

Kansas Administrative Regulations

Kansas Department of Agriculture—Division of Water Resources

Article 40.—Design of Earth Dams

5-40-1. Definitions.

As used in K.S.A. 82a-301 through 82a-305a and amendments thereto, in the regulations adopted pursuant to these statutes, and by the chief engineer in administering K.S.A. 82a-301 through 82a-305a and amendments thereto, the following terms shall have the meanings ascribed to them in this regulation, unless the context clearly requires otherwise:

(a) "Application" means the formal document and any required supporting information that are submitted to the chief engineer and request a permit, pursuant to K.S.A. 82a-301 through 82a-305a, and amendments thereto.

(b) "Appurtenant works" means the primary spillway and other conduits through a dam, the valves, the auxiliary spillway, the service spillway, the stilling basin, any constructed outlet channel, all dikes and berms designed and constructed to protect the dam, the drains, and all other features constructed to protect or operate a dam.

(c) "As-built drawings" means the drawings showing a permitted project and all appurtenant works as the project and works were actually built. This term shall include the following:

- (1) All deviations from the plans that were approved by the chief engineer;
- (2) the location and design of any instruments and monitoring equipment that were installed at the site;
- (3) the location and elevation of any benchmarks; and
- (4) a certification that the permitted project was constructed as shown on the as-built drawings.

(d) "Authorized representative" means any employee of the chief engineer designated by the chief engineer to perform duties and functions on behalf of the chief engineer.

(e) "Auxiliary spillway" means an open channel that is constructed over or around an embankment for the purpose of conveying safely past the dam the flows that are greater than the primary spillway design discharge and that can be stored in the detention storage. This term is also known as an emergency spillway.

(f) "Benchmark" means a reference point or object of known elevation and location that is not expected to move horizontally or vertically during the life of the project.

(g) "Borrow area" means land, usually located near the dam, from which earth used to construct the embankment will be excavated.

(h) "Breach analysis" means an engineering analysis to determine the areas that would be inundated if a dam failed.

(i) "Channel change" means any project that alters the course, current, or cross section of any stream.

(j) "Chief engineer" means the chief engineer, division of water resources of the Kansas department of agriculture.

(k) "Control section" means the immediate downstream end of the level section of an open-channel earthen spillway. The elevation of the control section is the elevation of the open-channel spillway crest.

(l) "Cutoff collar" means a projecting flange built or installed completely around the outside of a pipe to lengthen the path of seepage along the outer surface of the pipe.

(m) "Cutoff trench" means an excavation under a dam to be later filled with impervious material to prevent or reduce the seepage of water through the foundation of a dam.

(n) "Design discharge" means the maximum rate of flow, expressed in cubic feet per second, released from a dam's spillways for the design storm.

(o) "Design storm" means the precipitation event specified in K.A.R. 5-40-22 that is the minimum precipitation event required to be used to design a particular dam.

(p) "Detention storage" means the volume in the reservoir between the lowest uncontrolled spillway, not including any low-flow augmentation works, and the crest of the auxiliary spillway.

(q) "Detention storm" means the storm described in K.A.R. 5-40-23.

(r) "Easily erodible soils" means soils with a high content of fine sand or silt and with little or no cohesion or plasticity, including fine sand, silt, sandy loam, and silty loam.

(s) "Effective height" means the difference in elevation between the crest of an auxiliary spillway or service spillway and the lowest point of the downstream toe of a dam. If the dam does not have an auxiliary or service spillway, the effective height means the difference in elevation between the top of the dam and the lowest point of the downstream toe of the dam.

(t) "Effective storage" means the volume of storage space in a reservoir below the crest of the auxiliary spillway or service spillway and above the elevation of the downstream toe of the dam at its lowest point. Effective storage shall not be reduced by accounting for accumulated sediment.

(u) "Embankment" means the earthen-fill portion of the dam.

(v) "Emergency action plan" means a formal document that identifies potential emergency conditions at a dam and specifies preplanned actions to be followed to minimize property damage and loss of life if the dam fails.

