Presented below are water quality standards that are in effect for Clean Water Act purposes.

EPA is posting these standards as a convenience to users and has made a reasonable effort to assure their accuracy. Additionally, EPA has made a reasonable effort to identify parts of the standards that are not approved, disapproved, or are otherwise not in effect for Clean Water Act purposes.

August 7, 2018

Kansas Surface Water Quality Standards and Tables of Numeric Criteria

Effective May 7, 2018

The attached WQS document is in effect for Clean Water Act (CWA) purposes, with the exception of the provisions below. With the latest action, EPA continues not to act on these provisions, on which no action was initially taken in the July 18, 2017 action letter.

Kansas Surface Water Quality Standards Tables of Numeric Criteria

- **Table 1a.** Aquatic Life, Agriculture, and Public Health Designated Uses Numeric Criteria. Five new or revised water quality criteria for pollutants: Mercury, 1,2-dichloropropane, 1,2,4-trichlorobenzene, barium, and endrin
    - Federal water quality criteria currently applicable to Kansas waters remain in effect until the EPA takes federal action to withdraw these NTR criteria.
- **Table 1g, Footnote 2.** Temperature, Dissolved Oxygen, and pH Numeric Aquatic Life Criteria. Footnote 2 addressing Dissolved Oxygen
    - The following text was added to footnote a of Table 1g:
      (2) Dissolved oxygen concentrations can be lower than 5.0 mg/L when caused by documented natural conditions specified in the "Kansas Implementation Procedures: Surface Water Quality Standards."
- **Table 1g, Footnote 3.** Temperature, Dissolved Oxygen, and pH Numeric Aquatic Life Criteria. Footnote 3 addressing Dissolved Oxygen in lakes or reservoirs
    - The following text was added to footnote a of Table 1g:
      (3) For lakes or reservoirs experiencing thermal stratification, the dissolved oxygen criterion is only applicable to the top layer or epilimnion of the waterbody.
- **Table 1h.** Natural Background Concentrations
    - Table 1h in the Tables of Numeric Criteria (Effective July 9, 2015) is currently in effect for CWA purposes which can be found on the Kansas repository page.

KANSAS SURFACE WATER QUALITY STANDARDS

Prepared by The Kansas Department of Health and Environment

Bureau of Water

April 11, 2018

STATE OF KANSAS

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GOVERNOR JEFF COLYER, M.D.
JEFF ANDERSEN, SECRETARY

DATE: April 11, 2018

FROM: Michelle Probasco, Unit Chief, Planning and Standards Unit M.P.

SUBJECT: Unofficial Functional Copy Kansas Water Quality Standards and Supporting Documents

The following pages contain an *unofficial functional* version of the most currently effective *Kansas Surface Water Quality Standards* (K.A.R. 28-16-28b through 28-16-28h, and 28-16-58), and links to the standards supporting documents. The supporting documents include the *Kansas Surface Water Quality Standards: Tables of Numeric Criteria*, the *Kansas Antidegradation Policy*, the *Kansas Implementation Procedures: Surface Water Quality Standards, and the Kansas Surface Water Quality Standards Variance Register.* The *Kansas Surface Water Quality Standards*, K.A.R. 28-16-28b and 28-16-28d through 28-16-28h were published in the *Kansas Register* on February 8, 2018 and became effective on February 23, 2018, and K.A.R. 28-16-28c and 28-16-58 were published in the *Kansas Register* on March 5, 2015 and became effective on March 20, 2015. The *Kansas Surface Water Register*, 28-16-28g, was last published in the *Kansas Register* on June 19, 2014 and became effective on July 7, 2014.

There have been many style and editorial changes to the regulations. The major amendments to this set of regulations include:

- Adopting revised criteria for ammonia aquatic life criteria;
- Adopting revised regulations for water quality variances;
- Adopting a new regulation for the adoption of the *Kansas Surface Water Quality Standards Variance Register;*
- Adopting the *Multiple-Discharger Wastewater Lagoon Ammonia Variance.*

The Kansas Secretary of State publishes the *official* regulations. However, the official publication of the Kansas Regulations only takes place once per year and lags official adoption of new regulations by as much as a year. Therefore, to compile a complete, up-to-date set of Standards, the Bureau of Water has taken the electronic versions of the amended regulations as submitted to the Secretary of State and compiled the most current versions of K.A.R. 28-16-28b, 28-16-28c, 28-16-28d, 28-16-28e, 28-16-28f, 28-16-28g, 28-16-28h and 28-16-58 into a single document that follows. The copy of these regulations included in this document are an unofficial version compiled for use as a guide. These regulations may not be used as evidence in a court of law. Copies for this purpose must be obtained from the official state records, which are available through the Office of the Secretary of State, Capitol Building, 2nd Floor, Topeka, KS 66612.

The *Kansas Surface Water Quality Standards: Tables of Numeric Criteria* was created during the 2002 Triennial Review at the request of the Department of Administration. During the 2002 Triennial Review, KDHE separated the numeric criteria from the narrative criteria. The Department of Administration believed that with the addition of these new tables to K.A.R. 28-16-28e that it would make the review process very cumbersome and difficult to print in the Kansas Register. The Department of Administration states in their Policy and Procedures Manual that "agencies may wish to consider adopting a document by reference when the material is lengthy, highly complex, or technical, or when the materials cannot be readily adapted to the form, style and organization requirement for regulations." KDHE took this advice and created the Tables of Numeric Criteria, which are currently adopted by reference in K.A.R. 28-16-28e(e).

The *Kansas Antidegradation Policy* is a component of the Surface Water Quality Standards in the State's overall water quality program and is referenced in K.A.R. 28-16-28c(a). The intent of the antidegradation policy is to limit discharges and other activities that will negatively impact water quality, impair designated uses, or threaten to impair designated uses of surface waters. The antidegradation policy provides a baseline level of protection relative to established water quality criteria to all classified surface waters, and a higher level of protection to those waterbodies recognized as unique ecologically, highly valued for its resources, or having high water quality.

The *Kansas Implementation Procedures: Surface Water Quality Standards* are federally required and adopted by reference in K.A.R. 28-16-28b(ll). The Environmental Protection Agency (EPA) directs that the implementation procedures should address the mechanisms to be used by the State to ensure that standards are attained. The implementation procedures provide a uniform mechanism for interpreting *Kansas Surface Water Quality Standards* in their application to waters of the state.

The *Kansas Surface Water Register*, K.A.R. 28-16-28g, is amended independently on a more frequent basis. A link to the *Kansas Surface Water Register* has been included within the *List of Related Documents and Electronic Links* section of this document, as well as, within K.A.R. 28-16-28g included in this document. Please refer to the official regulations and the Bureau of Water website to obtain the most recent version of the *Surface Water Register*.

The *Kansas Surface Water Quality Standards Register*, K.A.R. 28-16-28h, is a clearinghouse for all surface water quality variances adopted by the State. Please refer to the official regulations and the Bureau of Water website to obtain the most recent version of the *Kansas Surface Water Quality Standards Register.*

KANSAS SURFACE WATER QUALITY STANDARDS
UNOFFICIAL COPY
April 11, 2018

List of Regulations within this Document:

- **28-16-28b. Definitions**
- **28-16-28c. General provisions**
- **28-16-28d. Surface water classification and use designation**
- **28-16-28e. Surface water quality criteria**
- **28-16-28f. Administration of surface water quality standards**
- **28-16-28g. Surface water register**
- **28-16-28h. Surface water variance register**
- **28-16-58. Definitions**
- **Kansas Surface Water Quality Standards – Tables of Numeric Criteria**

List of Related Documents and Electronic Links:

Kansas Surface Water Quality Standards – Tables of Numeric Criteria
Prepared by The Kansas Department of Health and Environment
Bureau of Water
December 15, 2017
Web page link: http://www.kdheks.gov/tmdl/download/SWQS_Tables_2017_12152017_final.pdf

Kansas Surface Water Register
Prepared by The Kansas Department of Health and Environment
Bureau of Water
December 12, 2013
Web page link: http://www.kdheks.gov/befs/download/Current_Kansas_Surface_Register.pdf

Kansas Surface Water Register Maps
Prepared by The Kansas Department of Health and Environment
Bureau of Water
Web page link: http://www.kdheks.gov/befs/download/Current_Surface_Water_Register_Maps.pdf

Kansas Antidegradation Policy
Prepared by The Kansas Department of Health and Environment
Bureau of Water
August 6, 2001
Web page link:
http://www.kdheks.gov/tmdl/download/Antidegradation_Policy_08_06_01_Unofficial.pdf

Kansas Implementation Procedures – Surface Water Quality Standards
Prepared by The Kansas Department of Health and Environment
Bureau of Water
November 29, 2017
Web page link:
http://www.kdheks.gov/tmdl/download/IMPLEMENTATION_WQS_11292017_Final.pdf

Kansas Surface Water Variance Register
Prepared by The Kansas Department of Health and Environment
Bureau of Water
October 31, 2017
Web page link:
http://www.kdheks.gov/tmdl/download/KS_VARIANCE_REGISTER_10312017_Final.pdf

Water Quality Standards White Papers
Prepared by The Kansas Department of Health and Environment
Bureau of Water

To access the following **Water Quality Standards White Papers** go to http://www.kdheks.gov/tmdl/kswqs.htm:

- Antidegradation, January 10, 2011
- Bacteria Criteria for Streams, January 10, 2011
- Chlorophyll-*a* Criteria for Public Water Supply Lake or Reservoirs, January 10, 2011
- Allowances for Low Dissolved Oxygen Levels for Aquatic Life Use, January 10, 2011
- Duration and Frequency for Assessing Numeric Criteria, January 10, 2011
- Temperature Criteria for Aquatic Life Use, January 10, 2011
- White Paper Glossary

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-28b. Definitions. As used in K.A.R. 28-16-28b through 28-16-28h, each of the following terms shall have the meaning specified in this regulation: (a) "Alluvial aquifer" means the sediment that is associated with and deposited by a stream and that contains water capable of being produced from a well.

(b) "Alternate low flow" means a low flow value, which is an alternate to the 7Q10 flow, that is based seasonally, hydrologically, or biologically, or a low flow determined through a water assurance district. Wherever used in this regulation in the context of mixing zones, the term shall refer to a minimum amount of streamflow occurring immediately upstream of a wastewater discharge and available, in whole or in part, for dilution and assimilation of wastewater discharges.

(c) "Antidegradation" means the regulatory actions and measures taken to prevent or minimize the lowering of water quality in surface waters of the state, including those streams, lakes, and wetlands in which existing water quality exceeds the level required for maintenance and protection of the existing uses.

(d) "Artificial sources" means sources of pollution that result from human activities and that can be abated by construction of control structures, modification of operating practices, complete restraint of activities, or any combination of these methods.

(e) "Background concentration" means the concentration of any elemental parameter listed in tables 1a, 1b, 1c, and 1d of the "Kansas surface water quality standards: tables of

numeric criteria," which is adopted by reference in K.A.R. 28-16-28e, or any elemental substance meeting the definition of pollutant in this regulation, that occurs in a surface water immediately upstream of a point source or nonpoint source under consideration and is from natural sources. The list of background concentration determinations for classified waterbodies of the state is contained in table 1h of the "Kansas surface water quality standards: tables of numeric criteria."

(f) "Base flow" means that portion of a stream's flow contributed by sources of water other than precipitation runoff. Wherever used in this regulation in the context of stream classification, the term shall refer to a fair weather flow sustained primarily by springs or groundwater seepage, wastewater discharges, irrigation return flows, releases from reservoirs, or any combination of these factors.

(g) "Bioaccumulation" means the accumulation of toxic substances in plant or animal tissue through either bioconcentration or biomagnification.

(h) "Bioassessment methods and procedures" means the use of biological methods of assessing surface water quality, including field investigations of aquatic organisms and laboratory or field aquatic toxicity tests.

(i) "Bioconcentration" means the concentration and incorporation of toxic substances into body tissues from ambient sources.

(j) "Biomagnification" means the transport of toxic substances through the food chain through successive cycles of eating and being eaten and through the subsequent accumulation and concentration of these substances in higher-order consumers and predators.

(k) "Biota" means the animal and plant life and other organisms of a given geographical region.

(l) "Carcinogenic" means having the property of inducing the production of cancerous cells in organisms.

(m) "Classified surface water" means any surface water or surface water segment that supports or, in the absence of artificial sources of pollution, would support one or more of the designated uses of surface water defined in K.A.R. 28-16-28d or K.S.A. 2017 Supp. 82a-2001, and amendments thereto, and that meets the criteria for classification given in K.A.R. 28-16-28d.

(n) "Compliance schedule" means any provision in a discharge permit, license, or enforceable order issued by the department pursuant to the federal clean water act or K.S.A. 65-165 et seq., and amendments thereto, that, for the purposes of meeting water quality-based effluent limitations, technology-based limits, and effluent limitations determined by the secretary or specified in Kansas statutes and regulations, provides a specified period of time for the construction or renovation of a wastewater treatment facility and the completion of any related scientific or engineering studies, reports, plans, design specifications, or other submittals required by the department.

(o) "Condition of acute toxicity" means any concentration of a toxic substance that exceeds the applicable acute criterion for aquatic life support specified in K.A.R. 28-16-28e or, for substances not listed in K.A.R. 28-16-28e or for mixtures of toxic substances, any concentration that exceeds 0.3 acute toxic units (TU_a), where one TU_a is equal to 100 divided by the median lethal concentration (LC_{50}). The concentration at which acute toxicity exists shall be determined through laboratory toxicity tests conducted in accordance with the EPA's "methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms."

