Body Repair & Paint Service		
AA	Auto Race Track		
7538	Auto Truck Repair Service		
2052	Bakery Products Manufacturing		
3312	Blast Furnaces and Steel Mills Manufacturing		
3732	Boat Building and Repairing Shop Manufacturing		
8421	Botanical Gardens		
2086	Bottled and Canned Soft Drinks Production		
3251	Brick and Structural Clay Tile Manufacturing		
1622	Bridge Construction		
3991	Brooms and Brushes Manufacturing		
4171	Bus Terminal Facilities		
7033	Camp Ground		
7542	Car Wash		
2895	Carbon Black Manufacturing		
3592	Carburetors, Pistons, Rings, Valves Manufacturing		
3672	Cathode Ray Television Picture Tubes Manufacturing		
211	Cattle Farm		
212	Cattle Working Area		
3241	Cement, Hydraulic Manufacturing		
6553	Cemetery	X	Zones C
2812	Chemical Manufacturing--Alkalies and Chlorine		
2899	Chemical Preparations Manufacturing		
5261	Christmas Tree Farm		
8661	Church		
8221	College or University		
4939	Combination Utility Services, nec		
6611	Combined Real Estate, Insurance, etc		
3646	Commercial Lighting Fixtures Manufacturing		
2754	Commercial Printing, Gravure Manufacturing		
3272	Concrete Products Manufacturing		
2023	Condensed and Evaporated Milk Manufacturing		

Kansas Wellhead Protection Planning
Contaminant Source Inventory

Worksheet for Conducting Initial Inventory

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Water Supply Diversion Point: City Wellfield
Inventory Prepared by: Kenneth A. Kopp, P.G.
Date Inventory Completed: June 13, 2022

Code	Description	Present	Comments
5082	Construction and Mining Machinery		
1795	Construction Demolition Landfill		
A	Construction Equipment Dealer		
3531	Construction Machinery Manufacturing		
U	Construction Materials Stock Pile		
BB	Construction Project Temporary-Equipment Storage/Staging		
3535	Conveyors and Conveying Equipment Manufacturing		
3351	Copper Rolling and Drawing Manufacturing		
115	Corn Field	X	Zones A, B and C
2653	Corrugated and Solid Fiber Boxes Manufacturing		
723	Crop Preparation Services for Market		
BC	CRP Grasland		
3643	Current-carrying Wiring Devices Manufacturing		
3087	Custom Compound Purchased Resins Manufacturing		
AC	Dairy Farm		
2026	Dairy Products Manufacturing & Procesing		
AD	Dog Kennel		
AE	Dog Race Track		
2047	Dog, Cat, and Other Pet Food Manufacturing		
2591	Drapery Hardware & Blinds & Shades Manufacturing		
1381	Drilling Oil and Gas Wells		
0	Drinking Water Treatment	X	Zones C
7216	Dry Cleaner		
6732	Education or Religious Institution		
3641	Electric Lamps Manufacturing		
AF	Electric Power Lines	X	Zones A, B and C
1692	Electric Power Plant		
4931	Electric Services		
AG	Electric Transformer Substation	X	Zones C
3534	Elevators and Moving Stairways Manufacturing		
3694	Engine Electrical Equipment Manufacturing		
2892	Explosives Manufacturing		
843	Extraction of Pine Gum		
3499	Fabricated Metal Products Manufacturing		
3443	Fabricated Plate Work (boiler shops) Manufacturing		
BD	Fair Ground		
BK	Farm Equipment Sales or Service		
3523	Farm Machinery and Equipment Manufacturing		
5191	Farm Supply Retail		
AH	Farmstead	X	Zones B and C
AI	Feed Mill		
2875	Fertilizer Storage		
2875	Fertilizers, Mixing Manufacturing		
2261	Finishing Plants, Cotton Manufacturing		
2041	Flour Mill Other Food Grain Milling		
3593	Fluid Power Cylinders & Actuators Manufacturing		

Kansas Wellhead Protection Planning
Contaminant Source Inventory
Worksheet for Conducting Initial Inventory

Name of Public Water Supply: City of Leon
Water Supply Diversion Point: City Wellfield
Inventory Prepared by: Kenneth A. Kopp, P.G.
Date Inventory Completed: June 13, 2022

Code	Description	Present	Comments
3824	Fluids Meters and Counting Devices Manufacturing		
821	Forest Nurseries and Seed Gathering		
851	Forestry Services		
2038	Frozen Specialties Manufacturing		
AZ	Fuel Storage Tanks	x	Zones C (AGL/Agriculture)
7261	Funeral Service and Crematories		
2599	Furniture and Fixtures Manufacturing		
4932	Gas and Other Services Combined		
3053	Gaskets, Packing and Sealing Devices Manufacturing		
5541	Gasoline Service Station		
849	Gathering of Forest Products, nec		
7992	Golf Course		
9100	Government Office Building		
CE	Grain Elevator		
BE	Gravel Dredge		
BG	Gravel Pit		
BF	Gravel Road	x	Zones B and C
3321	Gray Iron Foundry		
BH	Grazing Livestock	x	Zones B and C
3423	Hand and Edge Tools Manufacturing		
3429	Hardware Manufacturing		
5070	Hardware, Plumbing & Heating Equipment Wholesale Trade		
2426	Hardwood Dimension and Flooring Manufacturing		
CL	Health Services--hospitals, nursing and personal care		
G	Health Services--Office of physicians, dentists, optometrists		
1611	Highway and Street Construction		
AR	Highway Maintenance Facility		
BI	Highway Materials Storage Area		
BJ	Highway Rest Area		
Q	Historic Waste Dumps/Landfills		
V	Home & Horticultural Weed & Insect Control		
AJ	Horse Race Track		
8060	Hospital		
7010	Hotel & Motel		
AK	House (Non-farm Residence)	x	Zones C
3630	Household Appliances Manufacturing		
2519	Household Furniture Manufacturing		
Z	Household Hazardous Waste Collection Center		
2024	Ice Cream and Frozen Deserts Manufacturing		
AY	Incinerator		
2813	Industrial Gases Manufacturing		
2819	Industrial Inorganic Chemicals Manufacturing		
2869	Industrial Organic Chemicals Manufacturing		
3537	Industrial Trucks and Tractors Manufacturing		
CB	Injection Well		
2816	Inorganic Pigments Manufacturing		

Kansas Wellhead Protection Planning
Contaminant Source Inventory
Worksheet for Conducting Initial Inventory

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Date Inventory Completed: June 13, 2022

Code	Description	Present	Comments
BL	Interstate Highway	x	Zones C
4971	Irrigation Systems		
	Irrigation Well		
CF	Junk Yard		
Y	Lagoons & Liquid Waste		
W	Landfills/Dumps		
C	Landscape Fungus & Weeds		
B	Landscape Insects		
7210	Laundry, Self Service		
T	Lawn & Turf	x	Zones C
3524	Lawn and Garden Equipment Manufacturing		
4110	Local and Suburban Transportation		
4212	Local Trucking, without storage		
2411	Logging Camps & Logging Contractors Manufacturing		
2992	Lubricating Oils and Greases Manufacturing		
5030	Lumber and Construction Materials		
3599	Machinery, Except Electrical Manufacturing		
3999	Manufacturing Industries, nec		
4463	Marine		
2515	Mattreses and Bedsprings Manufacturing		
2011	Meat Packing Plant Manufacturing		
3412	Metal Barrels, Drums, and Pails Manufacturing		
3479	Metal Coating and Allied Services Manufacturing		
3442	Metal Doors, Sash, and Trim Manufacturing		
3497	Metal Foil and Leaf Manufacturing		
2514	Metal Household Furniture Manufacturing		
1000	Metal Mining Industry		
2522	Metal Office Furniture Manufacturing		
2542	Metal Partitions and Fixtures Manufacturing		
3469	Metal Stampings Manufacturing		
9711	Military Base Office Building		
BM	Milo Field	x	Zones A, B and C
3296	Mineral Wool Manufacturing		
1400	Mining Industry--Non-Fuel, and Non-Metal		
5719	Miscellaneous Home Furnishings Stores		
3449	Miscellaneous Metal Work Manufacturing		
3079	Miscellaneous Plastics Products Manufacturing		
5999	Miscellaneous Retail Stores, nec		
2451	Mobile Home Manufacturing		
6515	Mobile Home Park		
3714	Motor Vehicle Parts and Accesories Manufacturing		
3711	Motor Vehicles and Car Bodies Manufacturing		
3751	Motorcycles, Bicycles, and Parts Manufacturing		
3621	Motors and Generators Manufacturing		
AU	Municipal Sewage Treatment Plant-Lagoon		
AT	Municipal Sewage Treatment Plant-Mechanical		

Kansas Wellhead Protection Planning
Contaminant Source Inventory
Worksheet for Conducting Initial Inventory

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Date Inventory Completed: June 13, 2022

Code	Description	Present	Comments
8411	Museums and Art Galleries		
BN	Native Gras Land (not CRP)	X	Zones A, B and C
BO	Nature Center		
2873	Nitrogen Fertilizer Manufacturing		
3644	Noncurrent-carrying Wiring devices Manufacturing		
3357	Nonferrous Wire Drawing & Insulating Manufacturing		
3299	Nonmetallic Mineral Products Manufacturing		
I	Nonmetallic Minerals--crushed limestone, fire clay		
CK	Nonmetallic Minerals--industrial sand		
1542	Nonresidential Construction		
1389	Oil and Gas Field Services		
1389	Oil or Gas Well	X	Zones C
AS	Orchard		
2860	Organic Chemical Industry		
7535*	Paint Shops		
2851	Paints and Allied Products Manufacturing		
P	Paper and Allied Products-- pulp, board, & building paper		
CI	Paper and Allied Products--envelopes & bags products		
CJ	Paper and Allied Products--paperboard, containers, and boxes		
2951	Paving Mixtures and Blocks Manufacturing		
BP	Pesticide Application Equipment Storage	X	Zones C
2879	Pesticides & Agricultural Chemicals Manufacturing		
S	Pet (Cat, Dog) Insect Control		
2999	Petroleum and Coal Products Manufacturing		
5171	Petroleum Bulk Stations & Terminals (Truck Farm)		
2911	Petroleum Refining		
2834	Pharmaceutical Preparations Manufacturing		
7384	Photofinishing Laboratory		
4789	Pipeline Terminal		
4600	Pipeline (Petroleum, Chemical, etc)		
3086	Plastics Foam Products Manufacturing		
2821	Plastics Materials and Resins Manufacturing		
3088	Plastics Plumbing Fixtures Manufacturing		
3089	Plastics Products Manufacturing		
3471	Plating and Polishing Manufacturing		
2842	Polishes and Sanitation Goods Manufacturing		
BQ	Pond	X	Zones B and C
2452	Prefabricated Wood Buildings Manufacturing		
2048	Prepared Feeds Manufacturing		
3399	Primary Metal Products Manufacturing		
H	Printing and Publishing-- newspapers, books, greeting cards		
CM	Printing and Publishing-- photograving, & commercial printing		
2893	Printing Ink Manufacturing		
9223	Prison or Correctional Institution		
2531	Public Building & Related Furniture Manufacturing		
4220	Public Warehouse		

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Code	Description	Present	Comments
3561	Pumps and Pumping Equipment Manufacturing		
3743	Railroad Equipment Manufacturing		
AM	Railroad Track	x	Zones C (Historic)
AN	Railroad Yard		
F	Range & Pasture	x	Zones B and C
3272	Ready-mix Concrete Plant		
7033	Recreational Vehicle Camp		
BS	Recreational Vehicle Sales; Repair		
3585	Refrigeration and Heating Equipment Manufacturing		
4953	Refuse Systems		
7391	Research & Development Laboratory		
8512	Restaurant		
5261	Retail Nursery or Garden Store		
CH	Retail Operations--accesory, furniture stores		
CG	Retail Operations--building material & garden supply		
K	Retail Operation--- food, automotive dealers, merchandise		
BT	Retirement Housing Center		
7641	Reupholstery and Furniture Repair		
BU	Riparian Land	x	Zones B and C (Little Walnut River)
4441	River	x	Zones B and C (Little Walnut River)
BV	Road salt Storage		
1429	Rock Quarry		
3052	Rubber & plastics hose & belting Manufacturing		
N	Rural Homestead	x	Zones C
AO	Salvage Yard		
4952	Sanitary Sewer		
2013	Sausages and Other Prepared Meats Manufacturing		
8211	School		
5093	Scrap and Waste Materials		
3451	Screw Machine Products Manufacturing		
3340	Secondary Nonferrous Metals Manufacturing		
N	Septic Tank- Lateral Field	x	Zones C
4952	Sewer Pump Station		
4952	Sewerage Systems		
3444	Sheet Metal Work Manufacturing		
BW	Shooting Range		
CC	Shopping Center		
3993	Signs and Advertising Display Manufacturing		
1521	Single-family Housing Construction		
2841	Soap and Other Detergent Manufacturing		
AV	Solid Waste--landfill		
AW	Solid Waste--Transfer Station		
D	Sorghum	x	Zones A, B and C
2075	Soybean Oil Mills Manufacturing		

Kansas Wellhead Protection Planning
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Code	Description	Present	Comments
116	Soybeans	x	Zones A, B and C
3559	Special Industries Machinery Manufacturing		
4226	Special Warehousing and Storage		
3566	Speed Changers, Drives and Gears Manufacturing		
BX	State Park		
3325	Steel Foundry		
3317	Steel Pipe and Tubes Manufacturing		
3691	Storage Batteries Manufacturing		
2439	Structural Wood Members Manufacturing		
6552	Suburban Housing Development		
X	Sunflower Field		
3841	Surgical and Medical Instruments Manufacturing		
3842	Surgical Appliances and Supplies Manufacturing		
3613	Switchgear and Switchboard Apparatus Manufacturing		
4013	Switching and Terminal Services		
3795	Tanks and Tank Components Manufacturing		
AP	Telephone Lines	x	Zones B and C
3011	Tires and Inner Tubes Manufacturing		
6541	Title Abstract Offices		
7531*	Top and Body Repair Shops		
3612	Transformers Manufacturing		
3799	Transportation Equipment Manufacturing		
3792	Travel Trailers and Campers Manufacturing		
3713	Truck and Bus Bodies Manufacturing		
3715	Truck Trailers Manufacturing		
BY	Truck Wash		
4230	Trucking Terminal Facilities		
CD	Underground Storage Tanks		
2512	Upholstered Household Furniture Manufacturing		
9532	Urban and Community Development		
AX	Urbanized Area		
7519	Utility Trailer Rental		
3494	Valves and Pipe Fittings Manufacturing		
R	Vegetable Farm		
2076	Vegetable Oil Mills Manufacturing		
741	Veterinary Services, Farm Livestock		
742	Veterinary Services, Specialties		
4221	Warehouse		
4952	Waste Water Treatment Plant		
4941	Water Supply	x	Zones B and C (RWD 6 Butler Co.)
2231	Weaving and Finishing Mills, Wool Manufacturing		
AQ	Weed Control-vegetables		
3548	Welding Apparatus Manufacturing		
BA	Wells	x	Zones C (Domestic)
2046	Wet Corn Milling Manufacturing		

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Code	Description	Present	Comments
BZ	Wetland	X	Zones B and C
111	Wheat Field	X	Zones A, B and C
L	Wholesale Distribution Activities--Durable & Nondurable goods		
2449	Wood Containers Manufacturing		
2511	Wood Household Furniture Manufacturing		
2434	Wood Kitchen Cabinets Manufacturing		
2521	Wood Office Furniture Manufacturing		
2448	Wood Pallets and Skids Manufacturing		
2541	Wood Partitions and Fixtures Manufacturing		
2491	Wood Preserving & Treating		
2517	Wood TV and Radio Cabinets Manufacturing		
1795	Wrecking and Demolition Work		
CA	Zoo		
Other			

Appendix - 3.

