

## **APPENDIX C – Chapter 3 – Water Supplies Background Information**

### **Nonpublic Water Supplies**

Adequate quantity and quality of fresh water is necessary to support human, animal and plant life. The County Commissioners find that improper location, construction, maintenance, and abandonment of public and private water supplies at residential, commercial and industrial properties located in unincorporated areas of Lyon County is dangerous to health and responsible for contamination of the fresh waters of the State of Kansas.

In support of this statement it should be noted that 28% of 325 water tests collected by the Lyon County Health Department between the years of 1980 and 1995 were above the maximum contaminant level for nitrate in drinking water as established by the Environmental Protection Agency. Based on a Kansas Department of Health and Environment estimate of 200,000 to 250,000 abandoned wells in the State of Kansas there could be as many as 2,000 abandoned water wells in Lyon County. Improperly abandoned water wells are a safety hazard and a direct conduit into groundwater for surface pollutants.

The Kansas Private Water Well Study conducted by Kansas State University between 1993 and 1994 found that 25.4% of wells exceeded the guideline for nitrate, 45% exceeded the guidelines for total coliform bacteria, 15.3% exceeded guidelines for E.coli, and 5.6% exceeded guidelines for lead. 17.9% of Kansas wells showed a presence of atrazine. Dug and improperly cased drilled wells are twice as likely as properly cased drilled wells to have coliform bacteria, and six times more likely to have E. coli. The presence of coliforms is an indication that other more serious pathogens could also be present.

Recent research conducted at Pennsylvania State University, Harrisburg has shown a statistically significant link between people who have peptic ulcer disease and the presence of *Helicobacter pylori* bacteria contamination in their private well. Two forms of stomach cancer and approximately 75% of peptic ulcer disease are caused by *H. pylori*. *Roughly 85% of the wells that tested positive for coliform bacteria also contained H. pylori.* Morgan Powell a professor at Kansas State University concludes "...drinking unsafe water from private wells is in fact a significant health risk." In addition, there appears to be a correlation between nitrate levels no higher than 20 ppm NO<sub>3</sub>-N and spontaneous abortion in pregnant women. The association between levels of nitrate greater than 10 ppm NO<sub>3</sub>-N and methemoglobinemia or Blue Baby Syndrome has been recognized since 1948.

### **Minimum Standards For Ground Water Supplies**

#### **Location.**

All wells used as sources of water for private or semi-private water supplies must be separated from the specified sources of pollution by distances **equal to or greater than** those shown in Table I. Research conducted by Kansas State University indicates that distances greater than those shown in Table 1 (>400 feet) reduce the risk of water well contamination. The Administrative Agency must determine the minimum distances that must be provided between a well and other sources of contamination. Such distances must be sufficient to provide reasonable assurance that the well will not be contaminated.

**Table I**

<b>AREA</b>	<b>MINIMUM SEPARATION</b>
Subsurface absorption field for septic tank effluent	100'
House, building or structure subject to chemical treatment or chemical storage	100'
Pit privy	100'
Septic tank	100'
Barnyards, stables, manure piles, animal pens, etc.	100'
Streams, lakes, and ponds	50'
Sewer lines, not constructed of cast iron or other equally tight construction	100'
Sewer lines constructed of cast iron or other equally tight construction	10'
Other source determined by the Administrative Agency to be a source of pollution	100'

**Reference.**

Article 12, The Kansas Groundwater Exploration and Protection Act (K.A.R. 82a-1201 through K.A.R. 82a-1215) as amended and Article 30, the regulations pertaining to water well contractor's license and water well construction and abandonment (K.A.R. 28-30-1 through K.A.R. 28-30-10) as amended or other reference approved by the Kansas Department of Health and Environment, Bureau of Water shall be used as a guide in reviewing and approving wells for use as a private water supply.

**Construction.**

The following specific requirements must be regarded as supplemental and additional requirements:

- a. Casing. Steel and PVC casing must meet or exceed the specifications set forth in Table II.

**Table II**

STEEL PIPE			PVC PLASTIC PIPE		
Size Outside Diameter	Wall Thickness	Weight Per Foot	Size Outside Diameter	Wall Thickness	Weight Per Foot
Inches	Inches	Pounds	Inches	Inches	Pounds
3 ½	.156	5.58	3 ½	.216	.954
4	.156	6.41	4 ½	.237	1.364
4 ½	.156	7.25	6 5/8	.280	2.403
5 9/16	.188	10.76			
6 5/8	.219	14.97			
8 5/8	.219	19.64			

Other casing materials may be used as sources of water for private water supplies if, in the opinion of the Administrative Agency, they are equal or better than the casing specified in Table II. All casing materials must meet the approval of both the Kansas Department of Health and Environment and the Administrative Agency. The top of the well casing or curbing must not terminate below grade but must be extended to a point at least twelve (12) inches above finished grade. If the well is located in the flood plain the casing must extend twenty-four (24) inches above the highest Federal Emergency Management Agency Flood Insurance Rate Map flood plain elevation or highest recorded elevation whichever is the greater. No opening must be made in the casing below the finished ground surface or the pump house floor except by use of a properly installed pitless adapter or pitless unit so designed and fabricated to prevent soil or water from entering the well.

- b. Seating. The casing of all wells developed in rock must be extended into and firmly seated in sound rock. The diameter of the drill hole must be at least three (3) inches larger than the casing and the annular space between the drill hole and the casing must be filled with cement grout or bentonitic clay mud for the first five (5) feet into the first clay or shale layer, or a minimum of twenty (20) feet.
- c. Seals. If the pump is attached to the top of the well casing, the casing must be sealed water tight into the base of the pump. If the pump is not located on the top of the casing, the casing must be equipped with a sanitary well seal of a type approved by the Kansas Department of Health and Environment and the Administrative Agency.
- d. Pumps and Pump Installation. All power pumps and pumping equipment used or installed at private water supplies must comply with the provisions of this code. Solid base, closed top, hand pumps may also be used for lifting water at private wells. Slotted

top, open spout or split base hand pumps must not be used. All pumps must be designed and installed so as to maintain their prime.

- e. Pump House. An insulated and heated pump house of ample size to permit easy access to the pump for maintenance and repair must be provided, unless the pumping equipment is of weather-proof and frost-proof construction. The floor of the pump house must be constructed of impervious material such as concrete and must be sloped to drain to the doorway or to a floor drain that discharges to the ground surface at a point at least ten (10) feet from the well. The structure must be insect proof, rodent proof, insulated, and provided with a source of heat sufficient to prevent freezing. The ground surface around the pump house must be sloped away from the pump house.
- f. Protection from freezing. All discharge and suction lines located between the well and the inside of heated buildings must be protected from freezing.
- g. Suction Pipes. All suction pipes located less than ten (10) feet below the surface of the ground must be placed in a water tight pipe conduit having wall thickness equal to that of well casing shown in Table II. All suction pipes must be separated from potential sources of pollution by distances equal to those required for wells.
- h. Water Line Placement. Water lines must not be laid in the same trench with a sanitary sewer line or laid beneath a sanitary sewer line. Unless both of the following conditions are met:
  - 1. The bottom of the water pipe at all points has at least twelve (12) inches of vertical separation above the bottom of the sewer line.
  - 2. The water pipe is placed on a solid shelf excavated at one side of the common trench and there has at least a twelve (12) inch horizontal separation between the pipes.
- i. Vents. Vents must be provided; the end of the vent must be turned downward, shielded and screened with sixteen (16) mesh, copper, brass, or bronze screen wire to exclude insects.