(p) "Condition of chronic toxicity" means any concentration of a toxic substance that exceeds the applicable chronic criterion for aquatic life support specified in K.A.R. 28-16-28e or, for substances not listed in K.A.R. 28-16-28e or for mixtures of toxic substances, any concentration that exceeds 1.0 chronic toxic unit (TU_c), where one TU_c is equal to 100 divided by inhibition concentration 25 (IC_{25}). The concentration at which chronic toxicity exists shall be determined through laboratory toxicity tests conducted in accordance with the EPA's "short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms."

(q) "Criterion" means any numerical element or narrative provision that represents an enforceable water quality condition specified in K.A.R. 28-16-28b through 28-16-28h.

(r) "Critical low flow" means the minimum amount of streamflow immediately upstream of a point source discharge that will be used to calculate the quantity of pollutants that the point source discharge may be permitted to discharge without exceeding water quality criteria specified in K.A.R. 28-16-28b through 28-16-28h. The critical low flow may be the 7Q10 flow or the alternate low flow as defined in this regulation.

(s) "Department" means Kansas department of health and environment.

(t) "Designated use" means any of the uses specifically attributed to surface waters of the state in K.A.R. 28-16-28d or K.S.A. 2017 Supp. 82a-2001, and amendments thereto.

(u) "Digression" means an actual ambient concentration of a pollutant that does not meet the numeric criteria value for that pollutant.

(v) "Discharge" means the release of effluent, either directly or indirectly, into surface waters of the state.

(w) "Discharge design flow" means either of the following:

(1) The anticipated wastewater flow for the next permit cycle determined by the department for an industrial wastewater treatment facility, as defined in K.A.R. 28-16-56c; or

(2) the wastewater treatment capacity of a facility approved by the secretary for other wastewater treatment facilities or systems.

(x) "Discharger" means a person or facility that is responsible for the release of effluent into surface waters of the state.

(y) "Duration of digression" means the period of time over which pollutant concentrations can be averaged, including the time span during which aquatic life can be exposed to elevated levels of pollutants without harm.

(z) "Ecological integrity" means the natural or unimpaired structure and functioning of an aquatic or terrestrial ecosystem.

(aa) "Effluent" means the sewage or other wastewater discharged from an artificial source.

(bb) "EPA" means United States environmental protection agency.

(cc) "*Escherichia coli*" means a subset of the coliform group that is part of the normal intestinal flora in humans and animals and is a direct indicator of fecal contamination in water.

(dd) "Exceptional state waters" means any of the surface waters or surface water segments that are of remarkable quality or of significant recreational or ecological value, are listed in the surface water register as defined in this regulation, and are afforded the level of water quality protection under the antidegradation provisions of K.A.R. 28-16-28c and the mixing zone provisions of K.A.R. 28-16-28c.

(ee) "Excursion from numeric criteria value" means the digression of a pollutant exceeding its numeric criteria value beyond the designated duration of digression.

(ff) "Existing use" means any of the designated uses described in K.A.R. 28-16-28d or K.S.A. 82a-2001, and amendments thereto, known to have occurred in, or to have been made of, a surface water or surface water segment on or after November 28, 1975.

(gg) "Federal clean water act" means the federal water pollution prevention and control act, 33 U.S.C. Section 1251 et seq., as in effect on January 1, 1998.

(hh) "Frequency of digression" means the number of times that an excursion from numeric criteria value can occur over time without impairing the designated uses of the water.

(ii) "General purpose waters" means any classified surface water that is not classified as an outstanding national resource water or an exceptional state water.

(jj) "Groundwater" means water located under the surface of the land that is or can be the source of supply for wells, springs, or seeps or that is held in aquifers or the soil profile.

(kk) "Highest attainable condition" and "HAC" mean the achievable goal of a variance, according to K.A.R. 28-16-28f(d)(5), that reflects the modified designated use and criterion, designated use, or criterion that is applicable throughout the term of a variance.

(11) "Inhibition concentration 25" and "IC_{25}" mean a point estimate of the toxicant concentration that would cause a 25 percent reduction in a nonlethal biological measurement of the test organisms, including reproduction and growth.

(mm) "Interim criterion" means a temporary criterion.

(nn) "Interim designated use" means a temporary designated use.

(oo) "Kansas antidegradation policy," dated August 6, 2001 and hereby adopted by reference, means the department's written policy used to prevent or minimize the lowering of water quality in surface waters of the state.

(pp) "Kansas implementation procedures: surface water quality standards," including appendix A, dated November 29, 2017 and hereby adopted by reference, means the department's written procedures used for carrying out specific provisions of surface water quality standards, available upon request from the department's division of environment.

(qq) "Maximum contaminant level" means any of the enforceable standards for finished drinking water quality specified in 40 C.F.R. 141.11, 141.13, and 141.61 through 141.66, dated July 1, 2012.

(rr) "Median lethal concentration" means the concentration of a toxic substance or a mixture of toxic substances calculated to be lethal to 50 percent of the population of test organisms in an acute toxicity test.

(ss) "Microfibers per liter" and "µfibers/L" mean the number of microscopic particles with a length-to-width ratio of 3:1 or greater present in a volume of one liter.

(tt) "Microgram per liter" and "µg/L" mean the concentration of a substance at which one one-millionth of a gram (10^{-6} g) of the substance is present in a volume of one liter.

(uu) "Milligram per liter" and "mg/L" mean the concentration of a substance at which one one-thousandth of a gram (10^{-3} g) of the substance is present in a volume of one liter.

(vv) "Mixing zone" means the designated portion of a stream or lake where a discharge is incompletely mixed with the receiving surface water and where, in accordance with K.A.R. 28-16-28e, concentrations of certain pollutants may legally exceed chronic water quality criteria associated with the established designated uses that are applied in most other portions of the receiving surface water.

(ww) "Mutagenic" means having the property of directly or indirectly causing a mutation.

(xx) "Multiple-discharger variance" and "MDV" mean a term-limited variance for more than one discharger that is issued for a specified criterion or pollutant to achieve the highest attainable condition.

(yy) "Nonpoint source" means any activity that is not required to have a national pollutant discharge elimination system permit and that results in the release of pollutants to waters of the state. This release may result from precipitation runoff, aerial drift and deposition from the air, or the release of subsurface brine or other contaminated groundwaters to surface waters of the state.

(zz) "Numeric criteria value" means any of the values listed in tables 1a, 1b, 1c, 1d, 1g, 1h, 1i, 1j, and 1k of the "Kansas surface water quality standards: tables of numeric criteria."

(aaa) "Outstanding national resource water" means any of the surface waters or surface water segments of extraordinary recreational or ecological significance identified in the surface water register, as defined this regulation, and afforded the highest level of water quality protection under the antidegradation provisions and the mixing zone provisions of K.A.R. 28-16-28c.

(bbb) "pH" means the common logarithm of the reciprocal of the hydrogen ion concentration measured in moles per liter, expressed on a scale that ranges from zero to 14, with values less than seven being more acidic and values greater than seven being more alkaline.

(ccc) "Picocurie per liter" and "pCi/L" mean a volumetric unit of radioactivity equal to 2.22 nuclear transformations per minute per liter.

(ddd) "Point source" means any discernible, confined, and discrete conveyance from which pollutants are or could be discharged.

(eee) "Pollutant" means any physical, biological, or chemical conditions, substances, or combination of substances released into surface waters of the state that results in surface water pollution, as defined in this regulation.

(fff) "Pollutant minimization plan" and "PMP" mean a structured set of activities to improve processes and pollutant controls that prevent and reduce pollutant levels, including any cost-effective process for reducing pollutant levels, pollution prevention, treatment, best management practices, and other control mechanisms.

(ggg) "Potable water" means water that is suitable for drinking and cooking purposes in terms of both human health and aesthetic considerations.

(hhh) "Precipitation runoff" means the rainwater or the meltwater derived from snow, hail, sleet, or other forms of atmospheric precipitation that flows by gravity over the surface of the land and into streams, lakes, or wetlands.

(iii) "Presedimentation sludge" means a slurry or suspension of residual solid materials derived from an initial step in the production of potable water. This term shall include residual solids originating from the raw water supply used for industrial or other nonpotable water purposes, before the addition of any artificial materials not typically used in the production of potable water. The solid materials shall include sand, silt, and other easily settleable particles originating from the raw water supply.

(jjj) "Private surface water" means any freshwater reservoir or pond that is both located on and completely bordered by land under common private ownership.

(kkk) "Public swimming area" means either of the following:

(1) Any classified surface water that is posted for swimming by a federal, state, or local government that has jurisdiction over the land adjacent to that particular body of water; or

(2) any privately owned or leased body of water that is open and accessible to the public and is intended for swimming.

(lll) "Reconfiguration activities" means actions that beneficially reshape, remodel, or otherwise restructure the physical setting and characteristics of a surface water of the state.

(mmm) "Seven-day, ten-year low flow" and "7Q10 flow" mean the seven-day average low flow having a recurrence frequency of once in 10 years, as statistically determined from historical flow data. Where used in this regulation in the context of mixing zones, these terms shall refer to the minimum amount of streamflow occurring immediately upstream of a wastewater discharge and available, in whole or in part, for dilution or assimilation of wastewater discharges.

(nnn) "Site-specific criterion" means any criterion applicable to a given classified surface water segment and developed for the protection of the designated uses of that segment alone.

(ooo) "Streamflow" means the volume of water moving past a stream cross-sectional plane per unit of time.

(ppp) "Surface water pollution" and "pollution" mean any of the following:

(1) Contamination or other alteration of the physical, chemical, or biological properties of the surface waters of the state, including changes in temperature, taste, odor, turbidity, or color of the waters;

(2) discharges of gaseous, liquid, solid, radioactive, microbiological, or other substances into surface waters in a manner that could create a nuisance or render these waters harmful, detrimental, or injurious to any of the following:

(A) Public health, safety, or welfare;

(B) domestic, industrial, agricultural, recreational, or other designated uses; or

(C) livestock, domestic animals, or native or naturalized plant or animal life; or

(3) any discharge that will or is likely to exceed state effluent limitations predicated upon technology-based effluent standards or water quality-based standards.

(qqq) "Surface water register" means a list of the state's major classified surface waters, including a listing of waters recognized as outstanding national resource waters or exceptional state waters, and the surface water use designations for each classified surface water, periodically updated and published by the department pursuant to K.A.R. 28-16-28d and K.A.R. 28-16-28f. The surface water register, published as the "Kansas surface water register," is adopted by reference in K.A.R. 28-16-28g.

(rrr) "Surface water segment" means a delineated portion of a stream, lake, or wetland.

(sss) "Surface waters" means the following:

(1) Streams, including rivers, creeks, brooks, sloughs, draws, arroyos, canals, springs, seeps, and cavern streams, and any alluvial aquifers associated with these surface waters;

(2) lakes, including oxbow lakes and other natural lakes and man-made reservoirs, lakes, and ponds; and

(3) wetlands, including swamps, marshes, bogs, and similar areas that are inundated or saturated by surface water or groundwater at a frequency and a duration that are sufficient to support, and under normal circumstances that do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

(ttt) "Surface waters of the state" means all surface waters occurring within the borders of the state of Kansas or forming a part of the border between Kansas and one of the adjoining states.

(uuu) "Teratogenic" means having the property of causing abnormalities that originate from impairment of an event that is typical in embryonic or fetal development.

(vvv) "Thirty-day, ten-year low flow" and "30Q10 flow" mean the 30-day average low flow having a recurrence frequency of once in 10 years, as statistically determined from historical flow data. Where used in this regulation in the context of mixing zones, these terms shall refer to the minimum amount of streamflow occurring immediately upstream of a wastewater discharge and available, in whole or in part, for dilution or assimilation of wastewater discharges.

(www) "Toxic substance" means any substance that produces deleterious physiological effects in humans, animals, or plants.

(xxx) "Turbidity" means the cloudiness of water as measured by optical methods of nephelometry and expressed in standard nephelometric units.

(yyy) "Use attainability analysis" means a study conducted or accepted by the department that is designed to determine whether or not a surface water or surface water segment supports, or is capable of supporting in the absence of artificial sources of pollution, one or more of the designated uses defined in K.S.A. 2017 Supp. 82a-2001, and amendments thereto.

(zzz) "Variance" means a time-limited designated use and criterion that reflects the highest attainable condition as an alternative to one or more of the criteria specified in K.A.R. 28-16-28e, as implemented by the department in accordance with K.A.R. 28-16-28f.

(aaaa) "Water-effect ratio" and "WER" mean the numerical toxicity, including median lethal concentration and inhibition concentration 25, of a chemical pollutant diluted in water from a given stream, lake, or wetland divided by the numerical toxicity of the same pollutant diluted in laboratory water.

(bbbb) “Water quality certification” means the department's written finding that a proposed action that impacts water quality will comply with the terms and conditions of the Kansas surface water quality standards.

(cccc) “Whole-effluent toxicity limitation” means any restriction imposed by the department on the overall acute or chronic toxicity of an effluent discharged to a surface water.

(dddd) “Zone of initial dilution” means the region of a surface water in the immediate vicinity of a discharge where acute and chronic criteria may be exceeded. (Authorized by K.S.A. 2017 Supp. 65-171d and K.S.A. 65-171m; implementing K.S.A. 65-165, K.S.A. 2017 Supp. 65-171d, K.S.A. 65-171m, and K.S.A. 2017 Supp. 82a-2001; effective May 1, 1986; amended Aug. 29, 1994; amended July 30, 1999; amended Nov. 3, 2000; amended Aug. 31, 2001; amended Jan. 3, 2003; amended Oct. 24, 2003; amended Jan. 28, 2005; amended March 20, 2015; amended Feb. 23, 2018).

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-28c. General provisions. (a) Antidegradation.

(1) General purpose waters.

(A) Levels of water quality in surface waters of the state shall be maintained to protect the existing uses of those surface waters.