Recommended Water Quality Protection Measures

Index of Recommended Water Quality Protection Measures

Less Developed Rural Land
1. Forest Land
2. Wetland

Land Cover and Crop
3. Land Cover & Crop (dryland)
4. Land Cover & Crop (irrigated)
5. Pasture (Tame & Range)
6. Conservation Reserve Program (CRP)
7. Irrigation Well Pump Site
8. Chemigation System
9. Tail Water Pit

Livestock
10. Dairy- Drylot
11. Dairy- Pasture
12. Dog Kennel
13. Cattle- Feedlot
14. Cattle- Pasture
15. Hog- Feedlot
16. Hog- Barn
17. Horses- Pasture
18. Horses- Barn
19. Poultry- Barn
20. Sheep- Pasture

Farmstead and Household
21. Abandoned Water Well
22. Farmstead Equipment Maintenance
23. Farmstead Feed Mill
24. Farmstead Feed and Hay Storage
25. Farmstead Fertilizer Storage
26. Farmstead Fuel Storage
27. Farmstead Grain Storage
28. Household Wastewater (septic tank, lateral field)
29. Household Wastewater (lagoon)
30. Household Wastewater (city sewer)
31. Landscape Maintenance
32. Farmstead and Temporary Livestock Confinement
33. Animals (pets)
34. Farmstead Pesticide Storage
35. Farmstead Silage
36. Solid Waste Storage
37. Water Well in Use
38. Abandoned Farmstead

Transportation and Utilities
39. Railroad Tracks
40. State/Federal Highway
41. City Streets (paved and gravel)
42. County & Township Roads (paved and gravel)
43. Electrical Substation and Power Lines

Pipelines and Pump Stations
44. Pump Station- Raw surface water
45. Pump Station- Petroleum
46. Pump Station- Sewer
47. Natural Gas Pipelines
48. Petroleum Pipelines (crude)
49. Petroleum Pipelines (refined product)
50. Sewer Lines

Airports
51. Airport Fuel Storage
52. Airport Pesticide Applicator
53. Airport Maintenance Areas
54. Airport- Onsite Sanitary Wastewater

Recreation Area
55. Fair Ground
56. City Park
57. Camping Area (primitive)
58. Camping Area (modern)
59. Golf Course
60. Gun Club
61. Sports Complex

Municipal Waste Treatment
62. Municipal Wastewater: Lagoon
63. Municipal Wastewater: Mechanical
64. Wastewater: Land Application
65. Wastewater: Biosolids Storage
66. Wastewater: Biosolids Application
67. Injection Well
68. Sanitary Landfill
69. Composting
70. Abandoned Dump
71. Solid Waste Transfer Station

Recommended Water Quality Protection Measures (Continued)

Institutions and Businesses

72. Cemetery
73. Church
74. Hospital
75. Motel/Hotel
76. Nursing Home
77. Prison
78. Restaurant
79. School
80. Agricultural Center- Onsite Sanitary Wastewater
81. Agricultural Center- Water Well in Use
82. Agricultural Center Fuel Sales
83. Agricultural Center Equipment Repair
84. Agricultural Center Fertilizer Sales
85. Agricultural Center Fertilizer Application Service
86. Agricultural Center Pesticide Sales
87. Agricultural Center Pesticide Application Service
88. Agricultural Center Feed Mill
89. Agricultural Center Grain Elevator
90. Farm Equipment Dealer- Onsite Wastewater
91. Farm Equipment Dealer- Water Well in Use
92. Farm Equipment Dealer- Fuel Storage & Sales
93. Custom Packing Plant
94. Sale Barn
95. Seed Processor
96. Truck Wash
97. Veterinary Clinic
98. Auto Repair Shop
99. Beauty Shop
100. Car Wash
101. Dry Cleaner
102. Fuel Service Station
103. Funeral Home
104. Hardware Store
105. Photography/Print Shop
106. Small Engine Repair
107. Welding Shop

Industrial

108. Food Processor
109. Pharmaceutical Plant
110. Meat Processor
111. Metal Fabrication
112. Metal Plater
113. Petro-Chemical Refinery
114. Research Laboratory
115. Salvage/Recycler
116. Industrial Facility- Onsite Sanitary Wastewater
117. Industrial Facility- Water Well in Use

Mineral Extraction

118. Coal Mine
119. Oil or Gas Well
120. Rock Quarry
121. Geophysical Exploration Test Holes
122. Mineral Extraction- Onsite Sanitary Wastewater
123. Mineral Extraction- Water Well in Use

Recommended Water Quality Protection Measures

1. Forest Land
When possible leave in undisturbed state. Maintain good woodland conditions. Avoid or minimize woodland grazing. Control gully erosion. Use pesticides carefully.

2. Wetland
When possible leave in undisturbed state. Maintain in good wetlands condition. Avoid or minimize wetlands grazing. Use pesticides carefully.

3. Land Cover & Crop (dryland)
Follow Kansas Catalog of NPS Pollution Control Practices for Cropland Production - Nutrient Management and Pesticide Application.

4. Land Cover & Crop (irrigated)
Follow Kansas Catalog of NPS Pollution Control Practices for Cropland Production - Nutrient Management and Pesticide Application. Use only the amount of water the crop needs.

5. Pasture (Tame & Range)
Follow Kansas Catalog of NPS Pollution Control Practices for Cropland Production - Nutrient Management and Pesticide Application

6. Conservation Reserve Program (CRP)
When possible leave in undisturbed state. Maintain according to State and Federal laws regulations concerning CRP lands.

7. Irrigation Well Pump Site
Maintain site in such a way that no fuels or other contaminants may enter the soil. When possible, maintain a vegetative buffer strip between the well site and crop.

8. Chemigation System
Follow applicable State and Federal laws and regulations concerning proper operation and maintenance of Chemigation Systems. In particular, attention should be given to proper operation of anti-pollution devices.

9. Tail Water Pit
Construct and maintain according to State and Federal laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices for Cropland Production-Nutrient Management and Pesticide Application.

10. Dairy- Drylot
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

11. Dairy- Pasture
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

12. Dog Kennel
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

13. Cattle- Feedlot
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

14. Cattle- Pasture
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

15. Hog- Feedlot
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

16. Hog- Barn
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

17. Horses- Pasture
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

18. Horses- Barn
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

19. Poultry- Barn
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

20. Sheep- Pasture
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application.

21. Abandoned Water Well
Identify and properly plug all abandoned wells through a coordinated effort with landowners, cost share programs such as the County Conservation District Non-Point Source Program and the Public Water Supply.

22. Farmstead Equipment Maintenance
Use good practices for handling, recycling and disposal of equipment parts and fluids, so no contaminants may enter the soil.

23. Farmstead Feed Mill
Avoid long term spillage of grain on the ground. Use care when using pesticides to prevent them from entering the soil.

24. Farmstead Feed and Hay Storage
When possible, avoid storage of feed or hay on the ground. When storing on the ground, protect from rain and/or store at different sites each year. Use care when using pesticides to prevent them from entering the soil.

25. Farmstead Fertilizer Storage
Store fertilizer in such a manner that any spills are contained and prevented from entering the soil.

26. Farmstead Fuel Storage
Visually monitor above ground tanks for leaks. Comply with applicable State and Federal laws and regulations for large aboveground and underground fuel storage tanks.

27. Farmstead Grain Storage
Avoid long term spillage or storage of grain on the ground. Use care when using pesticides to prevent them from entering the soil.

28. Household Wastewater (septic tank, lateral field)
Install and maintain septic system according to Kansas Department of Health and Environment regulations and local codes.

29. Household Wastewater (lagoon)
Install and maintain lagoon according to Kansas Department of Health and Environment regulations and local codes.

30. Household Wastewater (city sewer)
Install and maintain lines according to Kansas Department of Health and Environment regulations and local codes.

31. Landscape Maintenance
Follow Kansas Catalog of NPS Pollution Control Practices for Cropland Production-Nutrient Management and Pesticide Application. Prevent fuels, solvents, or paints from entering the soil.

32. Farmstead and Temporary Livestock Confinement
Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application. Clean out confinement area regularly.

33. Animals (pets)
Follow Kansas Catalog of NPS Pollution Control Practices-Waste Management and Pesticide Application. Clean out confinement area regularly.

34. Farmstead Pesticide Storage
Follow Kansas catalog of NPS Pollution Control Practices for Proper Pesticides Storage, Handling and Mixing. Handle pesticides in such a manner that it is not allowed to enter the soil at the storage site. Follow label directions.

35. Farmstead Silage
Protect from rain and runoff. In areas with shallow aquifers avoid storage in unlined ground storage bunkers.

36. Solid Waste Storage
Contain all wastes in such a manner that no waste materials have an opportunity to enter the soil.

37. Water Well in Use
Properly protect and maintain the well and wellhead area according to Kansas Department of Health and Environment standards and recommendations

38. Abandoned Farmstead
Follow guidelines and recommended protection measures for associated land use activities, properly plug any abandoned wells as listed elsewhere. Use proper practices for handling, recycling and disposal of fluids, heavy metals and other contaminants.

39. Railroad Tracks
Maintain railroad tracks in good condition. Contact the Kansas Department of Health and Environment immediately in the event of an accidental spill or derailment.

40. State/Federal Highway
Use good practices for use and handling of deicers, pesticides, and road construction materials. Use good erosion control practices.

41. City Streets (paved and gravel)
Use good practices for use and handling of deicers, pesticides, and road construction materials. Use good erosion control practices.

42. County & Township Roads (paved and gravel)
Use good practices for use and handling of deicers, pesticides, and road construction materials. Use good erosion control practices.

43. Electrical Substation and Power Lines
Use good practices for herbicide application and brush control. Follow Kansas Catalog of NPS Pollution Control Practices for proper pesticide handling and mixing.

44. Pump station- raw surface water
Maintain Pump Station site in such a manner that no contaminants may enter the soil or be washed away from the site.

45. Pump Station- petroleum
Operate and maintain according to applicable State and Federal laws and regulations. Inspect regularly to ensure proper operation. Maintain Pump Station site in such a manner that no contaminants may enter the soil or be washed away from the site.

46. Pump Station- sewer
Operate and maintain according to applicable State and Federal laws and regulations. Inspect regularly to ensure proper operation. Maintain Pump Station site in such a manner that no contaminants may enter the soil or be washed away from the site.

47. Natural Gas Pipelines
Operate and maintain according to applicable State and Federal laws and regulations. Periodically inspect pipelines for leaks. Maintain pipelines in good condition. Follow Kansas Catalog of NPS Pollution Control Practices for proper handling and mixing of weed and brush control pesticides.

48. Petroleum Pipelines (crude)
Operate and maintain according to applicable State and Federal laws and regulations. Periodically inspect pipelines for leaks. Maintain pipelines in good condition. Follow Kansas Catalog of NPS Pollution Control Practices for proper handling and mixing of weed and brush control pesticides.

49. Petroleum Pipelines (refined product)
Operate and maintain according to applicable State and Federal laws and regulations. Periodically inspect pipelines for leaks. Maintain pipelines in good condition. Follow Kansas Catalog of NPS Pollution Control Practices for proper handling and mixing of weed and brush control pesticides.

50. Sewer Lines
Operate and maintain according to applicable State and Federal laws and regulations. Smoke test sewer system to locate leaks. Maintain pipelines in good condition.

51. Airport Fuel Storage
Visually monitor above ground tanks for leaks. Comply with applicable State and Federal laws and regulations for large aboveground and underground fuel storage tanks.

52. Airport Pesticide Applicator
Operate and maintain according to applicable State and Federal laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices for Proper Pesticides Storage, Handling and Mixing. Handle pesticides in such a manner that it is not allowed to enter the soil at the storage site. Follow label directions.

53. Airport Maintenance Areas
Use approved practices for handling, recycling and disposal of equipment parts, fluids, and fuels, so no contaminants may enter the soil

54. Airport- Onsite Sanitary Wastewater
Operate and maintain according to Kansas Department of Health and Environment laws and regulations and local codes. Use system for sewage disposal only.

55. Fair Ground
Maintain grounds in such a manner that all wastes are disposed of properly. Limit use of fertilizers and pesticides when possible.

56. City Park
Maintain park in such a manner that all wastes are disposed of properly. Limit use of fertilizers and pesticides when possible.

57. Camping Area (primitive)
Provide facilities with proper containment of wastes for later disposal according to Kansas Department of Health and Environment regulations and local codes.

58. Camping Area (modern)
Construct, maintain, and operate waste disposal systems according to Kansas Department of Health and Environment regulations and local codes.

59. Golf Course
Follow Kansas Catalog of NPS Pollution Control Practices for Cropland Production - Nutrient Management and Pesticide Application.

60. Gun Club
Limit area exposed to spent lead shot. Limit use of fertilizers and pesticides when possible.

61. Sports Complex
Maintain area in such a manner that all wastes are disposed of properly. Limit use of fertilizers and pesticides when possible.

62. Municipal Wastewater: Lagoon
Operate and maintain according to applicable State and Federal laws and regulations.

63. Municipal Wastewater: Mechanical
Operate and maintain according to applicable State and Federal laws and regulations.

64. Wastewater: Land Application
Operate and maintain according to applicable State and Federal laws and regulations.

65. Wastewater: Biosolids Storage
Operate and maintain according to applicable State and Federal laws and regulations.

66. Wastewater: Biosolids Application
Operate and maintain according to applicable State and Federal laws and regulations.

67. Injection Well
Operate and maintain according to applicable State and Federal laws and regulations.

68. Sanitary Landfill
Operate and maintain according to applicable State and Federal laws and regulations.

69. Composting
Operate and maintain according to applicable State and Federal laws and regulations.

70. Abandoned Dump
Maintain and monitor according to State and Federal laws and regulations.

71. Solid Waste Transfer Station
Contain all wastes in such a manner that no waste materials have an opportunity to enter the soil. Maintain according to KDHE guidelines and regulations.

72. Cemetery
Maintain awareness of potential to contaminate groundwater supplies with heavy metals and various contaminants. Limit use of fertilizer and pesticides.

73. Church
Limit use of fertilizer and pesticides on lawn. Dispose of waste according to State laws and local codes.

74. Hospital
Properly dispose of biological and chemical waste in accordance with State and Federal laws and regulations. Limit use of fertilizer and pesticides on lawn.

75. Motel/Hotel
Limit use of fertilizer and pesticides on lawn. Dispose of waste according to State laws and local codes.

76. Nursing Home
Properly dispose of biological and chemical waste in accordance with State and Federal laws and regulations. Limit use of fertilizer and pesticides on lawn.

77. Prison
Limit use of fertilizer and pesticides on lawn. Dispose of waste according to State laws and local codes.

78. Restaurant
Limit use of fertilizer and pesticides on lawn. Dispose of waste according to State laws and local codes.

79. School
Limit use of fertilizer and pesticides on lawn. Dispose of waste according to State laws and local codes.

80. Agricultural Center-Onsite Sanitary Wastewater
Install and maintain onsite wastewater system according to Kansas Department of Health and Environment regulations and local codes. Use system for sewage disposal only.

81. Agricultural Center-Water well in use
Properly protect and maintain the well and wellhead area according to Kansas Department of Health & Environment standards and recommendations.

82. Agricultural Center Fuel Sales
Visually monitor above ground tanks for leaks. Comply with applicable State and Federal laws and regulations for large aboveground and underground fuel storage tanks.

83. Agricultural Center Equipment Repair
Use good practices for handling, recycling and disposal of equipment parts and fluids, so no contaminants may enter the soil.

84. Agricultural Center Fertilizer Sales
Store bulk fertilizer according to State and Federal laws and regulations. Handle fertilizer in such a manner that it is not allowed to enter the soil at the storage site.

85. Agricultural Center Fertilizer Application Service
Conduct soil test before application of fertilizer. Apply fertilizer according to crop nutrient requirements. Follow Kansas Catalog of NPS Pollution Control Practices for Cropland Production-Nutrient Management and Pesticide Application.

86. Agricultural Center Pesticide Sales
Store all pesticides according to State and Federal laws and regulations. Handle pesticides in such a manner that it is not allowed to enter the soil at the storage site. Follow label directions.

87. Agricultural Center Pesticide Application Service
Operate and maintain according to applicable State and Federal laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices for Proper Pesticides Storage, Handling and Mixing. Handle pesticides in such a manner that it is not allowed to enter the soil at the storage site. Follow label directions.

88. Agricultural Center Feed Mill
Avoid long term spillage of feed on the ground. Use care when using pesticides to prevent them from entering the soil.

89. Agricultural Center Grain Elevator
Avoid long term storage or spillage of grain on the ground. Use care when using pesticides to prevent them from entering the soil.

90. Farm Equipment Dealer- Onsite Wastewater
Install and maintain onsite wastewater system according to Kansas Department of Health and Environment regulations and local codes. Use system for sewage disposal only.

91. Farm Equipment Dealer- Water Well in Use
Properly protect and maintain the well and wellhead area according to Kansas Department of Health & Environment standards and recommendations.

92. Farm Equipment Dealer Fuel Storage & Sales
Visually monitor above ground tanks for leaks. Comply with applicable State and Federal laws and regulations for large aboveground and underground fuel storage tanks.

93. Custom Packing Plant
Dispose of all waste according to State and Federal laws and regulations.

94. Sale Barn
Operate and maintain according to applicable State and Federal waste management laws and regulations. Follow Kansas Catalog of NPS Pollution Control Practices- Waste Management and Pesticide Application.

95. Seed Processor
Maintain and operate in a manner that prevents any pesticides or processing chemicals from entering the soil.

96. Truck Wash
Dispose of wash water according to State and Federal laws and regulations and local codes.

97. Veterinary Clinic
Dispose of all biological and chemical waste in accordance to State and Federal laws and regulations and local codes.

98. Auto Repair Shop
Use good practices for handling, recycling and disposal of equipment parts, fuels, and solvents. Prevent contaminants from entering the soil.

99. Beauty Shop
Prevent perm solutions or dyes from entering the soil.

100. Car Wash
Dispose of wash water according to State and Federal laws and regulations and local codes.

101. Dry Cleaner
Dispose of all dry cleaning waste according to State and Federal laws and regulations. Prevent solvents and spotting chemicals from entering the soil.