(B) For all surface waters of the state, if existing water quality is better than applicable water quality criteria established in K.A.R. 28-16-28b through 28-16-28g, that existing water quality shall be fully maintained and protected.

Water quality may be lowered only if the secretary finds, after full satisfaction of the intergovernmental coordination and public participation requirements on antidegradation contained in the "Kansas antidegradation policy," as adopted by reference in K.A.R. 28-16-28b, that a lowering of water quality is needed to allow for important social or economic development in the geographical area in which the waters are located.

In allowing the lowering of water quality, the maintenance and protection of existing uses shall be ensured, and the highest statutory and regulatory requirements for all new and existing point sources of pollution and all cost-effective and reasonable best management practices for nonpoint sources of pollution shall be achieved.

(2) Exceptional state waters. Wherever surface waters of the state constitute exceptional state waters, discharges shall be allowed only if existing uses and existing water quality are maintained and protected.

(3) Outstanding national resource waters. Wherever surface waters of the state constitute an outstanding national resource water, existing uses and existing water quality shall be maintained and protected. New or expanded discharges shall not be allowed into outstanding national resource waters.

(4) Threatened or endangered species. No degradation of surface water quality by artificial sources of pollution shall be allowed if the degradation will result in harmful effects on populations of any threatened or endangered species of aquatic or semiaquatic life or terrestrial wildlife or its critical habitat as determined by the secretary of the department of wildlife, parks, and tourism pursuant to K.S.A. 32-960, and amendments thereto, K.A.R. 115-15-3, or the federal endangered species act, 16 U.S.C. Section 1532 et seq., as in effect on July 1, 2012.

(5) Temporary discharges. Temporary sources of pollution meeting the requirements of subsection (d) of this regulation and K.A.R. 28-16-28e, producing only ephemeral surface water quality degradation not harmful to existing uses, may be allowed by the department.

(6) Thermal discharges. Implementation of these antidegradation provisions for thermal discharges shall be consistent with the requirements of 33 U.S.C. Section 1326, as in effect on July 1, 2012.

(7) Implementation. Implementation of these antidegradation provisions shall be consistent with the "Kansas antidegradation policy," available upon request from the department.

(b) Mixing zones.

(1) General limitations. Mixing zones shall not extend across public drinking water intakes, stream tributary mouths, or swimming or boat ramp areas, nor shall mixing zones exist in locations that preclude the normal upstream or downstream movement or migration of aquatic organisms. Mixing zones associated with separate discharges shall not overlap unless a

department-approved demonstration indicates that the overlapping will not result in a violation of the general water quality criteria specified in K.A.R. 28-16-28e or in an impairment of the existing uses of the receiving surface water. The zone of initial dilution for a mixing zone shall comprise, in terms of volume, not more than 10 percent of the mixing zone.

(2) Discharges into classified stream segments. No mixing zone within a classified stream segment, as defined in K.S.A. 2013 Supp. 82a-2001 and amendments thereto, shall extend beyond the middle of the nearest downstream current crossover point, where the main current flows from one bank to the opposite bank, or more than 300 meters downstream from the point of effluent discharge.

(3) Effluent-dominated streams. If the ratio of the receiving stream critical low flow to the discharge design flow is less than 3:1, then the mixing zone shall be the cross-sectional area or the volumetric flow of the stream during critical low flow conditions, as measured immediately upstream of the discharge during the critical low flow.

(4) Applications. Mixing zones shall be applied in accordance with paragraphs (b)(7) and (b)(8), based on the classification and designated uses of a stream segment for individual pollutants. For surface waters classified as outstanding national resource waters or exceptional state waters, or designated as special aquatic life use waters, mixing zones for specific discharges may be allowed by the secretary in accordance with paragraphs (b)(6), (b)(7), and (b)(8)(A). Mixing zones also may be allowed if there are no aquatic life criteria for an individual pollutant.

(5) Restrictions. The right to prohibit the use of mixing zones or to place more stringent limitations on mixing zones than those stipulated in paragraphs (b)(2), (3), and (13) shall be reserved by the secretary wherever site conditions preclude the rapid dispersion and dilution of

effluent within the receiving surface water or if, in the judgment of the secretary, the presence of a mixing zone would unduly jeopardize human health or any of the existing uses of the receiving surface water.

(6) Outstanding national resource waters. Mixing zones may be allowed by the secretary for existing permitted discharges in surface waters re-designated as outstanding national resource waters in the "Kansas surface water register" pursuant to K.A.R. 28-16-28g but shall be evaluated on an individual permit basis to prevent the degradation of the outstanding national resource waters.

(7) Exceptional state waters. If the ratio of the receiving stream critical low flow to the discharge design flow is equal to or greater than 3:1, the mixing zone shall not exceed 25 percent of the cross-sectional area or volumetric flow of the receiving stream during critical low flow conditions, measured immediately upstream of the discharge during the critical low flow.

(8) General purpose waters.

(A) Special aquatic life use waters. If the ratio of the receiving stream critical low flow to the discharge design flow is equal to or greater than 3:1, the mixing zone shall not exceed 25 percent of the cross-sectional area or volumetric flow of the receiving stream during critical low flow conditions, measured immediately upstream of the discharge during the critical low flow.

(B) Expected aquatic life use waters. If the ratio of the receiving stream critical low flow to the discharge design flow is equal to or greater than 3:1, the mixing zone shall not exceed 50 percent of the cross-sectional area or volumetric flow of the receiving stream during critical low flow conditions, measured immediately upstream of the discharge during the critical low flow.

(C) Restricted aquatic life use waters. If the ratio of the receiving stream critical low flow to the discharge design flow is equal to or greater than 3:1, the mixing zone shall not exceed

100 percent of the cross-sectional area or volumetric flow of the receiving stream during critical low flow conditions, measured immediately upstream of the discharge during the critical low flow.

(D) Recreational uses. Mixing zones for classified surface waters designated for recreational uses may be allowed by the secretary on an individual permit basis in accordance with paragraph (b)(10).

(9) Alternate low flows. Alternate low flows may be utilized by the department as the critical low flow in the calculation of the mixing zone cross-sectional area or volumetric flow for specific water quality criteria.

(A) The 30Q10 flow for ammonia or the guaranteed minimum flow provided by a water assurance district, if applicable, shall be used by the department in the calculation of the mixing zone cross-sectional area or volumetric flow.

(B) Other alternate low flows, with a specific recurrence frequency and averaging period, shall be considered by the department if those flows will not result in excursions above aquatic life criteria more frequently than once every three years.

(C) Each proposed alternate low flow shall be subject to approval by the secretary.

(10) Alternate or site-specific mixing zones. Alternate mixing zones employing specific linear distances for mixing zones or alternate stream dilution volumes or cross-sectional areas, or both, may be allowed by the secretary. Site-specific mixing zones may be allowed if data generated from a site-specific study supports the use of an alternate mixing zone, but maintains a zone of passage for aquatic life.

(11) Discharges into classified lakes. Mixing zones shall not extend into any lake classified as an outstanding national resource water or exceptional state water, or designated as a

special aquatic life use water according to K.A.R. 28-16-28d. Mixing zones in lakes designated as expected aquatic life use water or restricted aquatic life use waters may be allowed by the department if the mixing zones do not extend farther than 50 meters from the point of effluent discharge or do not comprise more than one percent of the total volume of the receiving lake as measured at the conservation pool.

(12) Discharges into classified ponds. Mixing zones shall not extend into any classified pond.

(13) Discharges into classified wetlands. Mixing zones shall not extend into any classified wetland.

(c) Special conditions. The following special conditions shall not remove the obligation to design, build, or use pollution control structures or methods to control point sources and nonpoint sources:

(1) Low flow. Any classified stream segment may be exempted by the secretary from the application of some or all of the numeric surface water criteria specified in K.A.R. 28-16-28e if streamflow is less than the critical low flow.

(2) Effluent-created flow.

(A) For any current classified stream segment in which continuous flow is sustained primarily through the discharge of treated effluent and the segment does not otherwise meet the requirements of a classified stream in K.A.R. 28-16-28d, the discharger shall provide treatment in accordance with the federal secondary treatment regulation, 40 C.F.R. 133.102, dated July 1, 2012.

(B) This discharge shall not violate the general surface water quality criteria listed in K.A.R. 28-16-28e or impair any of the existing or attained designated uses of a downstream classified stream segment.

(C) If a use attainability analysis demonstrates that the designated uses of a surface water segment are not attainable, then the new use designations for effluent-created flow shall be adopted as specified in K.A.R. 28-16-28d and approved by the EPA before serving as a basis for limitations in any new, reissued, or modified permit.

(d) Treatment requirements.

(1) All effluent shall receive appropriate minimum levels of treatment in accordance with 40 C.F.R. 122.44, dated July 1, 2012.

(2) Effluent shall receive a higher level of treatment than that stipulated in paragraph (d)(1) of this regulation, if the department determines that this higher level of treatment is needed to fully comply with the terms and conditions of subsection (a) of this regulation or K.A.R. 28-16-28e.

(e) Analytical testing. All methods of sample collection, preservation, and analysis used in applying K.A.R. 28-16-28b through 28-16-28g shall be in accordance with those methods prescribed by the department.

(f) Application of standards to privately owned reservoirs or ponds. The application of water quality standards to privately owned reservoirs or ponds shall be subject to the provisions of K.S.A. 65-171d, and amendments thereto. (Authorized by K.S.A. 2014 Supp. 65-171d, K.S.A. 2014 Supp. 82a-2010, and K.S.A. 65-171m; implementing K.S.A. 2014 Supp. 82a-2002, 82a-2003, 82a-2004, and 82a-2005; effective May 1, 1986; amended, T-87-8, May 1, 1986;

amended May 1, 1987; amended Aug. 29, 1994; amended July 30, 1999; amended Aug. 31, 2001; amended Jan. 3, 2003; amended Jan. 28, 2005; amended March 20, 2015.

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-28d. Surface water classification and use designation. (a) Surface water classification. Surface waters shall be classified as follows:

(1) Classified stream segments shall be those stream segments defined in K.S.A. 2017 Supp. 82a-2001, and amendments thereto.

(2) Classified surface waters other than classified stream segments shall be defined as follows:

(A) Classified lakes shall be all lakes owned by federal, state, county, or municipal authorities and all privately owned lakes that serve as public drinking water supplies or that are open to the general public for primary or secondary contact recreation.

(B) Classified wetlands shall be the following:

(i) All wetlands owned by federal, state, county, or municipal authorities;

(ii) all privately owned wetlands open to the general public for hunting, trapping, or other forms of secondary contact recreation; and

(iii) all wetlands classified as outstanding national resource waters or exceptional state waters, or designated as special aquatic life use waters according to subsection (d).

Wetlands created for the purpose of wastewater treatment shall not be considered classified wetlands.

(C) Classified ponds shall be all ponds owned by federal, state, county, or municipal authorities and all privately owned ponds that impound water from a classified stream segment

as defined in paragraph (a)(1).

(b) Designated uses of classified surface waters other than classified stream segments. The designated uses of classified surface waters other than classified stream segments shall be defined as follows:

(1) "Agricultural water supply use" means the use of classified surface waters other than classified stream segments for agricultural purposes, including the following:

(A) "Irrigation," which means the withdrawal of classified surface waters other than classified stream segments for application onto land; and

(B) "livestock watering," which means the provision of classified surface waters other than classified stream segments to livestock for consumption.

(2) "Aquatic life support use" means the use of classified surface waters other than classified stream segments for the maintenance of the ecological integrity of lakes, wetlands, and ponds, including the sustained growth and propagation of native aquatic life; naturalized, important, recreational aquatic life; and indigenous or migratory semiaquatic or terrestrial wildlife directly or indirectly dependent on classified surface waters other than classified stream segments for survival.

(A) "Special aquatic life use waters" means either classified surface waters other than classified stream segments that contain combinations of habitat types and indigenous biota not found commonly in the state or classified surface waters other than classified stream segments that contain representative populations of threatened or endangered species.

(B) "Expected aquatic life use waters" means classified surface waters other than classified stream segments containing habitat types and indigenous biota commonly found or expected in the state.

(C) “Restricted aquatic life use waters” means classified surface waters other than classified stream segments containing indigenous biota limited in abundance or diversity by the physical quality or availability of habitat, due to natural deficiencies or artificial modifications, compared to more suitable habitats in adjacent waters.

(3) “Domestic water supply use” means the use of classified surface waters other than classified stream segments, after appropriate treatment, for the production of potable water.

(4) “Food procurement use” means the use of classified surface waters other than classified stream segments for obtaining edible forms of aquatic or semiaquatic life for human consumption.

(5) “Groundwater recharge use” means the use of classified surface waters other than classified stream segments for replenishing fresh or usable groundwater resources. This use may involve the infiltration and percolation of classified surface waters other than classified stream segments through sediments and soils or the direct injection of classified surface waters other than classified stream segments into underground aquifers.

(6) “Industrial water supply use” means the use of classified surface waters other than classified stream segments for nonpotable purposes by industry, including withdrawals for cooling or process water.

(7) “Recreational use” means the use of classified surface waters other than classified stream segments for primary contact recreation or secondary contact recreation.

(A) “Primary contact recreational use for classified surface waters other than classified stream segments” means the use of classified surface waters other than classified stream segments for recreation on and after April 1 through October 31 of each year, during which a person is immersed to the extent that some inadvertent ingestion of water is probable. This use

shall include boating, mussel harvesting, swimming, skin diving, waterskiing, and windsurfing.

(i) "Primary contact recreational use: swimming beach" shall apply to those classified surface waters other than classified stream segments that have posted public swimming areas. These waters shall present a risk of human illness that is no greater than 0.8 percent.

(ii) "Primary contact recreational use: public access" shall apply to those classified surface waters other than classified stream segments where full body contact can occur and that are, by law or written permission of the landowner, open to and accessible by the public. These waters shall present a risk of human illness that is no greater than 1.0 percent.