102. Fuel Service Station
Visually monitor above ground tanks for leaks. Comply with applicable State and Federal laws and regulations for large aboveground and underground fuel storage tanks.

103. Funeral Home
Prevent biological and chemical materials from entering the soil.

104. Hardware Store
Prevent paints, solvents, fuels, and other contaminants from entering the soil.

105. Photography/Print Shop
Prevent solvents and processing chemicals from entering the soil.

106. Small Engine Repair
Use good practices for handling, recycling and disposal of equipment parts, fuel and solvents. Prevent contaminants from entering the soil.

107. Welding Shop
Use good practices for use, handling, recycling and disposal of solid wastes, fuels, and solvents. Prevent contaminants from entering the soil.

108. Food Processor
Dispose of all waste according to State and Federal laws and regulations.

109. Pharmaceutical Plant
Dispose of all waste according to State and Federal laws and regulations.

110. Meat Processor
Dispose of all waste according to State and Federal laws and regulations.

111. Metal Fabrication
Dispose of all waste according to State and Federal laws and regulations.

112. Metal Plater
Dispose of all waste according to State and Federal laws and regulations.

113. Petro-Chemical Refinery
Dispose of all waste according to State and Federal laws and regulations.

114. Research Laboratory
Dispose of all waste according to State and Federal laws and regulations.

115. Salvage/Recycler
Use good practices for handling, recycling and disposal of solvents, automobile and equipment parts, and fluids. Prevent contaminants from entering the soil.

116. Industrial Facility- Onsite Sanitary Wastewater
Install and maintain onsite sanitary wastewater system according to Kansas Department of Health and Environment regulations and local codes. Use system for sewage disposal only.

117. Industrial Facility- Water Well in Use
Properly protect and maintain the well and wellhead area according to Kansas Department of Health & Environment standards and recommendations.

118. Coal Mine
Dispose of all waste according to State and Federal laws and regulations.

119. Oil or Gas Well
Operate, maintain, and dispose of all waste according to State and Federal laws and regulations.

120. Rock Quarry
Dispose of all waste according to State and Federal laws and regulations.

121. Geophysical Exploration Test Holes
Properly plug all test holes when activities are completed.

122. Mineral Extraction- Onsite Sanitary Wastewater
Install and maintain onsite sanitary wastewater systems according to Kansas Department of Health and Environment laws and regulations and local codes.

123. Mineral Extraction- Water Well in Use
Properly protect and maintain the well and wellhead area according to Kansas Department of Health and Environment standards and recommendations.

KANSAS GEOLOGICAL SURVEY
Public Information Circular 14 • June 1999

Nitrate in Kansas Groundwater

M. A. Townsend and **D. P. Young**
Geohydrology, Kansas Geological Survey

Introduction

Groundwater is the major source of drinking water for 70% of Kansas residents. In rural areas, 85% of the population relies on groundwater. Therefore, contaminants that may cause health problems, such as nitrate, are of significant concern. For owners of private wells, the issue of groundwater contamination is particularly serious. Most private domestic supplies are neither tested nor treated on a routine basis.

Nitrate is the most common inorganic contaminant in Kansas groundwater. Previous studies have found that about 30% of domestic wells in Kansas have nitrate levels greater than the Maximum Contaminant Level (MCL) for public drinking water (Steichen et al., 1988; Spalding and Exner, 1993; Townsend and Young, 1995; Townsend, 1996). Concentrations seem to be increasing in many areas of the state (Townsend et al., 1996; Townsend et al., 1997). The purpose of this circular is to describe nitrate, its sources, the extent of the nitrate problem in Kansas, and how groundwater can be protected from nitrate contamination.

Background

Nitrogen (N) is an important plant nutrient, absorbed primarily in the form of nitrate (NO_3^-). The other prominent forms of nitrogen are atmospheric nitrogen gas (N_2), organic nitrogen, and ammonium (NH_4^+), the latter two of which can attach to soil particles. In the soil zone, most forms of nitrogen will be converted to nitrate by bacterial processes; this conversion is termed nitrification (fig. 1).

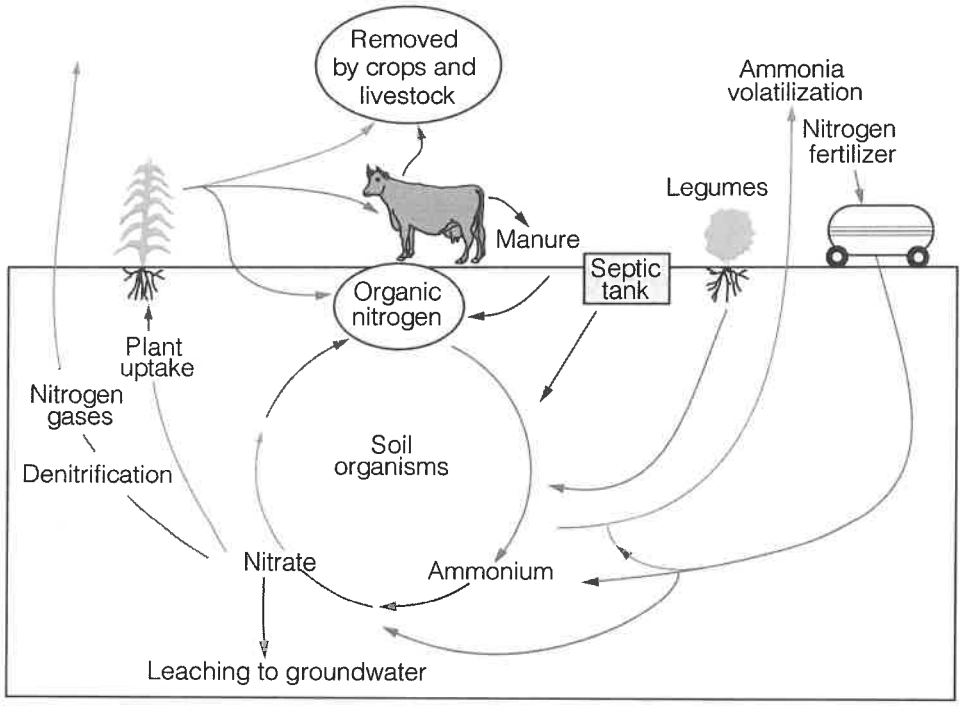

Figure 1. Simplified illustration of the nitrogen cycle.

Nitrate readily dissolves in water and, once there, is hard to remove. Nitrate concentration in groundwater is commonly reported as "nitrate as nitrogen" (nitrate-N) — that is, only the nitrogen in the nitrate molecule (NO_3^-) is counted. The U.S. Environmental Protection Agency (EPA) and the Kansas Department of Health and Environment (KDHE) set the MCL for drinking water at 10 milligrams/liter (mg/L) nitrate-N. Nitrate consumption can pose health risks. One of these, methemoglobinemia (or blue baby disease), is caused by bacterial conversion of nitrate to nitrite (NO_2^-) in the intestinal tract. Nitrite interferes with the oxygen-carrying capability of the blood and the victim appears "blue." This condition can be fatal both to human infants and to some young animals.

Background levels for natural nitrate-N in groundwater are nearly always less than 3 mg/L (Madison and Brunett, 1984). Concentrations above 3 mg/L indicate that nitrate from non-natural sources such as human or animal waste or fertilizers has entered the groundwater.

Sources of Nitrate

As fig. 1 illustrates, sources of nitrogen to the soil or land surface include fertilizer, legumes that fix nitrogen in the soil, and animal wastes. Losses include crop uptake and removal, conversion of nitrate to nitrogen

gases (denitrification), ammonia volatilization, and leaching of nitrate from the soil zone to groundwater. Nitrogen at or near the land surface may move downward toward the water table by leaching with water (precipitation or irrigation water, for example).

It is useful to divide the sources of nitrogen contamination into nonpoint and point sources. Nonpoint sources are diffuse, as opposed to point sources, which are single, identifiable sources of contamination. Nonpoint sources of nitrate include long-term, widespread overuse of chemical or manure fertilizers (on cropland, lawns, or golf courses) and long-term leaks in sewer lines. Point sources include areas of concentrated livestock confinement, leaky septic or sewer systems, and areas of chemical or manure storage or spills. Unplugged abandoned wells and boreholes, improperly constructed wells, and sinkholes are avenues that can allow rapid contamination of groundwater from point sources at the surface. Point sources may result in extremely high nitrate concentrations in localized areas.

Nitrate in groundwater is frequently associated with agriculture, the largest industry in Kansas. Plants have basic needs: water, nitrogen, and other nutrients. Statistics from the Kansas Department of Agriculture (KDA) show that sales of nitrogen fertilizers increased dramatically from the mid-1940s to the present (fig. 2). In 1997, more than 700,000 tons were sold, which gives an approximate idea of the amount actually used. As fig. 2 shows, during the same period, the number of water rights issued also increased (Will Gilliland, KDA, Division of Water Resources, 1998, personal communication). Because more fertilizer is generally applied to irrigated than non-irrigated cropland and because irrigation increases the amount of water available for leaching, the potential for nitrate leaching into groundwater from unused fertilizer increases.

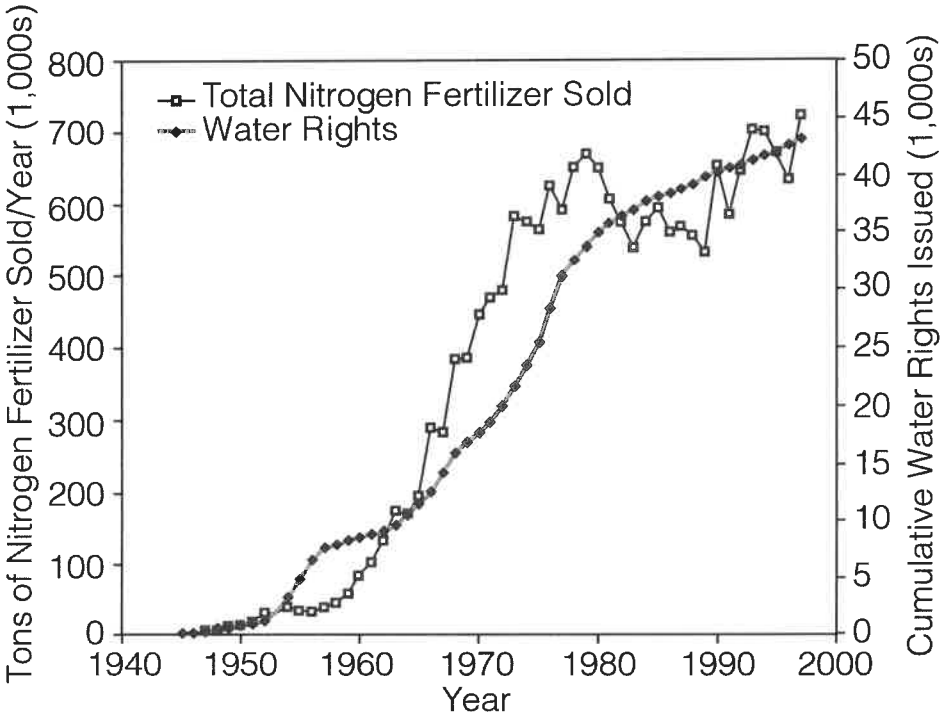

Figure 2. Total nitrogen fertilizer sold in Kansas from 1945 to 1997 (Kansas Department of Agriculture, 1998) and the cumulative water rights issued from 1945 to 1997 (Will Gilliland, KDA, Division of Water Resources, 1998, personal communication).

Table 1. Nitrogen from animal wastes in Kansas. Population statistics from 1990 U.S. census as reported by the Environmental Working Group, 1998; Animal statistics from Kansas Department of Agriculture, 1997.

Source of Nitrogen	Amount of Nitrogen	Approx. Number of Animals/Humans	Tons of Potential Available Nitrogen Per Year
Dairy Cattle	10 lb/ton manure	79,000	4,680
Beef Cattle	14 lb/ton manure	2.35 million	180,000
Swine	10 lb/ton manure	1.305 million	9,530
Humans Using Septic Systems	14.5 lb/person/year	765,000	5,550

Animal-waste sources of nitrogen include feedlots, manure applied as fertilizer, and septic systems. Of these, the biggest source of nitrogen is the waste from beef cattle (table 1). Because of the potential volume of nitrogen available from both fertilizer and animal sources, proper management for control of all sources of nitrogen is vital in protecting the state's groundwater.

Occurrence of Nitrate in Kansas Groundwater

Studies in Kansas show that many factors affect nitrate concentration in groundwater. These include soil characteristics, land-use practices, depth to the water table, depth of the well, age and construction of the well, and the amount of irrigation. Generally, areas such as south-central Kansas, which have relatively permeable (sandy) soils, a shallow water table, shallow wells, and irrigated farming, are most susceptible to nitrate contamination.

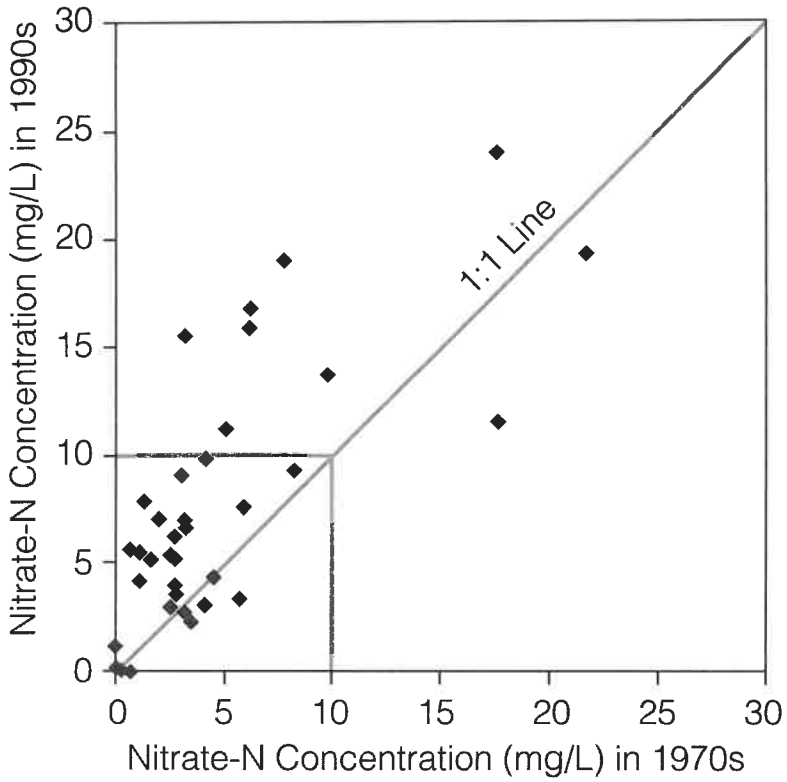

Figure 3. Comparison of nitrate-N concentrations in 36 irrigation wells sampled in the 1970s and in the 1990s. The 1:1 line shows where the values would plot if there were no change from the 1970s to the 1990s. Points above the line indicate an increase in nitrate-N concentrations; those below indicate a decrease. Box at 10 mg/L indicates U.S. EPA drinking-water limit.

Recent data compiled by the Kansas Geological Survey suggest that water in older (pre-1975) wells has higher concentrations of nitrate-N than newer wells. In 1975, regulations were adopted concerning water-well construction and abandonment by KDHE.

During the 1990s, Survey staff performed nitrate-N analyses on 36 irrigation wells that had been sampled in the 1970s. All wells are located in western or south-central Kansas. In the majority of the samples, nitrate-N concentrations increased from the 1970s to the 1990s, indicating that nitrate is moving from the surface to groundwater (fig. 3). This may be a function both of long-term irrigated farming in the area and the age of the wells. (Wells built before 1975 generally have the annular space filled with gravel pack to near land surface, potentially allowing for near-surface water flow down the wellbore to groundwater).

Protecting Groundwater from Nitrate Contamination

In general, the means to protect groundwater from surface contamination include proper well construction with at least 20 feet of grout to prevent surface and near-surface flow of water to groundwater; wellhead-protection programs around public and domestic water supplies; maintenance and correct closure of septic systems; proper plugging of abandoned wells; mixing chemicals away from wells, streams, and ponds; and correct disposal of excess fertilizer and other chemicals. Most of these measures are aimed at preventing contaminants at the surface from entering groundwater directly via wells and boreholes. The importance of proper well construction and proper plugging of abandoned wells cannot be overstressed. All the Groundwater Management Districts, as well as the State Conservation Commission and the Kansas Farm Bureau, have programs to assist with well plugging.

Agricultural-management practices that may reduce the potential for nitrate contamination of groundwater include: (1) soil testing to determine the volume of nitrogen available; (2) determination of yearly fertilizer-application rate by use of a nitrogen-budget calculation that gives credits for existing sources of nitrogen, including manure fertilizer, nitrogen fertilizer, legumes, stored soil nitrogen, and nitrate in irrigation water; (3) timing of fertilizer (and water) application to the needs of the plants, including split applications; (4) use of nitrification inhibitors such as N-Serve® when applying fertilizer to delay the formation of nitrate; (5) utilization of crop-rotation practices instead of continuous cropping; (6) use of cover crops to minimize over-winter nitrogen losses; and (7) integration of livestock and crop production (including crop rotation) to recycle nutrients and use nitrogen efficiently. More information on most of these practices is available from the Kansas State University Cooperative Extension Service (address listed at end of report).