(iii) "Primary contact recreational use: restricted access" shall apply to those classified surface waters other than classified stream segments where full body contact can occur and that are not open to and accessible by the public under Kansas law. These waters shall present a risk of human illness that is no greater than 1.2 percent.

(B) "Secondary contact recreational use for classified surface waters other than classified stream segments" means recreation during which the ingestion of classified surface waters other than classified stream segments is not probable. This use shall include wading, fishing, trapping, and hunting.

(i) "Secondary contact recreational use: public access" shall apply to classified surface waters other than classified stream segments where the surface water is, by law or written permission of the landowner, open to and accessible by the public.

(ii) "Secondary contact recreational use: restricted access" shall apply to classified surface waters other than classified stream segments where the surface water is not open to and accessible by the public under Kansas law.

(c) Designated uses of classified stream segments. The designated uses of classified stream segments shall be those defined in K.S.A. 2017 Supp. 82a-2001, and amendments thereto.

(d) Assignment of uses to surface waters.

(1) (A) Classified surface waters shall be designated for uses based upon the results of use attainability analyses conducted in accordance with K.S.A. 2017 Supp. 82a-2005, and amendments thereto. The provisions of the federal water quality standards regulation, 40 C.F.R. 131.10(g), as adopted by reference in paragraph (d)(1)(B), shall be followed.

(B) 40 C.F.R. 131.10(g), dated July 1, 2016, is hereby adopted by reference, except that the phrase "federal clean water" shall be inserted before the word "act."

(2) Classified surface waters and their designated uses shall be identified and listed in the "Kansas surface water register," as adopted by reference in K.A.R. 28-16-28g.

(3) The use designations for classified streams, lakes, wetlands, and ponds not listed in the surface water register shall be determined by the secretary on a case-by-case basis in accordance with paragraph (d)(1). (Authorized by K.S.A. 2017 Supp. 65-171d, 82a-2005, and 82a-2010; implementing K.S.A. 2017 Supp. 65-171d, 82a-2002, 82a-2003, 82a-2004, and 82a-2005; effective May 1, 1986; amended, T-87-8, May 1, 1986; amended May 1, 1987; amended Aug. 29, 1994; amended July 30, 1999; amended Aug. 31, 2001; amended Jan. 3, 2003; amended Jan. 23, 2004; amended Jan. 28, 2005; amended March 20, 2015; amended Feb. 23, 2018.)

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-28e. Surface water quality criteria. (a) Criteria development guidance. The development of surface water quality criteria for substances not listed in these standards shall be guided by water quality criteria published by the EPA. If the department finds that the criteria listed in this regulation are underprotective or overprotective for a given surface water segment, appropriate site-specific criteria may be developed and applied by the department, in accordance with K.A.R. 28-16-28f, using bioassessment methods or other related scientific procedures, including those procedures consistent with the EPA's "water quality standards handbook," second edition, as published in August 1994, or other department-approved methods.

(b) General criteria for surface waters. The following criteria shall apply to all surface waters, regardless of classification:

(1) Surface waters shall be free, at all times, from the harmful effects of substances that originate from artificial sources of pollution and that produce any public health hazard, nuisance condition, or impairment of a designated use.

(2) Hazardous materials derived from artificial sources, including toxic substances, radioactive isotopes, and infectious microorganisms derived from point sources or nonpoint sources, shall not occur in surface waters at concentrations or in combinations that jeopardize the public health or the survival or well-being of livestock, domestic animals, terrestrial wildlife, or aquatic or semiaquatic life.

(3) Surface waters shall be free of all discarded solid materials, including trash, garbage, rubbish, offal, grass clippings, discarded building or construction materials, car bodies, tires, wire, and other unwanted or discarded materials. The placement of stone and concrete rubble for bank stabilization shall be acceptable to the department if all other required permits are obtained before placement.

(4) Surface waters shall be free of floating debris, scum, foam, froth, and other floating materials directly or indirectly attributable to artificial sources of pollution.

(5) Oil and grease from artificial sources shall not cause any visible film or sheen to form upon the surface of the water or upon submerged substrate or adjoining shorelines, nor shall these materials cause a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines.

(6) Surface waters shall be free of deposits of sludge or fine solids attributable to artificial sources of pollution.

(7) Taste-producing and odor-producing substances of artificial origin shall not occur in surface waters at concentrations that interfere with the production of potable water by conventional water treatment processes, that impart an unpalatable flavor to edible aquatic or semiaquatic life or terrestrial wildlife, or that result in noticeable odors in the vicinity of surface waters.

(8) The natural appearance of surface waters shall not be altered by the addition of color-producing or turbidity-producing substances of artificial origin.

(9) In stream segments where background concentrations of naturally occurring substances, including chlorides and sulfates, exceed the water quality criteria listed in table 1a of the "Kansas surface water quality standards: tables of numeric criteria," as adopted by reference

in subsection (e), the existing water quality shall be maintained, and the newly established numeric criteria shall be the background concentration. Background concentrations shall be established using the methods outlined in the "Kansas implementation procedures: surface water quality standards," as adopted by reference in K.A.R. 28-16-28b, and available upon request from the-department.

(c) Application of criteria for designated uses of surface waters.

(1) The numeric criteria in tables 1a, 1b, 1c, and 1d of the "Kansas surface water quality standards: tables of numeric criteria" shall not apply if the critical low flow is less than 0.03 cubic meter per second (1.0 cubic foot per second) for waters designated as expected aquatic life use waters and restricted aquatic life use waters, unless studies conducted or approved by the department show that water present during periods of no flow, or flow below critical low flow, provides important refuges for aquatic life and permits biological recolonization of intermittently flowing segments.

(2) The numeric criteria in tables 1a, 1b, 1c, and 1d of the "Kansas surface water quality standards: tables of numeric criteria" shall not apply if the critical low flow is less than 0.003 cubic meter per second (0.1 cubic foot per second) for waters designated as special aquatic life use waters, unless studies conducted or approved by the department show that water present during periods of no flow, or flow below critical low flow, provides important refuges for aquatic life and permits biological recolonization of intermittently flowing segments.

(3) Each digression shall be assessed by the secretary for the purposes of section 303(d) of the federal clean water act, with consideration of acceptable duration and frequency of the digression and representation of actual ambient conditions by environmental monitoring data, as specified in the "Kansas implementation procedures: surface water quality standards."

(d) Criteria for designated uses of surface waters. The following criteria shall apply to all classified surface waters for the indicated designated uses:

(1) Agricultural water supply use. The water quality criteria for irrigation and livestock watering specified in table 1a of the "Kansas surface water quality standards: tables of numeric criteria" shall not be exceeded outside of mixing zones due to artificial sources of pollution.

(2) Aquatic life support use.

(A) Nutrients. The introduction of plant nutrients into streams, lakes, or wetlands from artificial sources shall be controlled to prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life.

(B) Suspended solids. Suspended solids added to surface waters by artificial sources shall not interfere with the behavior, reproduction, physical habitat, or other factors related to the survival and propagation of aquatic or semiaquatic life or terrestrial wildlife. In the application of this provision, suspended solids associated with discharges of presedimentation sludge from water treatment facilities shall be deemed noninjurious to aquatic and semiaquatic life and terrestrial wildlife if these discharges fully meet the requirements of paragraphs (b)(6) and (8) and paragraph (d)(2)(D).

(C) Temperature.

(i) Heat of artificial origin shall not be added to a surface water in excess of the amount that will raise the temperature of the water beyond the mixing zone more than 3^{o} C above natural conditions. Additionally, a discharge to a receiving water shall not lower the temperature of the water beyond the mixing zone more than 3^{o} C below natural conditions. The normal daily and seasonal temperature variations occurring within a surface water before the addition of heated or cooled water of artificial origin shall be maintained.

(ii) Temperature criteria applicable to industrial cooling water recycling reservoirs that meet the requirements for classification specified in K.A.R. 28-16-28d shall be established by the secretary on a case-by-case basis to protect the public health, safety, or the environment.

(D) Toxic substances.

(i) Conditions of acute toxicity shall not occur in classified surface waters outside of zones of initial dilution, nor shall conditions of chronic toxicity occur in classified surface waters outside of mixing zones.

(ii) Acute criteria for the aquatic life support use specified in tables 1a, 1b, and 1c of the "Kansas surface water quality standards: tables of numeric criteria" shall apply beyond the zone of initial dilution. Chronic criteria for the aquatic life support use specified in tables 1a, 1b, and 1d of the "Kansas surface water quality standards: tables of numeric criteria" shall apply beyond the mixing zone.

(iii) If a discharge contains a toxic substance that lacks any published criteria for the aquatic life support use, or if a discharge contains a mixture of toxic substances capable of additive or synergistic interactions, bioassessment methods and procedures shall be specified by the department to establish whole-effluent toxicity limitations that are consistent with paragraph (d)(2)(D)(i).

(3) Domestic water supply use.

(A) Except as provided in paragraph (d)(3)(B), the criteria listed in table 1a of the "Kansas surface water quality standards: tables of numeric criteria" for domestic water supply use shall not be exceeded at any point of domestic water supply diversion.

(B) In stream segments where background concentrations of naturally occurring substances, including chlorides and sulfates, exceed the domestic water supply criteria listed in

table 1a of the "Kansas surface water quality standards: tables of numeric criteria," due to intrusion of mineralized groundwater, the existing water quality shall be maintained, and the newly established numeric criteria for domestic water supply shall be the background concentration. Background concentrations shall be established using the methods outlined in the "Kansas implementation procedures: surface water quality standards," available upon request from the department.

(C) Any substance derived from an artificial source that, alone or in combination with other synthetic or naturally occurring substances, causes toxic, carcinogenic, teratogenic, or mutagenic effects in humans shall be limited to nonharmful concentrations in surface waters. Unless site-specific water quality conditions warrant the promulgation of more protective criteria under the provisions of subsection (a) of this regulation and K.A.R. 28-16-28f, maximum contaminant levels for toxic, carcinogenic, teratogenic, or mutagenic substances specified in 40 C.F.R. 141.11, 141.13, and 141.61 through 141.66, dated July 1, 2012, shall be deemed nonharmful.

(D) The introduction of plant nutrients into surface waters designated for domestic water supply use shall be controlled to prevent interference with the production of drinking water.

(4) Food procurement use.

(A) Criteria listed in table 1a of the "Kansas surface water quality standards: tables of numeric criteria" for food procurement use shall not be exceeded outside of a mixing zone due to any artificial source of pollution.

(B) Substances that can bioaccumulate in the tissues of edible aquatic or semiaquatic life or wildlife through bioconcentration or biomagnification shall be limited in surface waters to concentrations that result in no harm to human consumers of these tissues. For bioaccumulative

carcinogens, surface water concentrations corresponding to a cancer risk level of less than 0.000001 (10^{-6}) in human consumers of aquatic or semiaquatic life or wildlife shall be deemed nonharmful by the department and adopted as food procurement criteria. Average rates of tissue consumption and lifetime exposure shall be assumed by the department in the estimation of the cancer risk level.

(5) Groundwater recharge use. In surface waters designated for the groundwater recharge use, water quality shall be such that, at a minimum, degradation of groundwater quality does not occur. Degradation shall include any statistically significant increase in the concentration of any chemical or radiological contaminant or infectious microorganism in groundwater resulting from surface water infiltration or injection.

(6) Industrial water supply use. Surface water quality criteria for industrial water supplies shall be determined by the secretary on a case-by-case basis to protect the public health, safety, or the environment.

(7) Recreational use.

(A) General. The introduction of plant nutrients into surface waters designated for primary or secondary contact recreational use shall be controlled to prevent the development of objectionable concentrations of algae or algal by-products or nuisance growths of submersed, floating, or emergent aquatic vegetation.

(B) Primary contact recreation for classified surface waters other than classified stream segments. A single sample maximum or a geometric mean of at least five samples collected during separate 24-hour periods within a 30-day period shall not exceed the criteria in table 1j of the "Kansas surface water quality standards: tables of numeric criteria" beyond the mixing zone.

(C) Secondary contact recreational use for classified surface waters other than classified stream segments. A single sample maximum or a geometric mean of at least five samples collected during separate 24-hour periods within a 30-day period shall not exceed the criteria in table 1j of the "Kansas surface water quality standards: tables of numeric criteria" beyond the mixing zone.

(D) Primary contact recreation for classified stream segments. At least five samples shall be collected during separate 24-hour periods within a 30-day period. A geometric mean analysis of these samples shall not exceed the criteria in table 1i of the "Kansas surface water quality standards: tables of numeric criteria" beyond the mixing zone.

(E) Secondary contact recreation for classified stream segments. The following criteria shall be in effect from January 1 through December 31 of each year:

(i) At least five samples shall be collected during separate 24-hour periods within a 30-day period.

(ii) A geometric mean analysis of the samples specified in paragraph (d)(7)(E)(i) shall not exceed the criteria in table 1i of the "Kansas surface water quality standards: tables of numeric criteria" beyond the mixing zone.

(F) Wastewater disinfection. Wastewater effluent shall be disinfected if the department determines that the discharge of nondisinfected wastewater constitutes an actual or potential threat to public health. Situations that constitute an actual or potential threat to public health shall include instances in which there is a reasonable potential for the discharge to exceed the applicable criteria supporting the assigned recreational use designation or if a water body is known or likely to be used for either of the following:

(i) Primary or secondary contact recreation; or

(ii) any domestic water supply.

(8) Multiple uses. If a classified stream segment or classified surface water other than a classified stream segment is designated for more than one designated use according to K.A.R. 28-16-28d, the water quality of the classified stream segment or classified surface water other than a classified stream segment shall meet the most stringent of the applicable water quality criteria.

(e) Tables. The numeric criteria for the designated uses of classified surface waters shall be the numeric criteria specified in the department's "Kansas surface water quality standards: tables of numeric criteria," dated December 15, 2017, which is hereby adopted by reference. (Authorized by K.S.A. 2017 Supp. 65-171d, K.S.A. 65-171m, and K.S.A. 2017 Supp. 82a-2010; implementing K.S.A. 2017 Supp. 65-171d, K.S.A. 65-171m, and K.S.A. 2017 Supp. 82a-2002, 82a-2003, 82a-2004, and 82a-2010; effective May 1, 1986; amended, T-87-8, May 1, 1986; amended May 1, 1987; amended Aug. 29, 1994; amended July 30, 1999; amended Nov. 3, 2000; amended Aug. 31, 2001; amended Jan. 3, 2003; amended Oct. 24, 2003; amended Jan. 28, 2005; amended March 20, 2015; amended Feb. 23, 2018.)

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-28f. Administration of surface water quality standards. (a) Application of modified surface water quality standards. A modification to the surface water quality standards, the surface water register, or both, shall have no effect on the requirements of any existing enforceable discharge permit issued under K.S.A. 65-165, and amendments thereto, unless the discharge fails to meet the requirements of the permit or the secretary determines that continuation of the discharge will result in a potential or actual public health hazard or in irreversible water use impairments.

(b) Water quality certification. No action identified in this subsection shall be taken unless the department has issued a water quality certification for the following:

(1) Any action requiring a federal license or permit pursuant to the federal clean water act;

(2) any action subject to the permitting provisions of K.S.A. 65-165, and amendments thereto;

(3) any water development project subject to the provisions of K.S.A. 82a-325 et seq., and amendments thereto; and

(4) any action undertaken by any Kansas state agency that has a potential water quality impact.

(c) Compliance schedules.

(1) Except as provided in paragraph (c)(2), compliance schedules contained in any

discharge permit or license issued by the department pursuant to the federal clean water act or K.S.A. 65-165, and amendments thereto, shall not extend more than three years beyond the date of permit issuance.

(2) Compliance schedules of up to five years in total duration may be granted if it is demonstrated that the strict application of paragraph (c)(1) is not feasible due to construction scheduling constraints or other technical limitations.

(d) Variances.

(1) A variance establishing an interim designated use and interim criterion may be permitted and adopted into the regulations at the next systematic review or subsequent triennial review and after a public hearing consistent with 40 C.F.R. 131.20(b), dated July 1, 2016, if upon written request by any person, as defined in K.S.A. 65-170a and amendments thereto, the secretary finds that the attainment of the designated use and criterion is not feasible because one of the following conditions is met:

(A) One of the factors listed in 40 C.F.R. 131.10(g), as adopted by reference in K.A.R. 28-16-28d(d)(1)(B), exists.

(B) Actions necessary to facilitate lake, wetland, or stream restoration through dam removal or other significant reconfiguration activities preclude attainment of the designated use and criterion while the actions are being implemented.

(2) Each variance shall be issued and evaluated using methods outlined in the "Kansas implementation procedures: surface water quality standards," as adopted in K.A.R. 28-16-28b.

(3) Adoption and implementation of each variance shall be in accordance with 40 C.F.R. 131.14, dated July 1, 2016 and hereby adopted by reference, except that 131.14(a)(2),

131.14(a)(4), 131.14(b)(1)(ii), and 131.14(b)(2)(i)(A) shall be replaced by paragraphs (d)(4) through (d)(6) of this regulation, respectively.

(4) Each variance shall have a designated term limit and reflect the highest attainable condition during the specified term. A variance may be applied to individual or multiple dischargers or surface water bodies.

(5) Each variance shall have requirements and a time limitation demonstrating the intent that progress be made toward the attainment of the underlying designated use and criterion.

(A) Each Kansas surface water quality standard not specifically addressed in a variance shall remain applicable.

(B) Each person requesting a variance shall provide evidence that a designated use and criterion, or a designated use or criterion, addressed by the variance cannot be achieved solely by the implementation of technology-based effluent limits.

(C) Each requirement shall represent the highest attainable condition of the surface water segment applicable throughout the term of the variance. A specified requirement shall not result in lowering the currently attained ambient water quality, unless a variance is necessary for physical reconfiguration activities intended for surface water segment restoration. The highest attainable condition of each affected surface water segment as a quantifiable expression shall be specified as one of the following:

(i) The highest attainable interim criterion;

(ii) the interim effluent condition that reflects the greatest pollutant reduction achievable; or

(iii) the interim criterion or effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the variance is adopted.

(D) If the quantifiable expression identified in paragraph (d)(5)(C)(iii) is selected, a pollutant minimization plan consistent with 40 C.F.R. 131.3(p) shall be adopted and implemented if no additional feasible pollutant control technology is identified.

(6) Each variance request shall include supporting documentation that demonstrates all of the following:

(A) Attaining the designated use and criterion is not feasible throughout the term of the variance because of one of the factors cited in paragraphs (d)(1)(A) and (B).

(B) The term of the variance is only as long as necessary to achieve the highest attainable condition.

(C) The highest attainable condition of the affected surface water segment is as defined in paragraph (d)(5)(C).

(7) A discharger that impacts water quality shall not be granted a variance from requirements of K.A.R. 28-16-28c and 28-16-28e.

(8) Specific eligibility requirements may be included in a multiple-discharger variance as an alternative to identifying the specific dischargers at the time of adoption of the variance. Each discharger shall meet the eligibility requirements in the applicable section of the "Kansas surface water quality standards variance register," as adopted by reference in K.A.R. 28-16-28h, to participate in a multiple-discharger variance.

(e) Site-specific criteria. Site-specific criteria shall be established using the methods outlined in the "Kansas implementation procedures: surface water quality standards," as adopted by reference in K.A.R. 28-16-28b.

(f) Enforcement. Each person deemed by the department to be responsible for a violation of the Kansas surface water quality standards caused by an artificial source of pollution shall be

required by the department to initiate corrective actions that restore the designated uses of the affected surface water or surface water segment impaired by the violation and provide for the return of the original surface water quality conditions. (Authorized by K.S.A. 2017 Supp. 65-171d and K.S.A. 65-171m; implementing K.S.A. 65-164, K.S.A. 2017 Supp. 65-171d, and K.S.A. 65-171m; effective May 1, 1986; amended Aug. 29, 1994; amended July 30, 1999; amended Jan. 28, 2005; amended March 20, 2015; amended Feb. 23, 2018.)

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-28g. Surface water register. The classification and use designations of surface waters of the state shall be those identified in the department's "Kansas surface water register," dated December 12, 2013, which is hereby adopted by reference. (Authorized by K.S.A. 2013 Supp. 82a-2005 and 82a-2010; implementing K.S.A. 2013 Supp. 82a-2001, 82a-2002, 82a-2003, 82a-2004, and 82a-2005; effective Jan. 28, 2005; amended May 20, 2005; amended Sept. 15, 2006; amended May 25, 2007; amended June 6, 2008; amended Feb. 26, 2010; amended Aug. 5, 2011; amended July 7, 2014.)

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-28h. Surface water variance register. The variances approved by the secretary shall be those identified in the department's "Kansas surface water quality standards variance register," dated October 31, 2017, which is hereby adopted by reference. (Authorized by K.S.A. 2017 Supp. 65-171d; implementing K.S.A. 2017 Supp. 65-171d and K.S.A. 65-171m; effective Feb. 23, 2018.)

Kansas Department of Health and Environment

Amended Regulation

Article 16. – SURFACE WATER QUALITY STANDARDS

28-16-58. Definitions. As used in K.A.R. 28-16-57a through 28-16-63, each of the following terms shall have the meaning specified in this regulation: (a)(1) "Administrator" means ~~the~~ administrator of the United States environmental protection agency (EPA).

(2) "Application" means all documents required by the division of environment in the Kansas department of health and environment that are necessary for obtaining a permit.

(3) "Department" and "KDHE" mean Kansas department of health and environment.

(4) "Director" means director of the division of environment, KDHE.

(5) "Division" means division of environment, KDHE.

(6) "Draft permit" means a permit that has not been issued as a final action of the secretary.

(7) "EPA" means United States environmental protection agency.

(8) "Kansas implementation procedures: wastewater permitting" means the procedures dated July 1, 2014 and written and used by the department for the development of national pollutant discharge elimination system permit limitations, available upon request from the division.

(9) "Minimum standards of design, construction, and maintenance" means effluent standards, effluent limitations, pretreatment standards, other performance standards, and other standards of design, construction, and maintenance for wastewater control facilities published by the department in 1978 as "minimum standards of design for water pollution control facilities."

(10) "Municipal system" means a system under the jurisdiction of a city, county, township, district, or other governmental unit.

(11) "National pollutant discharge elimination system" and "NPDES" mean the national system for the issuance of permits under 33 U.S.C. Section 1342 and shall include any state or interstate program that has been approved by the administrator, in whole or in part, pursuant to 33 U.S.C. Section 1342.

(12) "Refuse act application" means an application for a permit under 33 U.S.C. Section 407, commonly known as the refuse act, of 33 U.S.C. Chapter 9, "protection of navigable waters and of harbor and river improvements generally."

(13) "Regional administrator" means the regional administrator for region VII of the EPA.

(14) "Secretary" means secretary of KDHE.

(15) "Water quality standards" means all water quality standards, as specified in K.A.R. 28-16-28b through K.A.R. 28-16-28g, to which a discharge is subject.

(16) "Waters of the state" means all surface and subsurface waters occurring within the borders of the state~~,~~ or forming part of the border between Kansas and one of the adjoining states.

(b) The definitions of the following terms contained in 33 U.S.C. Section 1362, as amended July 29, 2008 and hereby adopted by reference, shall be applicable to the following terms as used in K.A.R. 28-16-57a through K.A.R. 28-16-63, unless the context requires otherwise:

(1) "Biological monitoring";

(2) "effluent limitations";

(3) “municipality”;

(4) “person”;

(5) “state”; and

(6) “toxic pollutant.” (Authorized by K.S.A. 2014 Supp. 65-171d; implementing K.S.A. 65-165, K.S.A. 65-166, and K.S.A. 2014 Supp. 65-171d; effective, E-74-32, June 14, 1974; effective May 1, 1975; amended May 1, 1987; amended Aug. 31, 2001; amended Jan. 28, 2005; amended March 20, 2015.)

KANSAS SURFACE WATER QUALITY STANDARDS

Tables of Numeric Criteria

Kansas
Department of Health and Environment

Prepared by The Kansas Department of Health and Environment

Bureau of Water

December 15, 2017

Kansas Surface Water Quality Standards

Tables of Numeric Criteria

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria

PARAMETER	CAS NUMBER	Use Category					
		AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
		ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
RADIONUCLIDES (pCi/L)							
beta / photon emitters	a	a	a	a	a	a	50
gross alpha particles including radium-226,but not radon or uranium	a	a	a	a	a	a	15
radium 226 and 228 combined	a	a	a	a	a	a	5
strontium 90	a	a	a	a	a	a	8
tritium	a	a	a	a	a	a	20,000
METALS (µg/L)							
antimony, total	7440360	88	30	a	a	640	6
arsenic, total	7440382	340	150	200	100	20.5	10
arsenic (III)	a	360	50	a	a	0.14	0.018
arsenic (V)	a	850	48	a	a	a	a
barium, total	7440393	a	a	a	a	a	2,000
beryllium, total	7440417	a	a	a	a	a	4
boron, total	7440428	a	a	5,000	750	a	a
cadmium, total	7440439	table 1b	table 1b	20	10	170	5
chromium, total	7440473	a	40	1,000	100	a	100
chromium (III)	16065831	table 1b	table 1b	a	a	3,433,000	50
chromium (VI)	18540299	16	11	a	a	3,400	50
copper, total	7440508	BLM[d]	BLM[d]	500	200	a	1,000
lead, total	7439921	table 1b	table 1b	100	5,000	a	15
mercury, total	7439976	1.4	0.77	10	a	0.146	2
nickel, total	7440020	table 1b	table 1b	500	200	4,600	610
silver, total	7440224	table 1b	a	a	a	a	100
thallium, total	7440280	1,400	40	a	a	6.3[b]	2
zinc, total	7440666	table 1b	table 1b	25,000	2,000	26,000	5,000
OTHER INORGANIC SUBSTANCES (µg/L)							
ammonia	7664417	table 1c	table 1d	a	a	a	a
asbestos (fibers>10µm) (million-fibers/L)	12001295	a	a	a	a	a	7
chloride	16887006	860,000	c	a	a	a	250,000
chlorine, total residual	7782505	19	11	a	a	a	a
cyanide (free)	57125	22	5.2	a	a	220,000	200
fluoride	16984488	a	a	2,000	1,000	a	2,000
nitrate (as N)	14797558	a	a	a	a	a	10,000
nitrite + nitrate (as N)	a	a	a	100,000	a	a	10,000
selenium, total	7782492	20	5	50	20	4,200	50
selenium, (V)	a	11.2	a	a	a	a	a
sulfate	14808798	a	a	1,000,000	a	a	250,000