A simple equation for calculating the amount of nitrogen in irrigation water can determine the nitrogen credit as described in (2) above:

Depth of water applied (inches) x nitrate-N concentration of water applied (mg/L) x 0.227 = lb nitrogen/acre

For example, applying 18 inches of irrigation water with a nitrate-N concentration of 5 mg/L represents:

18 (inches of water) x 5 (mg/L) x 0.227 = 20 lbs nitrogen/acre

That 20 lbs nitrogen/acre applied in the irrigation water represents 20 lb/acre of fertilizer nitrogen that do not have to be applied. Using such

a nitrogen credit and applying less fertilizer saves money while helping to protect groundwater.

Efforts to control feedlot waste include (1) riparian-zone control to prevent surface runoff of waste to streams and ponds, (2) correctly built storage lagoons for liquid waste, and (3) rehabilitation of abandoned and intermittently used feedlots by growing plants to utilize excess nitrogen in soil.

Summary

Nitrate contamination of groundwater is occurring in Kansas, and nitrate concentrations are increasing in many areas of the state. Nitrate contamination may occur in both rural and urban settings but is often related to agricultural practices. Certain management practices can reduce the risk of nitrate entering groundwater.

By the time contamination is detected, the overlying unsaturated zone may be enriched with the contaminant. Remedial action may take decades to improve water quality, and expensive treatment or alternative sources may be required to provide high-quality water. It is important to prevent nitrate contamination of groundwater, rather than to wait for contamination to occur and attempt to rectify it. Prevention measures focus on avoiding direct contamination of groundwater from the surface through wells and boreholes and controlling the sources of nitrate contamination.

Additional Sources of Information

More information about nitrate contamination in Kansas groundwater can be obtained by contacting the Cooperative Extension Service at Kansas State University (Extension Agronomy, 2004 Throckmorton PSC, 1712 Claflin Road, Manhattan, KS 66506-0110, 785-532-6101, https://www.agronomy.k-state.edu/extension/) and the U.S. Geological Survey's Kansas Water Science Center (https://www.usgs.gov/centers/kansas-water-science-center).

Other sources of information include county health departments, local Farm Bureau offices, and local Natural Resource Conservation Service District Offices.

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KU KANSAS GEOLOGICAL SURVEY
The University of Kansas

The Kansas Geological Survey (KGS) is a research and service division of the University of Kansas that investigates and provides information about the state's natural resources. KGS scientists pursue research related to surface and subsurface geology, energy resources, groundwater, and environmental hazards. They develop innovative tools and techniques, monitor earthquakes and groundwater levels, investigate water-quality concerns, and map the state's surface geology.

The KGS has no regulatory authority and does not take positions on natural resource issues. The main headquarters of the KGS is in Lawrence in the West District of the University of Kansas, and the Kansas Geologic Sample Repository of the KGS is in Wichita.

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Kansas Geological Survey
The University of Kansas
1930 Constant Avenue
Lawrence, KS 66047-3724
785-864-3965
http://www.kgs.ku.edu

K-STATE Kansas State University

WATER QUALITY SERIES

Plugging Abandoned Wells

A source of clean, safe household water is important to all Kansans. Groundwater is often the only source, especially in areas with no public water supply. Groundwater is usually preferred for individual homes because it does not require filtering.

Groundwater use does require wells, and wells act as conduits for possible entrance of contaminants. Many test holes and unused (abandoned) wells are located in fields, farmsteads, industrial sites, and urban areas without being properly plugged. Not only are wells sources for potential contamination of groundwater, many are a physical hazard to animals and people, particularly children (see photo).

A 6-year-old child can easily slip through a section of 10-inch PVC pipe.

Landowners are liable for contamination or injury from unplugged wells or holes. The hazards of abandoned wells and test holes should concern everyone. They should be properly eliminated. This bulletin is provided to help landowners, service providers, and others understand the correct plugging procedure.

The Kansas Department of Health and Environment (KDHE) estimates more than 250,000 abandoned wells and test holes exist in Kansas. Kansas law defines an abandoned well as one that

- has not been used during the last 2 years;
- is in such disrepair that it cannot be used; or
- poses a groundwater-contamination hazard.

Kansas law requires that all abandoned wells and test holes be properly plugged. Proper plugging accomplishes five goals:

- restores protective barrier to minimize groundwater contamination;
- removes physical hazards by removing tempting openings for curious children and animals;
- restores stability to the land surface, (load carrying capacity);
- eliminates or reduces liability exposure; and
- protects and improves property values.

Kansas Regulations

The Kansas Department of Health and Environment administers laws regulating construction, reconstruction, and plugging of wells. Articles 12-K.S.A.82a-1212 and 1213 and 30-K.A.R. 28-30-4(a) and 28-30-7 specifically address plugging of abandoned wells. The regulations provide instructions for all types of wells and aquifer conditions. Well drillers and landowners alike are required by law to follow these procedures, which are available from KDHE.

This publication describes the easiest plugging procedure for the most-common well and aquifer conditions. If well or aquifer conditions are unknown or different from those described, landowners should contact KDHE for the proper plugging procedures. Landowners may plug wells on their property by following these procedures. Landowners also can hire a licensed water well contractor to plug a well.

The plugging procedure requires a plugging report (form WWC-5 or form WWC-5P) be filed with KDHE. These forms can be obtained by calling (785) 296-5524

and are frequently available locally through county health or Extension offices. Failure to file this report documenting proper closure leaves the owner liable for contamination. Documentation of the plugging procedure transfers the burden of proof to the complainant.

Aquifer Classification

Often times for older wells, little specific information is available about the well or the aquifer source. The type of aquifer or water formations penetrated by the well must be known for proper plugging. Sometimes this information can be obtained by asking questions of knowledgeable sources. Well logs for the actual well or nearby wells may be available from local drillers or KDHE. Geological and groundwater reports are available for most counties. Check the library or call the Kansas Geological Survey at (785) 864-3965.

A little must be know about the soil and geology (sand, gravel, clay, rock) of the well in order to ensure plugging will restore the integrity of the formation. Aquifers, the permeable water-bearing materials supplying a well, are classified based on the geology of the formation.

When water from the surface moves directly into an aquifer, it is called unconfined. Confined aquifers, on the other hand, have impervious layers that significantly restrict direct local recharge from the surface. Water in confined aquifers may be under pressure greater than atmospheric, and water rises above the restricting layer (artisan).

When the water-bearing layer is made up of individual grains of sand and gravel, the aquifer is called unconsolidated. All other aquifers are considered to be consolidated aquifers, often referred to as rock aquifers. Thus, there are four types of aquifers: unconfined-unconsolidated, unconfined-consolidated, confined-unconsolidated, and confined-consolidated.

Many aquifers are more complex than this simplified explanation. A consolidated formation may have several water-bearing zones separated by confining layers of varying permeability. Each zone may have a different yield and water quality. Good quality may lie above, below, or between zones of poor-quality water. Experienced well drillers recognize and note these differences as the well is drilled and connect or exclude various zones, based on the quality and quantity of water needed.

The procedure described here applies when plugging wells located in unconfined aquifers with unconsolidated formations. If it is suspected the formation is rock (consolidated formation), has confining layers, or the well penetrates multiple water-bearing formations, contact KDHE before proceeding or hire a licensed well driller to do the plugging. Do not attempt to use these procedures to plug wells in conditions other than unconfined and unconsolidated.

The procedure described generally applies to the sand and gravel aquifers shown in Figure 1. Other areas may not be sand and gravel aquifers. Generally, shallow wells (less than 50 feet near streams and 100 feet on uplands), can be plugged with this procedure. Large-diameter (12 inches or more) irrigation, industrial, or municipal wells also might be best handled by a licensed well driller.

Well Classification

Wells are classified according to construction. Understanding well construction methods is important because different types of wells require different plugging procedures. The oldest type is the dug well. These are large diameter, relatively shallow, hand-dug wells, usually lined with rock or brick. Typical dug wells are 3 to 6 feet in diameter and 15 to 50 feet deep (see Figure 2). The depth depends on depth to water, and size can vary from 2 feet in diameter to larger than 30 feet.

A driven well, used mainly for shallow, unconsolidated aquifers, is named for the process of driving the suction pipe with screened section into the sandy water-bearing formation. These wells are generally small in diameter with pipe sizes of 1 to 2 inches for home water supplies and up to 6 inches for irrigation and livestock wells. Driven wells are limited to sandy formations with high water tables,

Figure 1. *Sand and Gravel Aquifers*

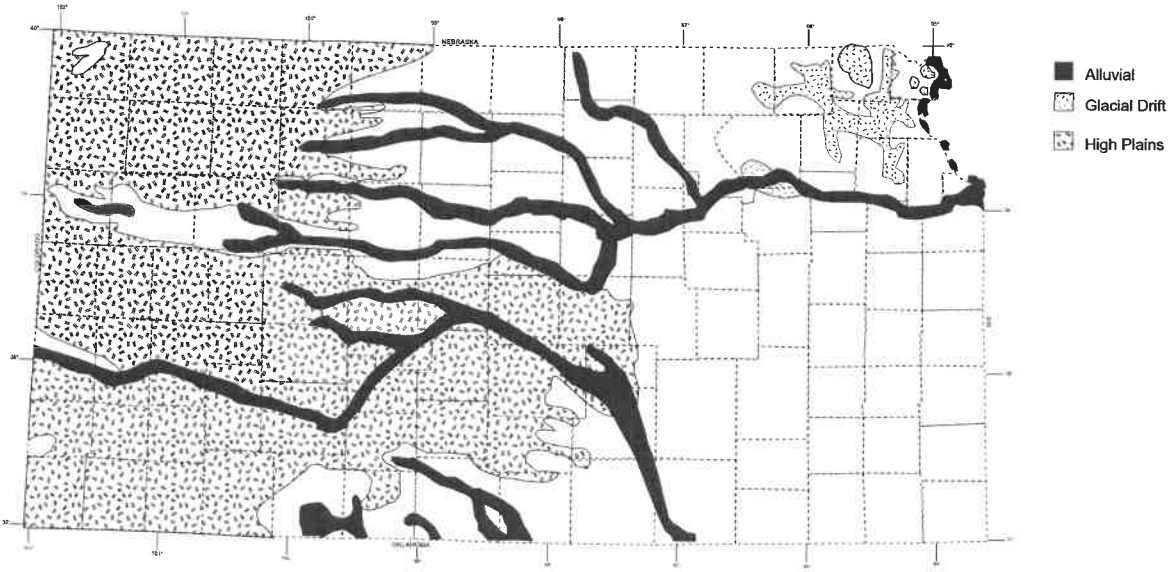


Figure 2. Plugging Diagrams for a Hand-dug Well

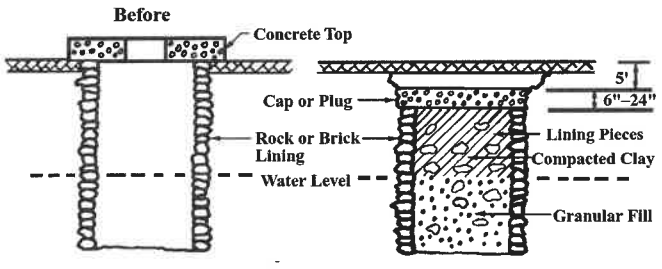
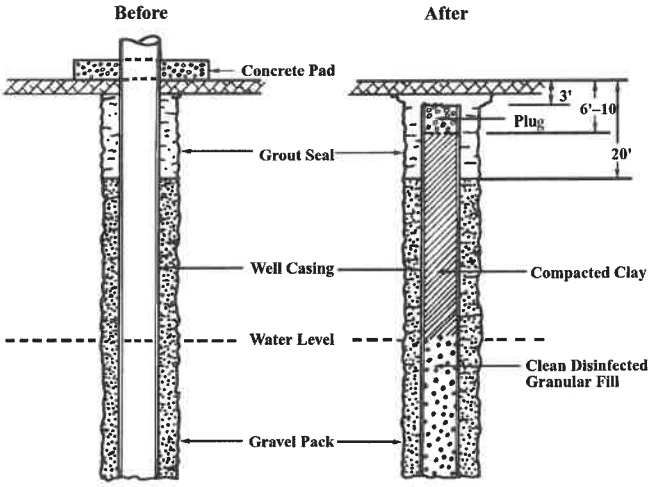


Figure 3. Plugging Diagram for a Drilled Well in an Unconfined-unconsolidated Aquifer



where centrifugal or shallow well jet pumps can be used. Driven or sandpoint wells are still being installed. To be legal, however, they must be grouted to a depth of 20 feet or to the water table. Because of shallow depths and grouting difficulties, they are discouraged for domestic use.

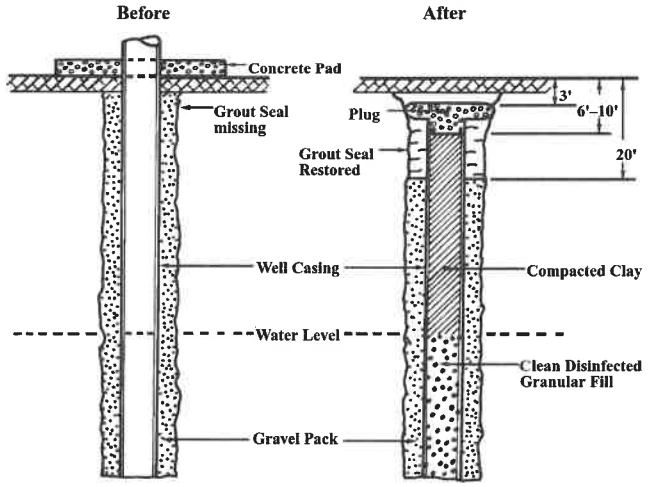
The drilled well is the most common type of well in Kansas (see Figure 3). Typically, a hole is drilled into the aquifer, and a casing 3 to 8 inches smaller than the bore hole is installed. Domestic and livestock watering wells are generally 4 to 10 inches in diameter, while irrigation wells generally range from 10 to 18 inches.

The depth of a drilled well varies depending on the aquifer and water depth. Depths greater than 300 feet are common in some places. The small-diameter well casings, usually 6 inches or less, are generally installed in bore holes only a few inches larger than the casing. Typically, the casing is inserted after the bore hole is drilled.

For large-capacity wells for irrigation, industrial, or municipal uses, the casing is installed into oversized holes. The space between the casing and bore hole is filled with gravel. This gravel pack allows unrestricted water flow into the perforated portion of the casing and acts as a filter to retain the aquifer particles. Near the surface, this space is filled with grout to prevent water movement from the surface along the casing.

Prior to 1975, grouting was not required and the common practice was to gravel pack to very near the surface to induce the greatest yield possible. This practice made flow along the outside of the casing an easy pathway for contaminants to enter the groundwater from the surface.

Figure 4. Plugging Diagram for a Drilled Well Without Proper Grouting in an Unconfined-unconsolidated Aquifer



Plugging Procedure

The plugging procedure described is for wells in an unconfined-unconsolidated aquifer (figures 2, 3, and 4). If the well has more than one water-bearing layer, penetrates a confining layer (aquiclude), or is into rock, contact KDHE to make certain of the proper plugging procedure or hire a licensed well driller. Plug wells using these steps:

Step 1. Prepare site. Remove all pumping equipment and any foreign objects from the well and remove debris from the surface around the well site.

Step 2. Remove top of casing. Excavate around the casing of a drilled or driven well to a depth that allows the casing to be cut off at least 3 feet below the surface. The more casing removed the better.

When excavating around the old casing, look for evidence that the well was properly grouted (Figure 3). Establishing a proper seal is critical to preventing contaminants from migrating along the outside of the casing. When a well does not have a proper grout seal, it should be restored. This requires 20 feet of excavation around the outside of the casing to allow placement of the grout. However, if it is possible to excavate this deep, the casing should be removed to this depth rather than be grouted.

Since deep excavation of a nongrouted well is often not practical, another option is to extend the plug beyond the edges of the original bore hole at least 1 foot outside the casing in all directions. This mushroom plug, shown in Figure 4, will help prevent water movement along the out-

side of the casing. Deeper excavation than the 3-foot minimum around the casing is especially desirable when no grouting exists outside the casing.

In dug wells, the casing of the well is the rock or brick lining of the well. This lining can be used as part of the fill material. The lining for dug wells should be removed to a depth of at least 5 feet. Be certain to mix lining material with fill material (see steps 4 and 5).

Step 3. Disinfect water. Existing bacteria or bacteria carried to the water by the fill material should be killed. This helps prevent contamination of nearby wells. Determine the amount of chlorine necessary by measuring the depth of water and diameter of the well and estimating the amount of water in the well. Then use Table 1, which lists the amount of chlorine product to add to produce a solution concentration in the well of approximately 500 milligrams per liter of chlorine.

The amount of chlorine needed depends on the product concentration. Four concentrations representing various chlorine products from household bleach (5.25 percent) to dry chlorine disinfectant (70 percent) are shown in Table 1. When dry chlorine is used, dissolve it in water before adding it to the well to make certain the material does not settle to the bottom.

If no working wells are within 100 feet of the abandoned well being plugged, the concentration of chlorine could be halved since bacteria migration beyond 100 feet is unlikely.

Example: A 6-inch diameter well, 60 feet deep, has 20 feet of water present. How much chlorine is needed for disinfection?

At the intersection of the 6-inch and 5.25-percent column in Table 1, 1.8 fluid ounces of bleach is needed for each foot of water, so 36 ounces, or 2.25 pints, (1.8 × 20) of bleach should be added.

Step 4. Fill water zone with clean porus material. Approved fill material is sand and gravel of less than 1-inch diameter. Generally the preferred fill is washed, course river sand. The fill material is chlorinated when it is added to the previously disinfected water in step 3.

Table 1 also shows the volume of fill needed per foot of well for various diameter holes. The water in the well may rise as the sand is added, depending on the permeability of the formation and the fill material. Estimate the volume of fill needed to avoid filling above the normal water level. Measure the normal water level using a weighted string that just touches the water surface. Mark the string with a knot at the top of the casing. Begin adding fill, but periodically check progress of the fill. Once the weight touches the top of the fill at the marked spot, stop adding fill. Even though the water level may have risen, add fill only to the original water level. Any water above the normal water level should be removed by pumping or allowed to soak away with time. The use of course sand and slow addition to the well will prevent bridging of the sand at the water surface. The sound of the sand hitting the water surface should be heard.

In dug wells, more fill than predicated from the table generally is required to fill this zone because mud in the bottom of the well compresses and voids in the rock lining. It may be necessary to bring as much as 30 percent more fill than predicted from the table.

Table 1. *Computing Volume of Fill Material and Disinfectant for Wells*

Diameter of opening	Volume of well per foot		Amount of product to disinfect 1 foot [a]			
			Liquid chlorine (fluid ounces)		Dry chlorine (dry ounces)	
	gal/ft	ft³/ft [b]	5.25%	10%	65%	70%
2 inches	0.16	0.02	0.20	0.10	0.02	0.02
3 inches	0.37	0.05	0.45	0.22	0.05	0.02
4 inches	0.65	0.09	0.80	0.42	0.07	0.07
5 inches	1.02	0.14	1.25	0.65	0.10	0.10
6 inches	1.47	0.20	1.80	0.95	0.15	0.15
8 inches	2.61	0.35	3.20	1.67	0.27	0.25
10 inches	4.08	0.55	5.00	2.60	0.42	0.40
12 inches	5.88	0.79	7.20	3.75	0.60	0.55
14 inches	8.00	1.07	9.77	5.12	0.82	0.77
16 inches	10.44	1.40	12.77	6.67	1.07	1.00
1.5 feet	13.22	1.77	16.17	8.45	1.35	1.25
2.0 feet	23.50	3.14	28.75	15.05	2.42	2.25
2.5 feet	36.72	4.91	44.92	23.50	3.77	3.50
3.0 feet	52.88	7.07	64.70	33.85	5.42	5.05
4.0 feet	94.00	12.57	115.02	60.15	9.65	8.97
5.0 feet	146.9	19.64	179.75	94.00	15.07	14.00
6.0 feet	211.5	28.27	258.75	135.37	21.72	20.17
7.0 feet	287.9	38.48	352.25	184.25	29.55	27.45
8.0 feet	376.0	50.27	460.25	240.65	38.60	35.85
9.0 feet	475.9	63.62	582.25	304.50	48.87	45.37
10.0 feet	587.5	78.54	719.00	376.00	105.32	56.02

[a] 500 mg/L concentration of chlorine; 128 oz. = 1 gallon

[b] 27 ft³ = 1 cubic yard

Although the lining rocks can be added in either the sand or subsoil layers, it is preferable to add with the subsoil as discussed later. This will keep the water-bearing area much cleaner, as it is difficult to remove the rock lining without a lot of debris from the surface falling into the well.

In some wells, especially those less than 20 feet deep, there may not be enough volume to dispose of the rocks in the subsoil layer only. In this case, some of the rock lining should be placed in the fill. Generally, the rock or brick lining can be pried loose with large pry bars. However, a backhoe or front-end loader may be desirable for large-diameter wells. When using heavy equipment, the surface soil around the well site should be scraped away to expose the subsoil layer. As the rock walls are added, be certain to add sufficient fill material to eliminate any voids among the rocks.

Example: For the 6-inch diameter well with 20 feet of water, how much sand is required?

From Table 1, at the intersection of 6-inch diameter and the column from the left side, 0.20 cubic foot of fill is needed for each foot of the 20-foot water zone, therefore, 4 cubic feet (0.20 $ft^3/ft \times 20$ ft) of fill is needed. Since there are 27 cubic feet per cubic yard, 4 cubic feet equals 0.15 cubic yard.

Step 5. Add compacted subsoil above the water zone. The casing above the water level is filled with natural subsoil clay material (subsoils low in organic matter and other potential contaminants) and compacted to form a solid column. The subsoil should be placed in a dry hole. The subsoil should be damp to allow it to compact easily. The clay fill should be placed in layers not exceeding 2 feet.

For small-diameter wells, a section of steel pipe with a cap on one end attached to a rope makes a good tamping tool. The fill should stop at least 3 feet below the top of the casing (6 feet below the surface) to leave adequate space for an approved plug.

Dug wells are filled to no more than 5 feet below the surface. At this point, the rock lining and subsoil fill should be leveled off.

Step 6. Place approved grout plug. Pour the approved grout material into the drilled or driven well casing making a plug at least 3 feet thick, the minimum required. In a dug well, the plug of approved grout material is 6 to 24 inches thick. KDHE-approved grout material includes commercial hole plug sodium bentonite clay, cement, and neat cement. Cement grout is a mixture of equal volumes of portland cement and sand. Use 10 to 12 gallons of water for each bag of cement. Neat cement is a mixture of portland cement and water, and 5 to 6 gallons of water should be used for each 94-pound bag of cement.

Sodium bentonite clay, normally sold in 50-pound bags that contain 0.7 cubic foot, is recommended for use because it is easy to handle, remains pliable, and expands when in contact with water. Because of bentonite's expansive and pliable nature, it will conform to the uneven rock edges and expand to fill voids in the wall. If any settlement should occur, the bentonite seal will not crack or lose its integrity.

Table 2 provides information to help determine the number of bags of sodium bentonite clay needed for placing the plug or filling the entire well with bentonite. A cement plug must be much thicker and may need reinforcing to have enough strength to prevent cracking and collapse.

Table 2. *Number of Bags of Sodium Bentonite Clay Needed for Various Well Diameters*

Diameter of opening (inches)	Feet of fill per bag [a]	Bags [a] per foot	Bags [b] per 3-foot plug
2	35.0	0.03	0.1
3	14.0	0.07	0.2
4	7.8	0.13	0.4
5	5.0	0.20	0.6
6	3.5	0.29	0.9
8	2.0	0.50	1.5
10	1.3	0.79	2.4
12	0.9	1.13	3.4
14	0.7	1.53	4.6
16	0.5	2.0	6.0
18	0.4	2.5	7.5

[a] Table values based on 50-pound bags, which have a volume of 0.7ft^3 per bag.

[b] Additional bags are required for mushroom plugs extending outside the casing (see step 6).

Example: A 6-inch diameter well is ready for the plug material. How many bags of bentonite are needed?

From Table 1, a 6-inch diameter well has a volume of 0.2 cubic feet per foot of casing. A typical bag of bentonite contains 0.7 cubic feet of material. Dividing 0.7 cubic feet per bag by 0.2 cubic feet equals 3.5 feet of casing per bag. Therefore, one bag will make a 3.5-foot plug inside the well casing. Several more bags will be needed to make the mushroom plug on top to protect the outside of the casing (see step 2).

Example: A 4-foot diameter well is ready for the plug material. How many bags of bentonite are needed?

Since bentonite is expansive, the minimum 6-inch plug will be used. Remember, the plug should extend beyond the rock lining to the original hole diameter. For this example, assume the rock lining is 1 foot thick; therefore a 6-foot diameter plug must be placed.

From Table 1, a 6-foot diameter hole requires 28.27 cubic feet of material. Since only a 6-inch plug is required, only 14.14 cubic feet of material is needed. Dividing 14.14 cubic feet by 0.7 cubic foot per bag determines that 20.2 bags (round up to 21 bags) are needed.

Step 7. Fill hole at top. Once the grout plug and mushroom cap have been completed, the remaining hole above the plug should be filled. Subsoil material can be placed in the bottom of the hole and compacted as the fill progresses in layers of 6 inches. Topsoil should be used in approximately the top foot of the hole. The fill should be mounded up at least 10 inches in the center to allow for settling and drainage away from the fill site.

Step 8. File the plugging report. Abandoned wells are an environmental and safety hazard. They are a liability. Following the plugging procedure described here and filing form WWC-5P or WWC-5 with KDHE to document the action minimizes further liability.

The well is not legally plugged until the form is filed. WWC-5 is the form used by drillers for reporting a new well.

It asks for location, property owner, physical characteristics of formation, well, casing, and the plugging procedure used. A new WWC-5P form was developed specifically for reporting well plugging. Forms are available from KDHE, but many county Extension, county health, and conservation district offices also have these forms available.

Alternative Plugging Option

For small-diameter wells, especially shallow ones, it is simpler to plug the entire casing with approved grout material or with sand fill below water and grout above water. This is a good choice for very-small-diameter wells where placement of the various layers of fill especially the subsoil fill, may be difficult. Filling the entire casing with grout may be the best option for small-diameter driven wells. A 2-inch diameter well needs only 0.02 cubic foot of fill per foot of casing. This means one bag of bentonite will fill 35 feet of well. The well water still needs to be chlorinated.

Sodium bentonite clay chips or pellets can easily be used to completely fill the casing. Bentonite clay powder or granular should never be poured into wells with water. Proper placement of powder or granular materials requires making a slurry and using a grout pump.

Placing cement grout into water. If cement or neat cement is used as grout, placement into water requires special procedures to avoid separation. A tremie pipe, which is usually about 3 inches in diameter and in sections of 5 to 10 feet long, will be needed to place the cement without passing through water. Use enough pipe to reach within a foot or two of the bottom and cut the end at a 45-degree angle. A hopper box or large funnel is attached to the top of the tremie pipe. The grout is mixed and placed in the hopper or funnel.

The mix must be thin enough to flow, but thick enough to set properly once in place. The proper ratio for neat cement grout is one 94-pound bag of cement to 5 or 6 gallons of water. For cement, use 5 or 6 gallons of water for each cubic foot of cement-sand mix. The volume of material must be monitored during placement because the tremie pipe is raised as the fill progresses. The end of the tremie must be kept below the surface of the grout at all times to prevent dilution and separation of the grout mix.

Precaution: Remember how much material is in the tremie pipe at all stages and approximately how much depth it will fill. A 10-foot section of 3-inch diameter tremie contains nearly a half a cubic foot, so 100 feet would contain 5 cubic feet. If filling an 8-inch casing, which contains 0.35 cubic feet per foot of length, ignoring the volume in the tremie would be an error of 14.3 feet. Tag or measure the progress of the plugging material as the well is filled, and pump or siphon off any excess water that is displaced as the grout is added.

Plugging Confined, Multiple-zone or Rock Aquifers

If the aquifer is known to contain confining layers or more than one water-bearing zone, a plug at each confining layer between each aquifer is required. If the outside of the casing was not grouted at those locations, as is common with old wells, the casing should be ripped and grout pumped into the gravel pack to restore a good seal at the confining layer. Most licensed well drillers have equipment to rip or puncture casing so grout can be forced into the gravel pack. Landowners are advised to hire a competent licensed water well driller to plug all confined, multiple-zone or rock aquifers and other unusual formations. In addition to having needed equipment, a driller should know the local geology, so grout plugs and other materials are placed correctly.

Oil and Gas Wells

Plugging abandoned oil, gas, or brine-disposal wells is equally important. Report these wells to the Kansas Corporation Commission to assure they are properly plugged. The KCC's district offices are in Dodge City, (316) 225-8888; Wichita, (316) 337-6231; Chanute, (316) 431-6946; and Hays, (785) 628-1200.

Conclusion

Abandoned wells are potential sources of direct contamination of valuable groundwater. Wells larger than a few inches in diameter also are a safety hazard for children and animals. All abandoned wells should be properly plugged to prevent contamination and eliminate the safety hazard. Plugging is required by Kansas law. When a replacement well is drilled, the old well, according to law, must continue to be used, upgraded to current standards, or plugged. It is not uncommon to visit a farmstead and find three or four wells with only one or perhaps two currently in use. While there is a reluctance to pay to get rid of something that has outlived its usefulness, groundwater protection, safety, and Kansas law make plugging important. Abandoned water wells can no longer be ignored.

Related References:

Plugging Cisterns, Cesspools, Septic Tanks, and Other Holes, K-State Research and Extension Publication MF-2246.

Plugging Packet, Kansas Department of Health and Environment.

Danny H. Rogers
Extension Irrigation Engineer

G. Morgan Powell
Extension Natural Resource Engineer

Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan, Kansas

MF-935 (Revised) January 1998

File Code: Engineering 4–5 (Water Quality)

MS 1-98—9M

Appendix - 4.

Susceptibility Analysis "Decision Tree" and "Scorecards"

Executive Summary

Public Water Supply: **LEON, CITY OF**
Assessment Area: **4**

Susceptibility Likelihood Scores for Assessment Area

Contaminant Category	A	B	B*	C	C*	D
Susceptibility Likelihood Score – SLS	41	42	43	48	42	51
SLS Range	Low	Low	Low	Low	Low	Low

A – Microbiolgical
B* – Nitrates
C* – Pesticides
B – Inorganic Compounds
C – Synthetic Organic Compounds
D – Volatile Organic Compounds

Susceptibility Likelihood Range

SLS Range	
0–50	Low Susceptibility
51–80	Moderate Susceptibility
81–100	High Susceptibility

Assessment Analysis

Public Water Supply: **LEON, CITY OF**
Assessment Area: **4**

Ground Water Multiple Wells Analysis

A – Microbiolgical **B** – Inorganic Compounds
B* – Nitrates **C** – Synthetic Organic Compounds
C* – Pesticides **D** – Volatile Organic Compounds

No.	Question	Response	A	B	B*	C	C*	D
1	Is any well under the influence of surface water?	No	0	0	0	0	0	0
2	Do all PWS wells meet KS PWS water well construction standards?	Yes	0	0	0	0	0	0
3	Is any well less than 30 feet deep?	No	0	0	0	0	0	0
4	Is gravel pack within 20 feet of any well surface?	No	0	0	0	0	0	0
5	Does a PWS own or control all the areas around the wells?	Yes	0	0	0	0	0	0
6	Does Zone B consist entirely of native grass?	No	2	2	2	2	2	2
7	Is there a contaminated well in Zone B?	Yes	1	1	1	1	1	1
8	Is a class V UIC well present?	Yes	1	1	1	1	1	1
9	Are any commercial, industrial, or urban areas present in Zone B?	No	0	0	0	0	0	0
10	Does each industrial/commercial site and urban area have a water quality protection plan in place?	Yes	0	0	0	0	0	0
11	Are any non–farm home sites present in Zone B?	No	0	0	0	0	0	0
12	Do all the non–farm home sites have a water quality protection plan?	Yes	0	0	0	0	0	0
13	Are any farmsteads present in Zone B?	No	0	0	0	0	0	0
14	Do all farmsteads have a water quality protection plan?	Yes	0	0	0	0	0	0
15	Is there grazing livestock in Zone B?	Yes	1	0	1	0	0	0
16	Have all livestock producers implemented water quality protection measures?	No	1	0	1	0	0	0
17	Is there livestock confinement in Zone B?	No	0	0	0	0	0	0

No.	Question	Response	A	B	B*	C	C*	D
18	Is each confined animal feeding operation registered with KDHE?	Yes	0	0	0	0	0	0
19	Is there corn or grain sorghum production in Zone B?	Yes	0	0	1	0	1	0
20	Are corn/grain sorghum nutrient and pesticide management plans in use for each site?	No	0	0	1	0	1	0
21	Are any orchards present in Zone B?	No	0	0	0	0	0	0
22	Are orchard nutrient and pesticide management plans in use for each site?	Yes	0	0	0	0	0	0
23	Are there unsewered developments (concentrations of lagoons or septic systems) present in Zone B?	No	0	0	0	0	0	0
24	Is there a railroad or major highway in Zone B or C?	Yes	0	1	1	1	1	1
25	Is there oil production in Zone B or C?	Yes	0	1	0	1	0	1
26	Do coarse textured soils predominate Zones A, B and C?	No	0	0	0	0	0	0
27	Is an irrigation well located in Zone B or C?	No	0	0	0	0	0	0
28	Is a wastewater treatment facility in Zone B or C?	Yes	1	1	1	1	1	1
29	Is a solid waste landfill in Zone B or C?	No	0	0	0	0	0	0
30	Are there unplugged, abandoned water wells present in Zone C?	Yes	2	1	1	1	1	1
31	Are any commercial, industrial, or urban area present in Zone C?	Yes	1	1	1	1	1	1
32	Does each industrial/commercial site and urban area have a water quality protection plan in place?	No	1	1	1	1	1	1
33	Is there livestock confinement in Zone C?	No	0	0	0	0	0	0
34	Is each confined livestock facility registered with KDHE?	Yes	0	0	0	0	0	0
35	Do all the livestock producers have water quality protection measures in place?	Yes	0	0	0	0	0	0
36	Are cropland nutrient management plans in place?	No	0	0	1	0	0	0
37	Are cropland pesticide management plans in place?	No	0	0	0	0	1	0
38	Does a perennial stream flow into Zone C?	Yes	1	1	1	1	1	1
39	Are watershed water quality protection plans in place?	No	1	1	1	1	1	1

Appendix - 5.