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria

PARAMETER	CAS NUMBER	Use Category: AQUATIC LIFE ACUTE	AQUATIC LIFE CHRONIC	AGRICULTURE LIVESTOCK	AGRICULTURE IRRIGATION	PUBLIC HEALTH FOOD PROCUREMENT	PUBLIC HEALTH DOMESTIC WATER SUPPLY
ORGANIC SUBSTANCES (µg/L) (EXCEPT PESTICIDES)							
A. Halogenated Ethers.....							
chloroalkyl ethers, total	a	238,000	a	a	a	a	a
bis(2-chloroethyl) ether	111444	238,000	a	a	a	0.53	0.03
2-chloroethyl vinyl ether	110758	360	120	a	a	a	a
bis(2-chloroisopropyl) ether	108601	238,000	a	a	a	65,000	1400
bis(chloromethyl) ether	542881	238,000	a	a	a	0.00029	0.0001
chloromethyl methyl ether	107302	238,000	a	a	a	0.00184	a
4,4-dibromodiphenyl ether	2050477	360	120	a	a	a	a
halogenated ethers, total	a	360	122	a	a	a	a
hexabromodiphenyl ether	36483600	360	120	a	a	a	a
nonabromodiphenyl ether	63936561	360	120	a	a	a	a
pentabromodiphenyl ether	32534819	360	120	a	a	a	a
tetrabromodiphenyl ether	40088479	360	120	a	a	a	a
tribromodiphenyl ether	49690940	360	120	a	a	a	a
B. Halogenated Aliphatic Hydrocarbons.....							
Chlorinated ethanes							
1,2-dichloroethane	107062	18,000	2,000	a	a	99[b]	0.38[b]
hexachloroethane	67721	980	540	a	a	3.3	1.9[b]
pentachloroethane	76017	7,240	1,100	a	a	a	a
1,1,1,2-tetrachloroethane	630206	9,320	a	a	a	a	a
1,1,2,2-tetrachloroethane	79345	9,320	2,400	a	a	4	0.17
tetrachloroethanes, total	a	9,320	a	a	a	a	a
1,1,1-trichloroethane	71556	18,000	a	a	a	173,077	200
1,1,2-trichloroethane	79005	18,000	9,400	a	a	16	0.6[b]
Chlorinated ethenes							
chlorinated ethylenes, total	a	11,600	a	a	a	a	a
chloroethylene (vinyl chloride)	75014	a	a	a	a	2.4	2
1,1-dichloroethylene	75354	11,600	a	a	a	7,100	7
cis-1,2-dichloroethylene	156592	11,600	a	a	a	a	70
trans-1,2-dichloroethylene	156605	11,600	a	a	a	10,000	100
tetrachloroethylene (PCE)	127184	5,280	840	a	a	3.3	0.8[b]
trichloroethylene (TCE)	79016	45,000	21,900	a	a	30	2.7[b]
Chlorinated propanes/propenes							
1,2-dichloropropane	78875	23,000	5,700	9	a	15	5
1,3-dichloropropene	542756	6,060	244	a	a	14.1	10[b]
Halogenated methanes							
bromochloromethane	74975	11,000	a	a	a	15.7	a
bromodichloromethane (dichlorobromomethane)	75274	11,000	a	a	a	17	0.55
bromotrichloromethane	75627	11,000	a	a	a	15.7	a
bis(2-chloroethoxy)methane	111911	11,000	a	a	a	15.7	a

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria

PARAMETER	CAS NUMBER	Use Category: AQUATIC LIFE ACUTE	AQUATIC LIFE CHRONIC	AGRICULTURE LIVESTOCK	AGRICULTURE IRRIGATION	PUBLIC HEALTH FOOD PROCUREMENT	PUBLIC HEALTH DOMESTIC WATER SUPPLY
dibromochloromethane (chlorodibromomethane)	124481	11,000	a	a	a	13	0.4
dibromodichloromethane	594183	11,000	a	a	a	15.7	a
dichlorodifluoromethane	75718	11,000	a	a	a	15.7	a
dichloromethane (methylene chloride)	75092	11,000	a	a	a	590	5
halogenated methanes, total	a	11,000	a	a	a	15.7	100
tetrachloromethane (carbon tetrachloride)	56235	35,200	a	a	a	4.4[b]	0.25[b]
tribromochloromethane	594150	11,000	a	a	a	15.7	a
tribromomethane (bromoform)	75252	11,000	a	a	a	140	4.3
trichlorofluoromethane	75694	11,000	a	a	a	15.7	a
trichloromethane (chloroform)	67663	28,900	1,240	a	a	470	5.7
Other halogenated aliphatic hydrocarbons							
hexachlorobutadiene	87683	90	9.3	a	a	18	0.44
hexachlorocyclopentadiene	77474	7	5.2	a	a	1,100	50
C. Monocyclic Aromatic Hydrocarbons except Phenols and Phthalates.....							
Benzenes							
aminobenzene (aniline)	62533	14	6.7	a	a	a	a
benzene	71432	5,300	a	a	a	51	1.2[b]
ethylbenzene	100414	32,000	a	a	a	2,100	700
nitrobenzene	98953	27,000	a	a	a	690	17
vinylbenzene (styrene)	100425	a	a	a	a	a	100
Chlorinated benzenes							
chlorobenzene	108907	250	50	a	a	1,600	100
dichlorobenzenes, total	25321226	1,120	763	a	a	2,600	a
1,2-dichlorobenzene (o-dichlorobenzene)	95501	1,120	763	a	a	1,300	600
1,3-dichlorobenzene (m-dichlorobenzene)	541731	1,120	763	a	a	960	400[b]
1,4-dichlorobenzene (p-dichlorobenzene)	106467	a	a	a	a	190	75
hexachlorobenzene	118741	6	3.7	a	a	0.00029	0.00075[b]
other chlorinated benzenes, total	a	250	50	a	a	a	a
pentachlorobenzene	608935	250	50	a	a	1.5	1.4
1,2,4,5-tetrachlorobenzene	95943	250	50	a	a	1.1	0.97
1,2,4-trichlorobenzene	120821	250	a	a	a	70	70
Toluenes and xylenes							
2,4-dinitrotoluene	121142	330	230	a	a	3.4	0.11
dinitrotoluenes, total	25321146	330	230	a	a	9.1	a
toluene	108883	17,500	a	a	a	15,000	1,000
xylenes, total	1330207	a	a	a	a	a	10,000

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria

PARAMETER	CAS NUMBER	Use Category: AQUATIC LIFE ACUTE	AQUATIC LIFE CHRONIC	AGRICULTURE LIVESTOCK	AGRICULTURE IRRIGATION	PUBLIC HEALTH FOOD PROCUREMENT	PUBLIC HEALTH DOMESTIC WATER SUPPLY
D. Nitrogen Compounds Except Monocyclic Aromatics.....							
acrylonitrile	107131	7,550	2,600	a	a	0.25	0.059[b]
benzidine	92875	2,500	a	a	a	0.0002	0.00012[b]
3,3-dichlorobenzidine	91941	a	a	a	a	0.028	0.04[b]
1,2-diphenylhydrazine	122667	270	a	a	a	0.2	0.04[b]
nitrosamines, total	a	5,850	a	a	a	1.24	0.0008
N-nitrosodibutylamine	924163	5,850	a	a	a	0.22	0.0063
N-nitrosodiethanolamine	1116547	5,850	a	a	a	1.24	a
N-nitrosodiethylamine	55185	5,850	a	a	a	1.24	0.0008
N-nitrosodimethylamine	62759	5,850	a	a	a	3	0.00069
N-nitrosodiphenylamine	86306	5,850	a	a	a	6	5[b]
N-nitrosodi-n-propylamine	621647	a	a	a	a	0.51	0.005
N-nitrosopyrrolidine	930552	5,850	a	a	a	34	0.016
E. Phenolic Compounds.....							
2,4-dimethyl phenol	105679	1,300	530	a	a	850	380
2,4-dinitrophenol	51285	a	a	a	a	5,300	69
nitrophenols, total	a	230	150	a	a	a	a
phenol	108952	10,200	2,560	a	a	860,000	10,000
Chlorinated phenols							
2-chlorophenol	95578	4,380	2,000	a	a	150	81
3-chlorophenol	108430	a	a	a	a	29,000	a
2,4-dichlorophenol	120832	2,020	365	a	a	790[b]	93[b]
3-methyl-4-chlorophenol	59507	30	a	a	a	a	a
2,4,5-trichlorophenol	95954	100	63	a	a	3,600	1,800
2,4,6-trichlorophenol	88062	a	970	a	a	2.4	2.1[b]
F. Phthalate Esters							
butylbenzyl phthalate	85687	a	a	a	a	1,900	1,500
dibutyl phthalate (di-n-butyl phthalate)	84742	940	3	a	a	4,500	2,000
diethyl phthalate	84662	a	a	a	a	44,000	17,000
dimethyl phthalate	131113	940	3	a	a	1,100,000	270,000
bis(2-ethylhexyl) phthalate (DEHP)	117817	400	360	a	a	5.9[b]	1.8[b]
phthalates, total	a	940	3	a	a	a	a
G. Polynuclear Aromatic Hydrocarbons (PAHs)……							
acenaphthene	83329	1,700	520	a	a	990	670
acenaphthylene	208968	a	a	a	a	0.0311	a
anthracene	120127	a	a	a	a	40,000	9,600[b]
benzo(a)anthracene	56553	a	a	a	a	0.018	0.0038
benzo(a)pyrene	50328	a	a	a	a	0.018	0.0028[b]
benzo(b)fluoranthene	205992	a	a	a	a	0.018	0.0038
benzo(g,h,i)perylene	191242	a	a	a	a	0.0311	a
benzo(k)fluoranthene	207089	a	a	a	a	0.018	0.0038
2-chloronaphthalene	91587	a	a	a	a	1,600	1,000

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria

PARAMETER	CAS NUMBER	Use Category: AQUATIC LIFE ACUTE	AQUATIC LIFE CHRONIC	AGRICULTURE LIVESTOCK	AGRICULTURE IRRIGATION	PUBLIC HEALTH FOOD PROCUREMENT	PUBLIC HEALTH DOMESTIC WATER SUPPLY
chrysene	218019	a	a	a	a	0.018	0.0038
dibenzo(a,h)anthracene	53703	a	a	a	a	0.018	0.0038
fluoranthene	206440	3,980	a	a	a	370[b]	300[b]
fluorene	86737	a	a	a	a	5,300	1,300[b]
indeno(1,2,3-cd)pyrene	193395	a	a	a	a	0.018	0.0038
naphthalene	91203	2,300	620	a	a	a	a
phenanthrene	85018	30	6.3	a	a	0.0311	a
pyrene	129000	a	a	a	a	4,000	960[b]
Polynuclear Aromatic Hydrocarbons, total (PAHs)	a	a	a	a	a	0.0311	0.2
H. Other Organics (Except Pesticides).....							
di(2-ethylhexyl) adipate	103231	a	a	a	a	a	400
isophorone	78591	117,000	a	a	a	960	35
polychlorinated biphenyls, total (PCBs)	a	2	0.014	a	a	0.000064	0.00017[b]
2,3,7,8-TCDD (dioxin)	1746016	0.01	0.00001	a	a	5.00E-09	1.3E-8[b]
PESTICIDES (µg/L)							
acrolein	107028	68	21	a	a	290	190
acrylamide	79061	a	a	a	a	a	0.01
alachlor (Lasso)	15972608	760	76	100	a	a	2
aldicarb	116063	a	a	a	a	a	3
aldicarb sulfone	1646884	a	a	a	a	a	2
aldicarb sulfoxide	1646873	a	a	a	a	a	3
aldrin	309002	3	0.001	1	a	0.00005	0.00013[b]
atrazine (Aatrex)	1912249	170	3	a	a	a	3
bromomethane (methyl bromide)	74839	11,000	a	a	a	1,500	47
bromoxynil (MCPA)	1689845	a	a	20	a	a	a
carbaryl (Sevin)	63252	a	0.02	100	a	a	a
carbofuran (Furadan)	1563662	a	a	100	a	a	40
chlordane	57749	2.4	0.0043	3	a	0.00081	0.00057[b]
chlorpyrifos	2921882	0.083	0.041	100	a	a	a
2,4-D	94757	a	a	a	a	a	70
dacthal (DCPA)	1861321	a	14,300	a	a	a	a
dalapon	75990	a	110	a	a	a	200
4,4-DDD (p,p=-DDD)	72548	a	a	a	a	0.00031	0.00031
4,4-DDE (p,p=-DDE)	72559	1,050	a	a	a	0.00022	0.00022
DDT, total	50293	1.1	0.001	50	a	0.00022	0.00022
diazinon (spectracide)	333415	0.17	0.17	100	a	a	a
dibromochloropropane (DBCP)	96128	a	a	a	a	15.7	0.2
1,2-dibromethane	106934	a	a	a	a	a	0.05
dieldrin	60571	0.24	0.056	1	a	0.000054	0.00014[b]
4,6-dinitro-o-cresol	534521	a	a	a	a	280	13
dinoseb (DNBP)	88857	a	a	a	a	a	7

Table 1a. Aquatic Life, Agriculture, And Public Health Designated Uses Numeric Criteria