Decision on Rigorous Delineation and Control

The City of Leon decided that after evaluating the results of the Susceptibility Analysis that-

___X___ The preliminary delineation was satisfactory to their needs. They do not intend to legally restrict or prohibit activities within the protection area, but rather choose to influence activities through non-regulatory activities.

_____ The preliminary delineation did not meet their needs. The risks posed by the activities and land uses within the preliminary protection area were sufficiently high, so as to dictate the need to restrict or prohibit certain activities.

Appendix - 6.

Public Participation

City of Leon, Kansas, solicited public participation while developing this Source Water Protection Plan in the following manner:

> The City of Leon solicited public participation by asking the locally elected board members to participate on the Source Water Protection Planning Committee. This committee was instrumental in the development of the City of Leon's Source Water Protection Plan.

Before the final draft of the Plan was submitted to KDHE for recording, the adoption of the source water protection plan was added to the agenda of a regular monthly board meeting. Discussion of the plan during the meeting was held before the final draft was approved by the City of Leon. After discussion of the proposed plan and its adoption in the regular board meeting open to the public, a copy of the plan was submitted to the Kansas Department of Health and Environment.

Appendix - 7.

Review and Approval Document from the Kansas Department of Health and Environment

KANSAS
RURAL
WATER
association
Quality water, quality life

P.O. Box 226 • Seneca, KS 66538 • 785/336-3760
FAX 785/336-2751 • http://www.krwa.net

December 27, 2021

Travis Sieve
Watershed Management Section
KDHE Bureau of Water
1000 SW Jackson Street, Suite 420
Topeka, Kansas 66612-1367

RE: City of Leon

Dear Travis:

Enclosed is a copy of a KRWA "Request for Assistance" form from the City of Leon, registering their intent to develop a Source Water Protection Plan. Your office's input and assistance with this project would be greatly appreciated.

If you have any questions, you can reach me by telephone at (785) 260-5381 or by E-mail to ken@krwa.net.

Please be reminded that the KRWA website at krwa.net has news and information for water and wastewater utilities, including water rights, source water protection and training opportunities.

Sincerely,

Kenneth A. Kopp, P.G.
Assistant General Manager
Kansas Rural Water Association

c: City of Leon

Source Water Protection Planning

Request for Assistance

We, the undersigned public water supply system, desire to have assistance from the Kansas Rural Water Association and to become a participant in the Kansas Public Water Supply Protection Program. It is our intent to develop and implement a Source Water Protection Plan. We request the assistance and guidance of the Kansas Department of Health and Environment during the development and implementation process.

Date: December 21, 2021

Public Water Supply Name: City of Leon

Address: 111 S Main, Leon, KS 67074

Phone: 316-742-3438 E-Mail: Cityofleon@yahoo.com

Primary Contact Person: Jodie Laidler

Source of Water: ground water Number of Wells: 3

Number of Connections: 291 Population Served: 737

Do you sell water to another city or rural water district: Yes: _____ No: X

Known water quality problems:

Nitrates: _____ Bacteria: _____ VOCs: _____ Pesticides: _____ Salts: _____ Taste/Odor: _____

Other:

Return form to:
Kansas Rural Water Association, c/o Kenneth A. Kopp, 2707 SW College Ave, Topeka, Kansas 66611

Appendix - 8.

Contacts

Source Water Protection Plan Contact List

Butler County USDA Service Center
2503 Enterprise Avenue
El Dorado, Kansas 67042-3275
Telephone: (316) 321-5803
Fax: (855) 725-7677 Fax
http://fsa.usda.gov/ks

Butler County Conservation District
2503 Enterprise Avenue, Suite B
El Dorado, Kansas 67042, USA
Telephone: (316) 320-3549
https://butlercountyconservationdistrictks.com/

Butler County Extension Office
Butler County Research and Extension Office
206 North Griffith
El Dorado, Kansas 67042
Telephone: (316) 321-9660
Fax: (316) 321-2302
https://butler.k-state.edu/

Butler County Emergency Management
2100 North Ohio Street, Suite B
Augusta, Kansas 67010
Telephone: (316) 733-9796
Fax: (316) 733-0119

Butler County Sheriff
141 South Gordy Street
El Dorado, Kansas 67042
Telephone: (316) 322-4254
Toll Free: (800) 794-0190
Fax: (316) 320-3189

Butler County Public Works Department
121 South Gordy Street, Suite 200
El Dorado, Kansas 67042
Telephone: (316) 322-4101
Toll Free: (800) 822-7091
Fax: (316) 322-4286

Butler County Board of Commissioners
(District 4)
Butler County Courthouse
Fourth Floor, Commission Meeting Room
205 West Central Avenue
El Dorado, Kansas 67042
Telephone: (316) 322-4300
Fax: (316) 322-4387

Butler County Public Health Department
206 North Griffith Street, Suite B
El Dorado, Kansas 67042
Telephone: (316) 321-3400
Toll Free: (800) 940-6083
Fax: (316) 321-1338

Local Environmental Protection Program
Butler County Community Development
Program Director/Sanitarian: Shawn Haring
121 South Gordy Street, Suite 202
El Dorado, Kansas 67042
Telephone: (316) 322-4325
E-mail: dalfaro@bucoks.com

Butler Co Fire District #9
Leon Fire Dept
201 South Main Street
Leon, Kansas 67074
Telephone: (316)745-3658

El Dorado Fire Department
220 East First Street
El Dorado, Kansas 67042
Telephone: (316) 321-9100

Little Walnut Township Board
P.O. Box 313
Leon, Kansas 67074
Telephone: (316) 742-3680

Evergy, Incorporated
700 North Star Street
El Dorado, Kansas 67042
Telephone: (800) 544-4857

Kansas Department of Health and Environment
Watershed Management Section
1000 S.W. Jackson Street, Suite 420
Topeka, Kansas 66612
Telephone: (785) 296-4195
E-mail: NPS@kdheks.gov

South-Central District Office
Julie Coleman, Environmental Administrator
300 West Douglas, Suite 700
Wichita, Kansas 67202-2921
Telephone: (316) 337-6020
Fax: (316) 337-6055
E-mail: KDHE.SCDOAdmin@ks.gov

Source Water Protection Plan Contact List (Continued)

Kansas Department of Agriculture
Division of Water Resources
1320 Research Park Drive
Manhattan, Kansas 66502-5000
Telephone: (785) 564-6640
Fax: (785) 564-6778
E-mail: Lane.Letourneau@kda.ks.gov

DWR Stafford Field Office
300 South Main Street
Stafford, KS 67578-1521
Telephone: (620) 234-5311
Fax: (620) 234-6900
E-mail: Jeff.Lanterman@ks.gov

Kansas Rural Water Association
P.O. Box 226
Seneca, Kansas 66538
Telephone: (785) 336-2751
http://krwa.net

The Drought Monitor
National Drought Mitigation Center
P.O. Box 830988
Lincoln, Nebraska 68583-0988
Telephone: (402) 472-6707
Fax: (402) 472-2946
E-mail: drought monitor@unl.edu
http://droughtmonitor.unl.edu

Appendix - 9.

Water Right and Well Site
Easement Documents

NOTICE OF CONTENTS OF ORDER DETERMINING AND ESTABLISHING VESTED RIGHTS TO CONTINUE THE BENEFICIAL USE OF WATER

TO City of Leon
Leon, Kansas

You are hereby notified that on the 31st day of January, 19 78, the Chief Engineer of the Division of Water Resources, Kansas State Board of Agriculture, entered in the records of his office in accordance with the provisions of section 82a-704 of the 1947 Supplement to the General Statutes of Kansas, 1935, the following order, made by him, determining and establishing your vested right to continue the use of water for beneficial purposes from two wells in the Little Walnut Creek drainage area at a point in the NW¼ NE¼, Section 22, Township 27 South, Range 6 East, Butler County, Kansas.:

ORDER

The extent of your vested right to continue the beneficial use of water from the source as stated has been determined and established to be a maximum quantity of 15 million gallons per year to be diverted at a maximum rate of 85 gallons per minute for Municipal use at or upon the following described property: City of Leon and immediate vicinity.

Any appeal from this order must be made to the district court of the county in which the point of diversion is located within 60 days after posting and mailing of this notice.

Dated at Topeka, Kansas, this 31st day of January, 19 78

Chief Engineer, Division of Water Resources
Kansas State Board of Agriculture

STATE OF KANSAS
BUTLER COUNTY, ss
FILED FOR RECORD AT
3:00 P M.

AUG 3 1978

BOOK 333 PAGE 372
DIXIE ROSE
REGISTER OF DEEDS
FEE: 9.00

R.V. Smrha

22-636 7-60—10M

COMPARED ✓
NUMERICAL ✓
DIRECT ✓
INDIRECT ✓
REGISTRATION

REGISTER OF DEEDS SEAL BUTLER COUNTY

RTN: KS St. Bd of Agri. (12)
Div. of Water Res.
105 N. Main
Stafford, KS 67578

MICROFILMED
BOOK 333 PAGE 372

THE STATE OF KANSAS

STATE BOARD OF AGRICULTURE
~~Roy Freeland, Secretary~~
K. R. (Pat) Boyer, *Special Assistant Secretary*

DIVISION OF WATER RESOURCES
Guy E. Gibson, *Chief*

CORRECTIONAL ORDER

**VESTED RIGHT
DETERMINED AND ESTABLISHED IN
THE NAME OF THE CITY OF LEON
TO CONTINUE THE BENEFICIAL USE OF WATER
IDENTIFIED AS VESTED RIGHT, CODE 626, BUTLER COUNTY**

It has been determined that in the order of the Chief Engineer, Division of Water Resources, Kansas State Board of Agriculture, dated January 31, 1955, determining and establishing the vested right of the City of Leon to continue the beneficial use of water, an error was made wherein the tract of land on which the point of diversion is located was erroneously described as

> two wells in the Northwest Quarter of the Northeast Quarter (NW¼ NE¼) of Section 22, Township 27 South, Range 6 East, Butler County, Kansas.

NOW, THEREFORE, It is the decision and order of the Chief Engineer, Division of Water Resources, Kansas State Board of Agriculture, that such is an error in the order. The same should be and is hereby corrected now, as of then, to show the correct description of the tract of land on which the point of diversion is located to be

> Two (2) wells:
>
> one (1) in the Southeast Quarter of the Northeast Quarter of the Northwest Quarter (SE¼ NE¼ NW¼); and
>
> one (1) in the Southwest Quarter of the Northeast Quarter of the Northwest Quarter (SW¼ NE¼ NW¼);
>
> both in Section 22, Township 27 South, Range 6 East, Butler County, Kansas.

In all other respects, this vested right to beneficial use of water is as stated and set forth in the order of the Chief Engineer dated

MICROFILMED

January 31, 1955.

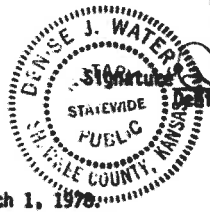
Dated at Topeka, Kansas, this 2nd day of August.

Guy E. Gibson, Chief Engineer
Division of Water Resources
Kansas State Board of Agriculture

STATE OF KANSAS, Shawnee COUNTY, ss.

BE IT REMEMBERED, That on this 2nd day of August, 1976, before me, the undersigned, a notary public in and for said County and State, came Guy E. Gibson, Chief Engineer, Division of Water Resources, Kansas State Board of Agriculture, who is personally known to me to be such duly appointed, qualified and acting official, and who is personally known to me to be the same person who executed the within instrument of writing as such official and such person duly acknowledged the execution of the same as such Chief Engineer.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year last above written.



Signature Denise J. Waters
Denise J. Waters, Notary Public

My Commission Expires March 1, 1978.

Submit completed application to:
Kansas Department of Agriculture
Division of Water Resources
Field Office for your area.
Call for address:
Topeka -- (785) 368-8251
Stafford -- (620) 234-5311
Stockton -- (785) 425-6787
Garden City -- (620) 276-2901
www.accesskansas.org/kda

DWR FIELD OFFICE APPLICATION FOR APPROVAL TO CHANGE THE PLACE OF USE AND/OR THE POINT OF DIVERSION

WATER METER REQUIRED

STATE OF KANSAS

Filing Fee Must Accompany the Application, K.S.A. 82a-708b(b) -- Fee Schedule is on the third page of this application form.

Paragraph Nos. 1, 2, 3 & 5 must be completed. Complete all other applicable portions. If change in point of diversion is greater than 100 feet, or if place of use will be changed, include a topographic map or detailed plat showing the authorized and proposed point(s) of diversion and/or place of use.

- ■ Vested Right under File No. BU-6
- ☐ Water Right under File No. _____
- ☐ Appropriation Right under File No. _____

1. Application is hereby made for approval of the Chief Engineer to change the (check one or more):
   ☐ Place of Use ■ Point of Diversion
   under the water right which is the subject of this application in accordance with the conditions described below.
   The source of supply is: ■ Groundwater ☐ Surface water

2. Name and address of Applicant: Christopher M. Wallace - City of Leon Maintenance Supervisor
   111 S. Main, PO Box 25 - Leon, Kansas 67074
   Phone Number: (~~620~~ 316) 742 - 3438 Email address: _____
   Name and address of Water Use Correspondent: City of Leon
   111 S. Main, PO Box 25 - Leon, Kansas 67074
   Phone Number: (~~620~~ 316) 742 - 3438 Email address: _____

3. The presently authorized place of use is:
   Owner of Land ------ NAME: City of Leon
   ADDRESS: 111 S. Main, PO Box 25 - Leon, Kansas 67074
   (If there is more than one landowner, attach supplemental sheets as necessary.) **NOTE: City of Leon and immediate vicinity.**

	NE¼				NW¼				SW¼				SE¼				TOTAL ACRES
Sec. Twp. Range	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
~~33 27 33E~~																	

4. If this application is for a change in place of use, it is proposed that the place of use be changed to: 9:30 am
   Owner of Land ------- NAME: No Change
   ADDRESS: _____
   (If there is more than one landowner, attach supplemental sheets as necessary.)