PARAMETER	CAS NUMBER	Use Category					
		AQUATIC LIFE		AGRICULTURE		PUBLIC HEALTH	
		ACUTE	CHRONIC	LIVESTOCK	IRRIGATION	FOOD PROCUREMENT	DOMESTIC WATER SUPPLY
diquat	85007	a	a	a	a	a	20
disulfoton (Di-syston)	298044	a	a	100	a	a	a
endosulfan, total	115297	0.22	0.056	a	a	159	a
alpha-endosulfan	959998	0.22	0.056	a	a	89	62
beta-endosulfan	33213659	0.22	0.056	a	a	89	62
endosulfan sulfate	1031078	a	a	a	a	89	62
endothall	145733	a	a	a	a	a	100
endrin	72208	0.086	0.036	0.5	a	0.06	2
endrin aldehyde	7421934	a	a	a	a	0.3	0.76[b]
epichlorohydrin	106898	a	a	a	a	a	4
ethylene dibromide	106934	a	a	a	a	a	0.05
fenchlorfos (Ronnel)	299843	a	a	100	a	a	a
glyphosate (Roundup)	1071836	a	a	a	a	a	700
guthion	86500	a	0.01	100	a	a	a
heptachlor	76448	0.52	0.0038	0.1	a	0.000079	0.00021[b]
heptachlor epoxide	1024573	0.52	0.0038	0.1	a	0.00011[b]	0.00010[b]
hexachlorocyclohexane (HCH or BHC)	61876	100	a	a	a	0.0414	0.0123
alpha-HCH (alpha-BHC)	319846	100	a	a	a	0.0049	0.0039[b]
beta-HCH (beta-BHC)	319857	100	a	a	a	0.046[b]	0.014[b]
delta-HCH (delta-BHC)	319868	100	a	a	a	a	a
gamma-HCH (gamma-BHC, lindane)	58899	0.95	0.08	5	a	1.8	0.2
technical-HCH (technical-BHC)	608731	a	a	a	a	0.0414	a
malathion	121755	a	0.1	100	a	a	a
methoxychlor	72435	a	0.03	1,000	a	a	40
methyl parathion	298000	a	a	100	a	a	a
metribuzin (Sencor)	21087649	a	100	a	a	a	a
mirex	2385855	a	0.001	a	a	0.000097	a
oxamyl (Vydate)	23135220	a	0.001	a	a	a	200
parathion	56382	0.065	0.013	100	a	a	a
pentachloronitrobenzene	82688	250	50	a	a	a	a
pentachlorophenol (PCP)	87865	table 1b	table 1b	a	a	3	0.28[b]
picloram (Tordon)	1918021	a	a	a	a	a	500
propachlor (Ramrod)	1918167	a	8	a	a	a	a
simazine (Princep)	122349	a	a	10	a	a	4
2,4,5-T	93765	a	a	2	a	a	a
tributyltin (TBT)	56359	0.46	0.072	a	a	a	a
toxaphene	8001352	0.73	0.0002	5	a	0.00028	0.00073[b]
2,4,5-TP (Silvex)	93721	a	a	a	a	a	50

a - Not available

b - US EPA has promulgated this criterion for Kansas under the Code of Federal Regulations, Title 40, part 131.36.

c - Criterion under investigation

d - The Biotic Ligand Model (BLM) as in the “Aquatic Life Ambient Freshwater Quality Criteria-Copper 2007 Revision (EPA-822-R-07-001, February 2007)”, which is adopted by reference.

Table 1b. Hardness-Dependent Aquatic Life Support Criteria

Formulae for calculation of hardness-dependent aquatic life support criteria for chromium III and total cadmium, total lead, total nickel, total silver and total zinc and pH-dependent aquatic life support criteria for pentachlorophenol. A WER value of 1.0 is applied in the hardness-dependent equations for total metals unless a site-specific WER has been determined and adopted by the department in accordance with K.A.R. 28-16-28e(a) and K.A.R. 28-16-28f(f). Hardness values in metal formulae are entered in units of mg/L as $CaCO_3$. Pentachlorophenol formulae apply only over the pH range 6.5-8.5.

CADMIUM (ug/L):
acute criterion = WER[EXP[(1.0166(LN(hardness)))-3.924]]
chronic criterion = WER[EXP[(0.7409(LN(hardness)))-4.719]]

CHROMIUM III (ug/L):
acute criterion = WER[EXP[(0.819*(LN(hardness)))+3.7256]]
chronic criterion = WER[EXP[(0.819*(LN(hardness)))+0.6848]]

LEAD (ug/L):
acute criterion = WER[EXP[(1.273*(LN(hardness)))-1.460]]
chronic criterion = WER[EXP[(1.273*(LN(hardness)))-4.705]]

NICKEL (ug/L):
acute criterion = WER[EXP[(0.846*(LN(hardness)))+2.255]]
chronic criterion = WER[EXP[(0.846*(LN(hardness)))+0.0584]]

PENTACHLOROPHENOL (ug/L):
acute criterion = EXP[(1.005*pH)-4.830]
chronic criterion = EXP[(1.005*pH)-5.290]

SILVER (ug/L):
acute criterion = WER[EXP[(1.72*(LN(hardness)))-6.59]]

ZINC (ug/L):
acute criterion = WER[EXP[(0.8473*(LN(hardness)))+0.884]]
chronic criterion = WER[EXP[(0.8473*(LN(hardness)))+0.884]]

Table 1c. pH- and Temperature-Dependent Values Aquatic Life Criteria For Total Ammonia Acute Criterion

Total ammonia as N, mg/L.

pH	Temperature, °C																				
	0-10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	51.0	48.0	44.0	41.0	37.0	34.0	32.0	29.0	27.0	25.0	23.0	21.0	19.0	18.0	16.0	15.0	14.0	13.0	12.0	11.0	9.9
6.6	49.0	46.0	42.0	39.0	36.0	33.0	30.0	28.0	26.0	24.0	22.0	20.0	18.0	17.0	16.0	14.0	13.0	12.0	11.0	10.0	9.5
6.7	46.0	44.0	40.0	37.0	34.0	31.0	29.0	27.0	24.0	22.0	21.0	19.0	18.0	16.0	15.0	14.0	13.0	12.0	11.0	9.8	9.0
6.8	44.0	41.0	38.0	35.0	32.0	30.0	27.0	25.0	23.0	21.0	20.0	18.0	17.0	15.0	14.0	13.0	12.0	11.0	10.0	9.2	8.5
6.9	41.0	38.0	35.0	32.0	30.0	28.0	25.0	23.0	21.0	20.0	18.0	17.0	15.0	14.0	13.0	12.0	11.0	10.0	9.4	8.6	7.9
7.0	38.0	35.0	33.0	30.0	28.0	25.0	23.0	21.0	20.0	18.0	**17.0**	15.0	14.0	13.0	12.0	11.0	10.0	9.3	8.5	7.9	7.3
7.1	34.0	32.0	30.0	27.0	25.0	23.0	21.0	20.0	18.0	17.0	15.0	14.0	13.0	12.0	11.0	10.0	9.3	8.5	7.9	7.2	6.7
7.2	31.0	29.0	27.0	25.0	23.0	21.0	19.0	18.0	16.0	15.0	14.0	13.0	12.0	11.0	9.8	9.1	8.3	7.7	7.1	6.5	6.0
7.3	27.0	26.0	24.0	22.0	20.0	18.0	17.0	16.0	14.0	13.0	12.0	11.0	10.0	9.5	8.7	8.0	7.4	6.8	6.3	5.8	5.3
7.4	24.0	22.0	21.0	19.0	18.0	16.0	15.0	14.0	13.0	12.0	11.0	9.8	9.0	8.3	7.7	7.0	6.5	6.0	5.5	5.1	4.7
7.5	21.0	19.0	18.0	17.0	15.0	14.0	13.0	12.0	11.0	10.0	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4.0
7.6	18.0	17.0	15.0	14.0	13.0	12.0	11.0	10.0	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	15.0	14.0	13.0	12.0	11.0	10.0	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	2.9
7.8	13.0	12.0	11.0	10.0	9.3	8.5	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.2	2.9	2.7	2.5
7.9	11.0	9.9	9.1	8.4	7.7	7.1	6.6	6.0	5.6	5.1	4.7	4.3	4.0	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	8.8	8.2	7.6	7.0	6.4	5.9	5.4	5.0	4.6	4.2	3.9	3.6	3.3	3.0	2.8	2.6	2.4	2.2	2.0	1.9	1.7
8.1	7.2	6.8	6.3	5.8	5.3	4.9	4.5	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4
8.2	6.0	5.6	5.2	4.8	4.4	4.0	3.7	3.4	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	4.9	4.6	4.3	3.9	3.6	3.3	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.96
8.4	4.1	3.8	3.5	3.2	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79
8.5	3.3	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.98	0.90	0.83	0.77	0.71	0.65
8.6	2.8	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.5	1.3	1.2	1.1	1.0	0.96	0.88	0.81	0.75	0.69	0.63	0.58	0.54
8.7	2.3	2.2	2.0	1.8	1.7	1.6	1.4	1.3	1.2	1.1	1.0	0.94	0.87	0.80	0.74	0.68	0.62	0.57	0.53	0.49	0.45
8.8	1.9	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37
8.9	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.93	0.85	0.79	0.72	0.67	0.61	0.56	0.52	0.48	0.44	0.40	0.37	0.34	0.32
9.0	1.4	1.3	1.2	1.1	1.0	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37	0.34	0.32	0.29	0.27

Table 1d. pH- and Temperature-Dependent Values Aquatic Life Criteria For Total Ammonia Chronic Criterion

Total ammonia as N, mg/L.

pH	Temperature, °C																							
	0-7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	4.9	4.6	4.3	4.1	3.8	3.6	3.3	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.5	1.4	1.3	1.2	1.1
6.6	4.8	4.5	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1
6.7	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1
6.8	4.6	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
6.9	4.5	4.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0
7.0	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.2	2.0	**1.9**	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	0.99
7.1	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95
7.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.96	0.90
7.3	3.8	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.97	0.91	0.85
7.4	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.96	0.90	0.85	0.79
7.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.83	0.78	0.73
7.6	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.1	0.98	0.92	0.86	0.81	0.76	0.71	0.67
7.7	2.6	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60
7.8	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53
7.9	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47
8.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60	0.56	0.53	0.50	0.44	0.44	0.41
8.1	1.5	1.5	1.4	1.3	1.2	1.1	1.1	0.99	0.92	0.87	0.81	0.76	0.71	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35
8.2	1.3	1.2	1.2	1.1	1.0	0.96	0.90	0.84	0.79	0.74	0.70	0.65	0.61	0.57	0.54	0.50	0.47	0.44	0.42	0.39	0.37	0.34	0.32	0.30
8.3	1.1	1.1	0.99	0.93	0.87	0.82	0.76	0.72	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26
8.4	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.26	0.25	0.23	0.22
8.5	0.80	0.75	0.71	0.67	0.62	0.58	0.55	0.51	0.48	0.45	0.42	0.40	0.37	0.35	0.33	0.31	0.29	0.27	0.25	0.24	0.22	0.21	0.20	0.18
8.6	0.68	0.64	0.60	0.56	0.53	0.49	0.46	0.43	0.41	0.38	0.36	0.33	0.31	0.29	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.16	0.15
8.7	0.57	0.54	0.51	0.47	0.44	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.14	0.13
8.8	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.13	0.12	0.11
8.9	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.09
9.0	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.11	0.10	0.09	0.09	0.08

Table 1g. Temperature, Dissolved Oxygen, And pH Numeric Aquatic Life Criteria.

Aquatic Life Use	Dissolved Oxygen (DO)	pH	Temperature
Special	5.0 mg/L[a]	6.5-8.5[b]	32°C[c]
Expected	5.0 mg/L[a]	6.5-8.5[b]	32°C[c]
Restricted	5.0 mg/L[a]	6.5-8.5[b]	32°C[c]

a - (1) The concentration of dissolved oxygen in surface waters shall not be lowered by the influence of artificial sources of pollution. (2) Dissolved oxygen concentrations can be lower than 5.0 mg/L when caused by documented natural conditions specified in the "Kansas Implementation Procedures: Surface Water Quality Standards". (3) For lakes or reservoirs experiencing thermal stratification, the dissolved oxygen criterion is only applicable to the top layer or epilimnion of the waterbody.

b - pH range outside the zone of initial dilution.

c - (1) Beyond the zone of initial dilution a discharge shall not elevate the temperature of a receiving surface water above this temperature, except as provided in paragraph 28-16-28e(d)(2)(C)(ii). (2) Additional requirements in paragraph 28-16-28e(d)(2)(C)(i).

Table 1h. Natural Background Concentrations

BASIN	HUC 8	SEGMENT / LAKE NUMBER	WATERBODY	POLLUTANT	NATURAL BACKGROUND CONCENTRATION (mg/L)
Cimarron	11040006	1	Cimarron River	Chloride	1,010
Cimarron	11040007	1	Crooked Creek	Chloride	1,200
Cimarron	11040008	2	Bluff Creek	Sulfate	350
Cimarron	11040008	5	Cimarron River	Chloride	900
Cimarron	11040008	5	Cimarron River	Sulfate	465
Kansas Lower Republican	10250017	29	Buffalo Creek	Chloride	590
Kansas Lower Republican	10270701	6	Kansas River	Chloride	275
Kansas Lower Republican	10270101	6	Kansas River	Sulfate	300
Lower Arkansas	11030009	1	Rattlesnake Creek above the Little Salt Marsh in Quivira National Wildlife Refuge	Chloride	1,400
Lower Arkansas	11030009	1	Rattlesnake Creek below the Little Salt Marsh in Quivira National Wildlife Refuge	Chloride	3,660
Lower Arkansas	11030009	1	Rattlesnake Creek above and below the Little Salt Marsh in Quivira National Wildlife Refuge	Sulfate	455
Lower Arkansas	11030010	1	Arkansas River	Chloride	620
Lower Arkansas	11030010	3	Arkansas River	Chloride	650
Lower Arkansas	11030010	4	Arkansas River	Chloride	650
Lower Arkansas	11030010	6	Peace Creek	Chloride	1,800
Lower Arkansas	11030010	7	Salt Creek	Chloride	1,300
Lower Arkansas	11030011	1	Cow Creek near Willowbrook	Chloride	300
Lower Arkansas	11030011	2	Little Cow Creek	Chloride	300
Lower Arkansas	11030011	3	Cow Creek near Lyons	Chloride	460
Lower Arkansas	11030011	1755	Cow Creek	Chloride	300
Lower Arkansas	11030013	1	Arkansas River	Chloride	345
Lower Arkansas	11030013	2	Arkansas River	Chloride	265
Lower Arkansas	11030013	3	Arkansas River	Chloride	385
Lower Arkansas	11030013	3	Arkansas River	Sulfate	350
Lower Arkansas	11030013	LM014201	Slate Creek W.A. Watershed	Chloride	27,590