	NE¼				NW¼				SW¼				SE¼				TOTAL ACRES
Sec. Twp. Range	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	

For Office Use Only: *Code* ___ *Fee $* _____ *TR #* _____ *Receipt Date* _____ *Check #* _____

(a) One in the SE quarter of the NE quarter of the NW quarter of Section 22, Township 27 South, Range 06E (E/~~W~~), in BUTLER County, Kansas, 4420 (approx) feet north 2970 (approx.) feet west Depth of well 35 (feet) ***Well No. 9*** Computer ID No. 01 **(Division of Water Resources use only)**

(b) One in the SW quarter of the NE quarter of the NW quarter of Section 22, Township 27 South, Range 06E (E/~~W~~), in BUTLER County, Kansas, _____ feet north _____ feet west Depth of well 35 (feet) ***Well No. 2*** Computer ID No. 02 **(Division of Water Resources use only)**

(c) One in the NE quarter of the SE quarter of the NW quarter of Section 22, Township 27 South, Range 06E (E/~~W~~), in BUTLER County, Kansas, _____ feet north _____ feet west of Southeast corner of section. Authorized Rate 85 gpm (3-wells) Authorized Quantity 15 mgy (3 wells) Depth of well 90 (feet) ***Well No. 3*** Computer ID No. 03 ~~02~~ **(Division of Water Resources use only**

6. If this application is for a change in point of diversion, the proposed location of the point(s) of diversion ~~(is)~~ (are) **Two (2) Wells & Two (2) Pumps & Two (2) Motors - Well No. 3 plugged and dropped per this change.** located as follows:

(a) One in the SE quarter of the NE quarter of the NW quarter of Section 22, Township 27 South, Range 06E (E/~~W~~), in BUTLER County, Kansas, 4410 feet north 2970 feet west of Southeast corner of section. Proposed well depth (feet) ~~35~~ 125 **NEW - WELL No. 9**

(b) One in the SW quarter of the NE quarter of the NW quarter of Section 22, Township 27 South, Range 06E (E/~~W~~), in BUTLER County, Kansas, _____ feet north _____ feet west of Southeast corner of section. Proposed well depth (feet) N/A **WELL No. 2**

7. Why do you need a new point of diversion?

Well No. 9 needs replaced as per KDHE

8. If a well, is the test hole log attached? ☐ Yes ■ No

9. When do you propose to complete the new point of diversion?

ASAP

10. If the point of diversion is a well:
(a) What are you going to do with the old well?

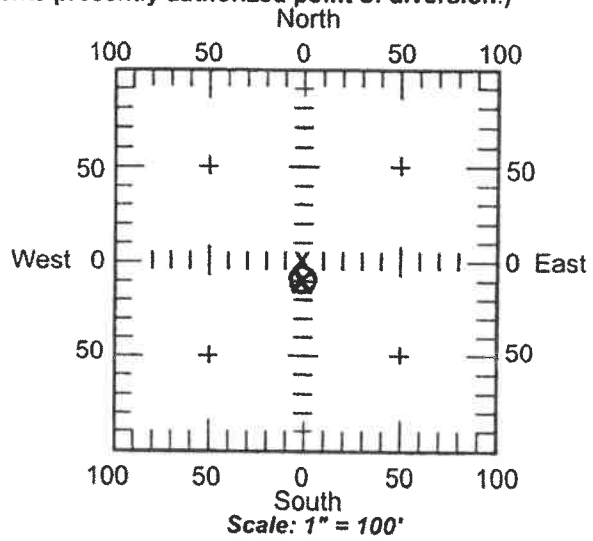
Plug It

(b) When will this be done? **When new well drilled.**

11. Groundwater Management District recommendation attached? ☐ Yes ■ No

12. Assisted by **Jan Stryker - SFO**

13a. If the proposed point of diversion will be relocated within 100 feet of the existing point of diversion, indicate its location on the diagram below in relation to the existing point of diversion. **(PLEASE NOTE: The "X" in center of diagram below represents presently authorized point of diversion.)**



Scale: 1" = 100'

13b. If the proposed point of diversion will be relocated more than 100 feet but within 1320 feet from the existing point of diversion, attach a topographic map or aerial photograph. For groundwater sources, show all wells (including domestic) within one-half mile of the proposed point of diversion and the names and mailing addresses of the owners. For surface water sources, show the names and addresses of the landowner(s) one-half mile downstream and one-half mile upstream from your property lines.

14. If the proposed groundwater point of diversion is 300 or fewer feet from existing point of diversion, complete the following:

(a) Does the undersigned represent all owners of the currently authorized place(s) of use identified in this application?
■ Yes ☐ No (If no, all owners must sign this application.)

(b) Will the ownership interest of any owner of the currently authorized place(s) of use identified in this application be adversely affected if this application is approved as requested?
☐ Yes ■ No (If yes, all owners must sign this application.)

(c) If this application is not approved expeditiously, will there be substantial damage to property, public health or safety?
■ Yes ☐ No (If no, all owners must sign this application.)

If the application proposes a surface water change in point of diversion, a groundwater change in point of diversion greater than 300 feet, or a change in place of use, the application must be signed by all owners of the currently authorized place of use, or their duly authorized agent (attach notarized statement authorizing representation).

I declare that I am an owner of the currently authorized place of use as identified herein, or that I represent all such owners and am authorized to make this application on their behalf, and declare further that the statements contained herein are true, correct, and complete.

Dated at Leon (city), Kansas, this 25 (day) day of September (month), 2002 (year)

[signature] (Owner) _____ (Spouse)

_____ (Owner) _____ (Spouse)

State of Kansas)
) SS
County of Butler)

I hereby certify that Christopher M Wallace appeared before me and signed this foregoing application in my presence this 25th (day) day of September (month), 2002 (year).

Notary Public State of Kansas
Jan Long
My Appt Exp 9-14-06

[signature]
Notary Public

My Commission Expires 9-14-06.

ONLY COMPLETE APPLICATIONS WILL BE PROCESSED. To be complete, all of the applicable portions of the application form must be completed with accurate information; maps, if necessary, must be included; signatures of all the appropriate owners' must be affixed to the application and notarized; and the appropriate fee must be paid.

FEE SCHEDULE Effective July 1, 2002

Each application to change the place of use or the point of diversion under this section shall be accompanied by the application fee set forth in the schedule below: Make checks payable to: **Kansas Department of Agriculture**

(1) Application to change a point of diversion 300 feet or less $100
(2) Application to change a point of diversion more than 300 feet $200
(3) Application to change the place of use $200

Any application submitted which requests two of the types of changes set forth above shall be accompanied by a fee of $300.

SUMMARY ORDER APPROVING APPLICATION FOR CHANGE AND IMPOSING CONDITIONS

This Summary Order is issued under authority of K.S.A. 82a-708b and K.A.R. 5-14-3 and other applicable provisions of the *Kansas Water Appropriation Law, K.S.A. 82a-701 et. seq.*, and rules and regulations promulgated thereunder, K.A.R. 5-1-1 *et.seq.* With the exception of those conditions expressly contained herein, this Summary Order does not change the terms, conditions and limitations of File No. **BU-06**.

1. A change application was received on _____ requesting that the place of use and / or point of diversion authorized under the above-referenced file number be changed as described in the application.

2. On and after the effective date of this summary order, the authorized place(s) of use shall be located substantially as shown on the topographic map accompanying the application to change the place of use. ☐ Applicable ■ Not Applicable

3. The change in point of diversion shall not impair existing rights and shall be limited to the same source or sources of water as previously authorized. The point of diversion authorized by this summary order shall be located within a ~~20~~ 10 foot radius of the authorized point(s) of diversion. ■ Applicable ☐ Not Applicable

4. The point(s) of diversion authorized herein shall not actually be located more than 20 ~~10~~ feet from the previously authorized point(s) of diversion. ■ Applicable ☐ Not Applicable

5. As required by K.A.R. 5-3-5d, if the works for diversion is a well with a diversion rate of 100 gallons per minute or more, a tube or other device suitable for making water level measurements shall be installed, operated and maintained in accordance with K.A.R. 5-6-13. ■ Applicable ☐ Not Applicable

6. **The owner of the authorized place(s) of use shall properly install an acceptable water meter on or before December 31, 2002**____, or before the first use of water, whichever occurs first. The water meter shall be installed, operated and maintained in accordance with K.A.R. 5-1-4 through 5-1-12 As required by K.S.A.82a-732 and K.A.R. 5-3-5e, the owner shall maintain records and report the reading of the water meter and the total quantity of water diverted annually to the Chief Engineer by March 1 following the end of each calendar year. ■ Applicable ☐ Not Applicable

7. **Installation of the works for diversion of water shall be completed on or before December 31, 2002**____, or within any authorized extension of time. By March 1, 2003 ___ the applicant shall notify the Chief Engineer that construction of the works for diversion has been completed, on the form provided by the Chief Engineer, as required by K.A.R. 5-8-4e. ■ Applicable ☐ Not Applicable

8. **The completed well log shall be submitted with the required notice.** ■ Applicable ☐ Not Applicable

9. All diversion works into which any type of chemical or other foreign substance will be injected into the water shall be equipped with an in-line, automatic, quick-closing check valve capable of preventing pollution of the source of the water supply. The check valve(s) shall be installed, operated and maintained in accordance with K.A.R. 5-3-5c. ■ Applicable ☐ Not Applicable

10. Additional Conditions are attached. ☐ Yes ■ No

11. In accordance with K.S.A. 82a-708a and K.A.R. 5-5-14, all of the owners of the authorized place(s) of use of water appropriated under the above-referenced file number are responsible for compliance with its terms, conditions and limitations, as amended and/or supplemented by this Summary Order, and with applicable provisions of the *Kansas Water Appropriation Law* and the *Rules and Regulations* promulgated thereunder. Failure to comply with these provisions may result in civil penalties pursuant to K.S.A. 82a-737 and/or the suspension or revocation and dismissal of the water or appropriation right.

Administrative Appeal and Effective Date of Order

You have the right to a hearing in accordance with K.A.R. 5-14-3 before this Summary Order becomes a final action of the Kansas Department of Agriculture. Any request for a hearing must be filed with the **Chief Engineer, Division of Water Resources, Kansas Department of Agriculture, 109 SW 9th Street, Topeka, Kansas 66612,** within 15 days after the date shown on the Certificate of Service attached hereto. If a hearing is not requested in accordance with K.A.R. 5-14-3, this Summary Order will become effective on the 15th day after the date shown on the Certificate of Service.

_____
For Use by Register of Deeds

FOR OFFICE USE ONLY
APPLICATION APPROVED AND SUMMARY ORDER ISSUED

By: M Bruce Falk
Duly Authorized Designee of the Chief Engineer

(Print Name): M. Bruce Falk
Division of Water Resources – Kansas Department of Agriculture

Date of Issuance: October 1, 2002

State of Kansas }
County of Stafford } SS

Acknowledged before me on October 1, 2002

by M Bruce Falk

Signature: J. Marlene Whitlock
J. Marlene Whitlock Notary Public

J. MARLENE WHITLOCK
Notary Public - State of Kansas
My Appt. Expires March 6, 2004

My commission expires _____ (Notary Seal)

Submit completed application to:
Kansas Department of Agriculture
Division of Water Resources
Field Office for your area.
Call for address:
Topeka -- (785) 368-8251
Stafford -- (620) 234-5311
Stockton -- (785) 425-6787
Garden City -- (620) 276-2901
www.ksda.gov

DWR FIELD OFFICE APPLICATION FOR APPROVAL TO CHANGE THE PLACE OF USE AND/OR THE POINT OF DIVERSION

STATE OF KANSAS

Filing Fee Must Accompany the Application, K.S.A. 82a-708b(b) -- Fee Schedule is on the third page of this application form.

Paragraph Nos. 1, 2, 3 & 5 must be completed. Complete all other applicable portions. If change in point of diversion is greater than 100 feet, or if place of use will be changed, include a topographic map or detailed plat showing the authorized and proposed point(s) of diversion and/or place of use.

~~WATER~~ METER REQUIRED

☒ Vested Right, File No. BU-006
☐ Appropriation Right, File No. _____

1. Application is hereby made for approval of the Chief Engineer to change the (check one or more):
☐ Place of Use ☒ Point of Diversion
under the water right which is the subject of this application in accordance with the conditions described below.
The source of supply is: ☒ Groundwater ☐ Surface water

2. Name and address of Applicant: City of Leon
111 S. Main, P.O. Box 25, Leon, KS 67074
Phone Number: (316) 742-3438 Email address: _____
Name and address of Water Use Correspondent: Don LaKin, City Supt.
see above
Phone Number: ( ) _____ Email address: _____

3. The presently authorized place of use is: No change CITY OF LEON & IMMEDIATE VICINITY. P/D
Owner of Land ---- NAME: _____
ADDRESS: _____
(If there is more than one landowner, attach supplemental sheets as necessary.)

Sec. Twp. Range	NE¼				NW¼				SW¼				SE¼				TOTAL ACRES
	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
22-27S-6E																	

JS/pw.

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FEB 04 2008
9:46 AM
STAFFORD FIELD OFFICE
DIVISION OF WATER RESOURCES

4. If this application is for a change in place of use, it is proposed that the place of use be changed to:
Owner of Land ---- NAME: _____
ADDRESS: _____
(If there is more than one landowner, attach supplemental sheets as necessary.)

Sec. Twp. Range	NE¼				NW¼				SW¼				SE¼				TOTAL ACRES
	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	

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MAY 20 2008
STAFFORD FIELD OFFICE
DIVISION OF WATER RESOURCES

For Office Use Only: *Code* _____ *Fee $*_____ *TR #* _____ *Receipt Date* _____ *Check #* _____

5. The presently authorized point(s) of diversion ~~(is)~~ (are) Two wells located as follows:

(a) One in the SW quarter of the NE quarter of the NW quarter of Section 22, Township 27 JS/DWR South, Range 6 (E/W), in Butler County, Kansas, ~~4419~~ feet north ~~3954~~ feet west of Southeast corner of section. Well 2
Authorized Rate 85 Authorized Quantity 15 M Depth of well 135 (feet)
(Computer ID No. ____ DWR use only) QUANTITY & RATE COMBINED (2) WELLS

(b) One in the SE quarter of the NE quarter of the NW quarter of Section 22, Township 27 South, Range 6 (E/W), in Butler County, Kansas, 4410 feet north 2970 feet west of Southeast corner of section. Well 9
Authorized Rate 85 Authorized Quantity 15 M Depth of well 125 (feet)
(Computer ID No. ____ DWR use only) (Note – Our GPS reading on this site was 4698' N and 3054' W.)
Use supplemental sheet for additional points of diversion, if needed.

6. If this application is for a change in point of diversion, the proposed location of the point(s) of diversion ~~(is)~~ (are) Two wells located as follows:

(a) One in the SW quarter of the NE quarter of the NW quarter of Section 22, Township 27 South, Range 6 (E/W), in Butler County, Kansas, ~~4419~~ feet north ~~3954~~ feet west of Southeast corner of section. Well 12
Proposed well depth (feet) 135 JS/DWR

(b) One in the NW quarter of the NE quarter of the NW quarter of Section 22, Township 27 South, Range 6 (E/W), in Butler County, Kansas, 4717 feet north 3648 feet west of Southeast corner of section. Well 10
Proposed well depth (feet) 100
Use supplemental sheet for additional points of diversion, if needed.

7. Why do you need a new point of diversion? Old Well 9 is too close to the river to meet KDHE regulations

8. If a well, is the test hole log attached? ☒ Yes ☐ No

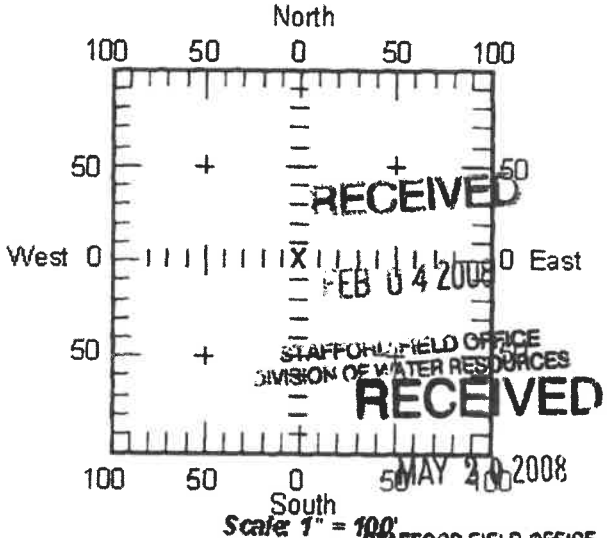
9. When do you propose to complete the new point of diversion?
1 May 2008

10. If the point of diversion is a well:
(a) What are you going to do with the old well?
Plugged and abandoned
(b) When will this be done? 12 Jan 04

11. Groundwater Management District recommendation attached? ☐ Yes ☒ No

12. Assisted by R. Vincent

13a. If the proposed point of diversion will be relocated within 100 feet of the existing point of diversion, indicate its location on the diagram below in relation to the existing point of diversion. **(PLEASE NOTE: The "X" in center of diagram below represents presently authorized point of diversion.)**



13b. If the proposed point of diversion is more than 100 feet but within 1320 feet from the existing point of diversion, attach a topographic map or aerial photograph. For groundwater sources, show all wells (including domestic) within one-half mile of the proposed point of diversion and the names and mailing addresses of the owners. For surface water sources, show the names and addresses of the landowner(s) one-half mile downstream and one-half mile upstream from your property lines.

14. If the proposed groundwater point of diversion is 300 or fewer feet from existing point of diversion, complete the following:

(a) Does the undersigned represent all owners of the currently authorized place(s) of use identified in this application?
☐ Yes ☐ No (If no, all owners must sign this application.)

(b) Will the ownership interest of any owner of the currently authorized place(s) of use identified in this application be adversely affected if this application is approved as requested?
☐ Yes ☐ No (If yes, all owners must sign this application.)

(c) If this application is not approved expeditiously, will there be substantial damage to property, public health or safety?
☐ Yes ☐ No (If no, all owners must sign this application.)

If the application proposes a surface water change in point of diversion, a groundwater change in point of diversion greater than 300 feet, or a change in place of use, the application must be signed by all owners of the currently authorized place of use, or their duly authorized agent (attach notarized statement authorizing representation).

I declare that I am an owner of the currently authorized place of use as identified herein, or that I represent all such owners and am authorized to make this application on their behalf, and declare further that the statements contained herein are true, correct, and complete.

Dated at Leon (city), Kansas, this 31 (day) day of January (month), 2008 (year)

City of Leon (Owner) _____ (Spouse)

L. Gerald Schuetz Mayor (Owner) _____ (Spouse)

State of Kansas)
) SS
County of BUTLER)

I hereby certify that L. GERALD SCHUETZ (Please Print) appeared before me and signed this foregoing application in my presence this 31 day of January, 2008.