Table 1h. Natural Background Concentrations

BASIN	HUC 8	SEGMENT / LAKE NUMBER	WATERBODY	POLLUTANT	NATURAL BACKGROUND CONCENTRATION (mg/L)
Lower Arkansas	11030013	LM014201	Slate Creek W.A. Watershed	Sulfate	2,500
Lower Arkansas	11030015	3	Ninnescha River, South Folk	Chloride	265
Lower Arkansas	11060002	4	Arkansas River, Salt Folk	Chloride	305
Lower Arkansas	11060002	4	Arkansas River, Salt Folk	Sulfate	730
Lower Arkansas	11060002	7	Mule Creek	Sulfate	310
Lower Arkansas	11060003	2	Medicine Lodge River	Sulfate	450
Lower Arkansas	11060003	6	Medicine Lodge River	Sulfate	525
Lower Arkansas	11060003	8	Medicine Lodge River	Sulfate	300
Lower Arkansas	11060003	27	Soldier Creek	Sulfate	300
Neosho	11070202	5	Clear Creek	Sulfate	290
Neosho	11070202	16	French Creek	Sulfate	1,045
Neosho	11070202	17	Cottonwood River, South	Sulfate	840
Neosho	11070202	21	Doyle Creek	Sulfate	370
Neosho	11070205	LM035901	Mined Land Lake 12	Sulfate	1,000
Neosho	11070205	LM036801	Mined Land Lake 22	Sulfate	1,000
Neosho	11070205	LM036901	Mined Land Lake 23	Sulfate	1,000
Neosho	11070205	LM037301	Mined Land Lake 27	Sulfate	1,000
Neosho	11070205	LM037601	Mined Land Lake 30	Sulfate	1,000
Neosho	11070205	LM038841	Mined Land Lake W.A.	Sulfate	1,000
Neosho	11070205	LM048201	Mined Land Lake 17	Sulfate	1,000
Neosho	11070205	LM048401	Mined Land Lake 44	Sulfate	1,000
Neosho	11070207	LM047601	Mined Land Lake 6	Sulfate	1,000
Neosho	11070207	LM047801	Mined Land Lake 7	Sulfate	1,000
Smoky Hill-Saline	10260003	9	Smoky Hill River	Sulfate	500
Smoky Hill-Saline	10260003	17	Smoky Hill River	Sulfate	700
Smoky Hill-Saline	10260003	21	Smoky Hill River	Sulfate	700
Smoky Hill-Saline	10260003	LM013001	Cedar Bluff Lake	Sulfate	452
Smoky Hill-Saline	10260006	5	Smoky Hill River	Chloride	435

Table 1h. Natural Background Concentrations

BASIN	HUC 8	SEGMENT / LAKE NUMBER	WATERBODY	POLLUTANT	NATURAL BACKGROUND CONCENTRATION (mg/L)
Smoky Hill-Saline	10260006	9	Smoky Hill River	Chloride	625
Smoky Hill-Saline	10260006	15	Smoky Hill River	Chloride	820
Smoky Hill-Saline	10260006	15	Smoky Hill River	Sulfate	411
Smoky Hill-Saline	10260006	21	Smoky Hill River	Sulfate	464
Smoky Hill-Saline	10260008	3	Chapman Creek	Sulfate	370
Smoky Hill-Saline	10260008	6	Smoky Hill River	Chloride	265
Smoky Hill-Saline	10260008	6	Smoky Hill River	Sulfate	325
Smoky Hill-Saline	10260008	8	Mud Creek	Sulfate	400
Smoky Hill-Saline	10260008	18	Gypsum Creek	Sulfate	325
Smoky Hill-Saline	10260008	25	Holland Creek	Sulfate	1,200
Smoky Hill-Saline	10260008	28	Turkey Creek	Sulfate	1,200
Smoky Hill-Saline	10260008	35	Carry Creek	Sulfate	400
Smoky Hill-Saline	10260009	5	Paradise Creek	Chloride	860
Smoky Hill-Saline	10260009	5	Paradise Creek	Sulfate	630
Smoky Hill-Saline	10260009	8	Saline River	Chloride	860
Smoky Hill-Saline	10260009	8	Saline River	Sulfate	500 or 780 *
Smoky Hill-Saline	10260009	9	Saline River	Sulfate	390
Smoky Hill-Saline	10260009	LM014001	Wilson Lake	Chloride	680
Smoky Hill-Saline	10260009	LM014001	Wilson Lake	Sulfate	480
Smoky Hill-Saline	10260010	1	Saline River	Chloride	300
Smoky Hill-Saline	10260010	1	Saline River	Sulfate	375
Smoky Hill-Saline	10260010	3	Saline River	Chloride	370
Smoky Hill-Saline	10260010	3	Saline River	Sulfate	390

Table 1h. Natural Background Concentrations

BASIN	HUC 8	SEGMENT / LAKE NUMBER	WATERBODY	POLLUTANT	NATURAL BACKGROUND CONCENTRATION (mg/L)
Smoky Hill-Saline	10260010	10	Wolf Creek	Chloride	390
Smoky Hill-Saline	10260010	10	Wolf Creek	Selenium	7**
Smoky Hill-Saline	10260010	10	Wolf Creek	Sulfate	450
Smoky Hill-Saline	10260010	14	Bullfoot Creek	Sulfate	300
Smoky Hill-Saline	10260010	17	Elkhorn Creek	Sulfate	425
Solomon	10260012	2	Oak Creek	Selenium	12
Solomon	10260012	10	Beaver Creek	Selenium	16
Solomon	10260012	23	Deer Creek	Selenium	9
Solomon	10260014	18	Kill Creek	Selenium	9
Solomon	10260014	18	Kill Creek	Sulfate	540
Solomon	10260014	19	Covert Creek	Selenium	6
Solomon	10260014	19	Covert Creek	Sulfate	610
Solomon	10260014	20	Twin Creek	Selenium	12
Solomon	10260014	20	Twin Creek	Sulfate	730
Solomon	10260014	21	Carr Creek	Selenium	8
Solomon	10260014	21	Carr Creek	Sulfate	690
Solomon	10260015	1	Solomon River	Chloride	370
Solomon	10260015	12	Solomon River	Chloride	400
Solomon	10260015	18	Limestone Creek	Selenium	6.6
Solomon	10260015	18	Limestone Creek	Sulfate	300 **
Solomon	10260015	27	Salt Creek	Chloride	650
Solomon	10260015	27	Salt Creek	Sulfate	310
Upper Arkansas	11030001	1	Arkansas River	Sulfate	1,875
Upper Arkansas	11030001	3	Arkansas River	Selenium	7 or 10 ***
Upper Arkansas	11030001	9	Arkansas River	Selenium	7 or 10 ***
Upper Arkansas	11030003	1	Arkansas River	Selenium	7 or 10 ***
Upper Arkansas	11030003	1	Arkansas River	Sulfate	350
Upper Arkansas	11030004	1	Arkansas River	Sulfate	1,000
Upper Arkansas	11030004	10	Arkansas River	Fluoride	1.45
Upper Arkansas	11030004	10	Arkansas River	Sulfate	550

Table 1h. Natural Background Concentrations

BASIN	HUC 8	SEGMENT / LAKE NUMBER	WATERBODY	POLLUTANT	NATURAL BACKGROUND CONCENTRATION (mg/L)
Upper Arkansas	11030004	11	Arkansas River	Sulfate	350
Upper Republican	10250001	1	Arikaree River	Selenium	9
Upper Republican	10250003	2	Republican River, South Fork	Fluoride	1.45
Upper Republican	10250003	9	Republican River, South Fork	Fluoride	1.20
Walnut	11030017	18	Whitewater River	Sulfate	390
Walnut	11030018	30	Eightmile Creek	Sulfate	520

* 780 mg/L applies when stream flows are above the normal flow

** Only applies when stream flows are above the median (50 percentile) flow

*** From April to October, 7 mg/L applies; from November to March, 10 mg/L applies.

Table 1i. *Escherichia coli* Criteria For Classified Stream Segments

Use	Colony Forming Units (CFUs)/100mL	
Primary Contact Recreation	Geometric Mean Apr. 1 – Oct. 31	Geometric Mean Nov. 1 – Mar. 31
Class A	160	2358
Class B	262	2358
Class C	427	3843
Secondary Contact Recreation	Geometric Mean Jan. 1 – Dec. 31	
Class a	2358	
Class b	3843	

Table 1j. *Escherichia coli* Criteria For Classified Surface Waters Other Than Classified Stream Segments

Use	Colony Forming Units (CFUs)/100mL			
Primary Contact Recreation	Geometric Mean Apr. 1 – Oct. 31	Geometric Mean Nov. 1 – Mar. 31	Single Sample Maximum Apr. 1 – Oct. 31	Single Sample Maximum Nov. 1 – Mar. 31
Swimming Beach	160	800	732	3655
Public Access	262	1310	1198	6580
Restricted Access	427	2135	1950	9760
Secondary Contact Recreation	Geometric Mean Jan. 1 – Dec. 31		Single Sample Maximum Jan. 1 – Dec. 31	
Public Access	2135		9760	
Restricted Access	2135		9760	

Table 1k. Chlorophyll-a Criteria For Lakes Or Reservoirs With Active[a] Or Reserve[b] Domestic Water Supply Use

	Lakes or Reservoirs with Domestic Water Supply Use
Chlorophyll-a	The lesser value[c] of 10 µg/L or long-term average[d]

a. These lakes or reservoirs are currently being used as domestic water supply sources.

b. These lakes or reservoirs are not currently being used as domestic or public water supply sources, but they are listed as backup supplies by municipalities and other public water suppliers, or the active water rights for water supply uses are still being held by the municipalities and other public water suppliers.

c. With an exception for Cheney Lake, the criterion for Cheney Lake is set at the action level of 11 µg/L according to "A Comparative Water Quality Study of Cheney Reservoir, Kansas" by Smith et al, 2001.

d. Running average of a minimum of 4 samples over a 12-year period. For any lake or reservoir with insufficient data, the criterion is set at 10 µg/L until a long-term average can be calculated, and the new criterion will be the lesser value of 10 µg/L or the long-term average.

Table 1l. Current Lakes Or Reservoirs Serving As Active Or Reserve Domestic Water Supply

Lake Number	Register Name (with Local Name)
LM050001	Alma City Lake
LM040001	Augusta City Lake
LM041601	Augusta Santa Fe Lake
LM032001	Banner Creek Lake
LM031001	Big Hill Lake (Pearson-Skubitz Big Hill Lake)
LM046401	Blue Mound City Lake
LM043901	Bone Creek Lake
LM046201	Bronson City Lake
LM072601	Caney City Lake (Timber Hill Lake)
LM013001	Cedar Bluff Lake
LM044101	Cedar Creek Reservoir
LM040701	Cedar Valley Lake
LM073701	Centralia Lake
LM017001	Cheney Lake
LM030001	Clinton Lake
LM043001	Council Grove City Lake
LM022001	Council Grove Lake
LM051301	Critzer Lake
LM064901	Crystal Lake
LM071701	Edna City Lake
LM033001	El Dorado Lake
LM025001	Elk City Lake
LM040201	Eureka Lake (Eureka Old City Lake)
LM023001	Fall River Lake
LM045001	Fort Scott City Lake
LM040401	Gardner City Lake
LM040601	Garnet North City Lake
LM040801	Harveyville Lake (Harveyville City Lake)
LM069701	Herington City Lake
LM047201	Herington Reservoir
LM035001	Hillsdale Lake
LM073901	Jetmore Lake
LM026001	John Redmond Lake
LM016001	Kanopolis Lake
LM043401	Lake Kahola
LM041201	Lebo City Lake
Not Assigned	Linn Valley Lake

Table 1l. Current Lakes Or Reservoirs Serving As Active Or Reserve Domestic Water Supply

Lake Number	Register Name (with Local Name)
LM065701	Louisburg Old Lake
LM043801	Louisburg SFL (Louisburg Middle Creek SFL)
LM065901	Lyndon City Lake
LM051801	Madison City Lake
LM020001	Marion Lake
LM027001	Melvern Lake
LM019001	Milford Lake
LM051001	Miola Lake (Lake Miola)
LM013601	Mission Lake
LM071901	Moline Reservoir
LM051401	Mound City Lake
LM048701	Murray Gill Lake (Quivira Boy Scout Lake)
LM049901	New Alma City Lake
LM061301	New Olathe Lake
LM053801	New Yates Center Lake (Yates Center Reservoir)
LM010001	Norton Lake (Sebelius Lake)
LM066101	Osage City Reservoir
LM053901	Otis Creek Lake (Eureka)
LM066301	Parker City Lake
LM041401	Parsons Lake
LM029001	Perry Lake
LM044201	Pleasanton Reservoir (Pleasanton City Lake East)
LM012701	Polk Daniels Lake (Elk Co. SFL)
LM028001	Pomona Lake
LM073001	Pony Creek Lake
LM061901	Prairie Lake
LM066601	Prescott City Lake
LM022501	Quarry Lake
LM046801	Richmond City Lake
LM011501	Sabetha City Lake
LM072001	Sedan City South Lake
LM072101	Severy City Lake
LM073501	Spring Hill City Lake
LM051201	Strowbridge Reservoir (Carbondale East Lake)
LM049601	Thayer New City Lake
LM069101	Timber Lake
LM024001	Toronto Lake
LM021001	Tuttle Creek Lake

Table 1l. Current Lakes Or Reservoirs Serving As Active Or Reserve Domestic Water Supply

Lake Number	Register Name (with Local Name)
LM042001	Wabaunsee Co. Lake
LM018001	Waconda Lake
LM042201	Wellington Lake (Wellington Old City Lake)
LM042301	Wellington New City Lake
LM050801	Winfield City Lake
LM074401	Xenia Lake
LM069201	Yates Center Reservoir (South Owl Lake)