JOHNNIE L. JONES
Notary Public - State of Kansas
My Appt. Expires 07-02-2010

Notary Public

My Commission Expires 07-02-2010

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FEB 04 2008

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DIVISION OF WATER RESOURCES
MAY 20 2008
STAFFORD FIELD OFFICE
DIVISION OF WATER RESOURCES

ONLY COMPLETE APPLICATIONS WILL BE PROCESSED. To be complete, all of the applicable portions of the application must be completed with accurate information; maps, if necessary, must be included; signatures of all the appropriate owners' must be affixed to the application and notarized; and the appropriate fee must be paid.

FEE SCHEDULE Effective July 1, 2002

Each application to change the place of use or the point of diversion under this section shall be accompanied by the application fee set forth in the schedule below: Make checks payable to: **Kansas Department of Agriculture**

(1) Application to change a point of diversion 300 feet or less $100
(2) Application to change a point of diversion more than 300 feet $200
(3) Application to change the place of use $200

Any application submitted which requests two of the types of changes set forth above shall be accompanied by a fee of $300.

SUMMARY ORDER APPROVING APPLICATION FOR CHANGE AND IMPOSING CONDITIONS

This Summary Order is issued under authority of K.S.A. 82a-708b and K.A.R. 5-14-3 and other applicable provisions of the *Kansas Water Appropriation Law, K.S.A. 82a-701 et. seq.*, and rules and regulations promulgated thereunder, K.A.R. 5-1-1 *et.seq.* With the exception of those conditions expressly contained herein, this Summary Order does not change the terms, conditions and limitations of File No. B46.

1. A change application was received on 2/4/2008 requesting that the place of use and / or point of diversion authorized under the above-referenced file number be changed as described in the application.
2. On and after the effective date of this summary order, the authorized place(s) of use shall be located substantially as shown on the topographic map accompanying the application to change the place of use. ☐ Applicable ☒ Not Applicable
3. The change in point of diversion shall not impair existing rights and shall be limited to the same source or sources of water as previously authorized. The point of diversion authorized by this summary order shall be located within a 300 foot radius of the authorized point(s) of diversion. ☒ Applicable ☐ Not Applicable
4. The point(s) of diversion authorized herein shall not actually be located more than 1044 feet from the previously authorized point(s) of diversion. ☒ Applicable ☐ Not Applicable
5. As required by K.A.R. 5-3-5d, if the works for diversion is a well with a diversion rate of 100 gallons per minute or more, a tube or other device suitable for making water level measurements shall be installed, operated and maintained in accordance with K.A.R. 5-6-13. ☒ Applicable ☐ Not Applicable
6. **The owner of the authorized place(s) of use shall properly install an acceptable water meter on or before December 31, 2009**, or before the first use of water, whichever occurs first. The water meter shall be installed, operated and maintained in accordance with K.A.R. 5-1-4 through 5-1-12. As required by K.S.A.82a-732 and K.A.R. 5-3-5e, the owner shall maintain records and report the reading of the water meter and the total quantity of water diverted annually to the Chief Engineer by March 1 following the end of each calendar year. ☒ Applicable ☐ Not Applicable
7. **Installation of the works for diversion of water shall be completed on or before December 31, 2009**, or within any authorized extension of time. By March 1, 2010 the applicant shall notify the Chief Engineer that construction of the works for diversion has been completed, on the form provided by the Chief Engineer, as required by K.A.R. 5-8-4e. ☒ Applicable ☐ Not Applicable
8. **The completed well log shall be submitted with the required notice.** ☐ Applicable ☒ Not Applicable
9. All diversion works into which any type of chemical or other foreign substance will be injected into the water shall be equipped with an in-line, automatic, quick-closing check valve capable of preventing pollution of the source of the water supply. The check valve(s) shall be installed, operated and maintained in accordance with K.A.R. 5-3-5c. ☒ Applicable ☐ Not Applicable
10. Additional Conditions are attached. ☐ Yes ☒ No
11. In accordance with K.S.A. 82a-708a and K.A.R. 5-5-14, all of the owners of the authorized place(s) of use of water appropriated under the above-referenced file number are responsible for compliance with its terms, conditions and limitations, as amended and/or supplemented by this Summary Order, and with applicable provisions of the *Kansas Water Appropriation Law* and the *Rules and Regulations* promulgated thereunder. Failure to comply with these provisions may result in civil penalties pursuant to K.S.A. 82a-737 and/or the suspension or revocation and dismissal of the water or appropriation right.

Administrative Appeal and Effective Date of Order

You have the right to a hearing in accordance with K.A.R. 5-14-3 before this Summary Order becomes final action of the Kansas Department of Agriculture. Any request for a hearing must be filed with the **Chief Engineer, Division of Water Resources, Kansas Department of Agriculture, 109 SW 9th Street, Topeka, Kansas 66612,** within 15 days after the date shown on the Certificate of Service attached hereto. If a hearing is not requested in accordance with K.A.R. 5-14-3, this Summary Order will become effective on the 15th day after the date shown on the Certificate of Service.

For Use by Register of Deeds

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FEB 04 2008
STAFFORD FIELD OFFICE
DIVISION OF WATER RESOURCES

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APPLICATION APPROVED AND SUMMARY ORDER ISSUED

By: M Bruce Falk
Duly Authorized Designee of the Chief Engineer

(Print Name): M. Bruce Falk
Division of Water Resources - Kansas Department of Agriculture

Date of Issuance: March 17, 2008

State of Kansas) SS
County of Stafford)

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MAY 20 2008
STAFFORD FIELD OFFICE
DIVISION OF WATER RESOURCES

Acknowledged before me on March 17, 2008
by M Bruce Falk

Signature: Jenny L Clark
Notary Public

OFFICIAL SEAL
JENNY L. CLARK
MY COMMISSION EXPIRES
April 7, 2008

My commission expires:
(Notary Seal)

THE STATE OF KANSAS

KANSAS DEPARTMENT OF AGRICULTURE
Jamie Clover Adams, Secretary of Agriculture

DIVISION OF WATER RESOURCES
David L. Pope, Chief Engineer

CERTIFICATE OF APPROPRIATION FOR BENEFICIAL USE OF WATER

WATER RIGHT, File No. 34,692

PRIORITY DATE November 13, 1980

WHEREAS, It has been determined by the undersigned that construction of the appropriation diversion works has been completed, that water has been used for beneficial purposes and that the appropriation right has been perfected, all in conformity with the conditions of approval of the application pursuant to the water right referred to above and in conformity with the laws of the State of Kansas.

NOW, THEREFORE, Be It Known that DAVID L. POPE, the duly appointed, qualified and acting Chief Engineer of the Division of Water Resources of the Kansas Department of Agriculture, by authority of the laws of the State of Kansas, and particularly K.S.A. 82a-714, does hereby certify that, subject to vested rights and prior appropriation rights, the appropriator is entitled to make use of groundwater to be withdrawn by means of a well located in the Northwest Quarter of the Southeast Quarter of the Northwest Quarter (NW¼ SE¼ NW¼) of Section 22, more particularly described as being near a point 3,551 feet North and 3,763 feet West of the Southeast corner of said section, in Township 27 South, Range 6 East, Butler County, Kansas, at a diversion rate not in excess of 17 gallons per minute (0.04 c.f.s.) and a quantity not to exceed 3.2 million gallons (9.8 acre-feet) of water per calendar year for municipal use in the City of Leon and the immediate vicinity.

(over)

All terms, conditions and limitation applicable to the Appropriation of Water not expressly changed or removed by the issuance of the Certificate of Appropriation remain in full force and effect. Failure to comply with those terms, conditions and limitations, and those added or amended by this Certificate, will result in the suspension of this appropriation right or revocation and dismissal of this appropriation right.

This is a final agency action. If you choose to appeal this decision or any finding or part thereof, you must do so by filing a petition for review in the manner prescribed by the Kansas Act for Judicial Review and Civil Enforcement of Agency Actions (KJRA K.S.A. 77-601 et. seq.) within 30 days of service of this order. Your appeal must be made with the appropriate district court for the district of Kansas. If you have any questions or would like clarification concerning this order, you may contact the Chief Engineer.

IN WITNESS WHEREOF, I have hereunto set my hand at my office at Topeka, Kansas, this 8th day of April, 2002

DIVISION OF WATER RESOURCES
DAVID L. POPE
CHIEF ENGINEER
KANSAS DEPARTMENT of AGRICULTURE

David L. Pope, P.E.
Chief Engineer
Division of Water Resources
Kansas Department of Agriculture

State of Kansas)
) SS
County of Shawnee)

The foregoing instrument was acknowledged before me this 8th day of April, 2002, by David L. Pope, P.E., Chief Engineer, Division of Water Resources, Kansas Department of Agriculture.

DENISE J. ROLFS
Notary Public - State of Kansas
My Appt. Expires March 01, 2006

Notary Public Denise J Rolfs

THE STATE OF KANSAS

KANSAS DEPARTMENT OF AGRICULTURE
Adrian J. Polansky, Secretary of Agriculture

DIVISION OF WATER RESOURCES
David W. Barfield, Chief Engineer

APPROVAL OF APPLICATION
and
PERMIT TO PROCEED
(This Is Not a Certificate of Appropriation)

This is to certify that I have examined Application, **File No. 46,998** of the applicant

CITY OF LEON
111 SOUTH MAIN - P.O. BOX 25
LEON KANSAS 67075

for a permit to appropriate water for beneficial use, together with the maps, plans and other submitted data, and that the application is hereby approved and the applicant is hereby authorized, subject to vested rights and prior appropriations, to proceed with the construction of the proposed diversion works (except those dams and stream obstructions regulated by K.S.A. 82a-301 through 305a, as amended), and to proceed with all steps necessary for the application of the water to the approved and proposed beneficial use and otherwise perfect the proposed appropriation subject to the following terms, conditions and limitations:

1. That the priority date assigned to such application is **February 28, 2008.**

2. That the water sought to be appropriated shall be used for municipal purposes within the City of Leon, Kansas and immediate vicinity.

3. That the authorized source from which the appropriation shall be made is groundwater from Permian age limestones and Quaternary age alluvium, to be withdrawn by means of one (1) well located in the Northwest Quarter of the Northeast Quarter of the Northwest Quarter (NW¼ NE¼ NW¼) of Section 22, more particularly described as being near a point 4,717 feet North and 3,648 feet West of the Southeast corner of said section, in Township 27 South, Range 6 East, Butler County, Kansas, located substantially as shown on the topographic map accompanying the application.

4. That the appropriation sought shall be limited to a maximum diversion rate not in excess of **100 gallons per minute (0.223 c.f.s.)** and to a quantity not to exceed **18.0 million gallons (55.24 acre-feet)** of water for any calendar year.

5. That installation of works for diversion of water shall be completed on or before **December 31, 2009**, or within any authorized extension thereof. The applicant shall notify the Chief Engineer and pay the statutorily required field inspection fee, which is currently $400.00, when construction of the works has been completed. Failure to timely submit the notice and the fee will result in revocation of the permit. Any request for an extension of time shall be accompanied by the required statutory fee, which is currently $100.00.

6. That the proposed appropriation shall be perfected by the actual application of water to the proposed beneficial use on or before **December 31, 2028**, or any authorized extension thereof. Any request for an extension of time shall be submitted prior to the expiration of the deadline and shall be accompanied by the required statutory fee, which is currently $100.00.

7. That the applicant shall not be deemed to have acquired a water appropriation for a quantity in excess of the amount approved herein nor in excess of the amount found by the Chief Engineer to have been actually used for the approved purpose during one calendar year subsequent to approval of the application and within the time specified for perfection or any authorized extension thereof.

8. That the use of water herein authorized shall not be made so as to impair any use under existing water rights nor prejudicially and unreasonably affect the public interest.

9. That the right of the appropriator shall relate to a specific quantity of water and such right must allow for a reasonable raising or lowering of the static water level and for the reasonable increase or decrease of the streamflow at the appropriator's point of diversion.

10. That this permit does not constitute authority under K.S.A. 82a-301 to 305a to construct any dam or other obstruction; nor does it grant any right-of-way, or authorize entry upon or injury to, public or private property.

11. That all diversion works constructed under the authority of this permit into which any type of chemical or other foreign substance will be injected into the water pumped from the diversion works shall be equipped with an in-line, automatic quick-closing, check valve capable of preventing pollution of the source of the water supply. The type of valve installed shall meet specifications adopted by the Chief Engineer and shall be maintained in an operating condition satisfactory to the Chief Engineer.

12. That an acceptable water flow meter shall be installed and maintained on the diversion works authorized by this permit in accordance with the Kansas Administrative Regulations 5-1-4 through 5-1-12 adopted by the Chief Engineer. This water flow meter shall be used to provide an accurate quantity of water diverted as required for the annual water use report (including the meter reading at the beginning and end of the report year).

13. That the applicant shall maintain accurate and complete records from which the quantity of water diverted during each calendar year may be readily determined and the applicant shall file an annual water use report with the Chief Engineer by March 1 following the end of each calendar year. Failure to file the annual water use report by the due date shall cause the applicant to be subject to a civil penalty.

14. That no water user shall engage in nor allow the waste of any water diverted under the authority of this permit.

15. That failure without cause to comply with provisions of the permit and its terms, conditions and limitations will result in the forfeiture of the priority date, revocation of the permit and dismissal of the application.

16. That the right to appropriate water under authority of this permit is subject to any minimum desirable streamflow requirements identified and established pursuant to K.S.A. 82a-703c for the source of supply to which this water right applies.

17. That all wells with a diversion rate of 100 gallons per minute or more drilled under the authority of this permit shall have a tube or other device installed in a manner acceptable to, and in accordance with specifications adopted by, the Chief Engineer. This tube or device shall be suitable for making water level measurements and shall be maintained in a condition satisfactory to the Chief Engineer.

18. That the permit holder shall submit a progress report to the office of the Chief Engineer by March 1, following the tenth full calendar year after the permit was issued. The progress report must be submitted on a form prescribed by the Chief Engineer, and shall compare annual water use projected in the original application with the actual annual water use for the prior 10 years. The progress report must document compliance with the approved conservation plan, contain sufficient details to determine the extent of perfection of the water right during the previous ten years, and demonstrate how the water right, in association with other water rights, meets the municipal use need.

19. That the Chief Engineer specifically retains jurisdiction in this matter with authority to make such reasonable reductions in the approved rate of diversion and quantity authorized to be perfected, and such changes in other terms, conditions, and limitations set forth in this approval and permit to proceed as may be deemed to be in the public interest.

This Order shall become a final agency action, as defined by K.S.A. 77-607(b), without further notice to the parties, if a request for hearing or a petition for administrative review is not filed as set forth below.

Request for Hearing. According to K.A.R. 5-14-3(c), any party who desires a hearing must submit a request within 15 days after the date shown on the Certificate of Service attached to this Order. Filing a request for a hearing will give you the opportunity to submit additional facts for consideration, contest any findings made by the Chief Engineer or present any other information you believe should be considered in this matter. A timely-filed request for hearing will stay the deadline for requesting administrative review of this Order pending the outcome of the hearing.

Petition for Review. The applicant, if aggrieved by this Order, may petition for administrative review, pursuant to K.S.A. 82a-711(c) and K.S.A. 82a-1901(a). The petition must be filed within 30 days after the date shown on the Certificate of Service attached to this Order and must set forth the basis for the review, unless stayed by the timely filing of a request for hearing.

Any request for hearing or petition for administrative review shall be in writing and shall be submitted to the attention of: Chief Legal Counsel, Kansas Department of Agriculture, 109 SW 9th Street, 4th Floor, Topeka, Kansas 66612, Fax: (785) 368-6668.

Dated at Topeka, Kansas, this 9th day of May, 2008.

David W Barfield

David Barfield, P.E.
Chief Engineer
Division of Water Resources
Kansas Department of Agriculture

DIVISION OF WATER RESOURCES
DAVID W. BARFIELD
CHIEF ENGINEER
DEPARTMENT of AGRICULTURE

State of Kansas)
) SS
County of Shawnee)

The foregoing instrument was acknowledged before me this 9th day of May, 2008, by David Barfield, P.E., Chief Engineer, Division of Water Resources, Kansas Department of Agriculture.

Brendylon F Harmon

Notary Public

OFFICIAL SEAL
BRENDYLON F. HARMON
MY COMMISSION EXPIRES
November 19, 2011

RECEIVED
JUN 18 2008
STAFFORD FIELD OFFICE
DIVISION OF WATER RESOURCES

SCANNED

WATER METER REQUIRED

CERTIFICATE OF SERVICE

On this 13th day of May, 2008, I hereby certify that the attached Approval of Application and Permit to Proceed, File No. 46,998, dated May 9 2008 was mailed postage prepaid, first class, US mail to the following:

CITY OF LEON
111 SOUTH MAIN
P O BOX 25
LEON KANSAS 67079

ROBERT VINCENT
GROUND WATER ASSOCIATES INC
PO BOX 3834
WICHITA KS 67201

Brenda Harmon
Staff

Appendix - 10.

Annual Review Check-Off

As stated in the Source Water Protection Strategy, the Source Water Protection Plan should be reviewed annually to ensure that the adopted source water protection measures are effective and relevant to protect the City of Leon's water supply, and that the items identified for implementation have been completed.

Date of Review	Signature of Committee Chair	Signature of Operator
1/3/2023	Kristina Semisch	