(w) "Erosion-resistant soils" means cohesive soils with a high clay content and high plasticity, including silty clay, sandy clay, and clay.

(x) "Freeboard" means the vertical distance between the maximum water surface elevation attained during the design storm and the top of the dam.

(y) "General plan" means a plan adopted by a watershed district, drainage district, or similar entity required by statute to be approved by the chief engineer, including any of the plans formulated under K.S.A. 24-901 and K.S.A. 24-1213, and amendments thereto.

(z) "Hazard" means the property or people that could be damaged or endangered by the failure of a dam, including people or property that might be inundated. This term shall include a public or industrial water supply stored in the reservoir created by the dam that would be released if the dam failed.

(aa) "High-impact dams" means all of the following classes of dams:

(1) Size class 4, hazard class A dams;

(2) size classes 3 and 4, hazard class B dams; and

(3) all hazard class C dams, using the definitions of hazard class and size class in K.A.R. 5-40-20 and K.A.R. 5-40-21.

(bb) "Hydraulically most distant point in the watershed" means the point in a watershed from which a raindrop falling at that point takes the longest time to reach the dam.

(cc) "Impervious material" means material that allows a relatively low rate of water movement through its cross section.

(dd) "Inspection year" means the period on and after May 1 of one year through April 30 of the following year. The inspection year shall be named for the calendar year in which the inspection year ends.

(ee) "Inundation area" means the area below a dam that will be inundated with water as determined by conducting a breach analysis meeting the requirements specified in K.A.R. 5-40-24.

(ff) "Invert" means the lowest point on the inside of the outlet of a conduit.

(gg) "Low-flow augmentation works" means any uncontrolled conduit, orifice, or other appurtenant works that slowly release water from storage in a reservoir, or bypass low flow through a reservoir.

(hh) "Low-impact dams" means all of the following classes of dams:

(1) Size classes 1, 2, and 3, hazard class A dams; and

(2) size classes 1 and 2, hazard class B dams, using the definitions of hazard class and size class in K.A.R. 5-40-20 and K.A.R. 5-40-21.

(ii) "Maintenance" means the actions or upkeep performed on a dam or its appurtenances to compensate for wear and tear on the dam and appurtenances and to preserve the dam and appurtenances so that the dam and appurtenances function properly until they are removed, including woody vegetation control; grass seeding; burrowing animal control; repair of minor erosion, cracks, animal burrows, and minor settling; care of pipes, piezometers, drains, valves, gates, and other mechanical devices; replenishment of riprap; and removal of debris from spillways.

(jj) "Modification" means any change in a dam or its appurtenances that involves a change to or significant disturbance of the embankment, an alteration of the flow

characteristics of a spillway, a change in the storage capacity or freeboard, or any other significant alteration in the functioning of the dam.

(kk) "Navigable stream" means any of the following:

- (1) The Arkansas river;
- (2) the Missouri river; or
- (3) the Kansas river.

(ll) "One percent-chance storm" means a rainfall event that has a one percent chance of being equaled or exceeded one or more times in a year.

(mm) "Owner of a dam" means the owner or owners of the land upon which a dam and appurtenant works are constructed unless an easement authorizes another person or entity to construct and maintain a dam on that easement. With such an easement, the holder of the easement shall be considered to be the owner of the dam.

(nn) "Perennial stream" means a stream, or part of a stream, that flows continuously during all of the calendar year, except during an extreme drought.

(oo) "Permanent pool" means the storage space in a reservoir below the elevation of the lowest uncontrolled spillway, not including any low-flow augmentation works. This term is also known as the "normal pool."

(pp) "Permit" means the consent or other formal document issued by the chief engineer that authorizes the construction, repair, or modification of a dam, channel change, or stream obstruction, and its operation and maintenance.

(qq) "PMP" means the probable maximum precipitation that can occur in a precipitation event as prescribed by K.A.R. 5-40-31.

(rr) "Prejurisdictional dam" means any of the following:

- (1) A dam constructed before May 28, 1929;
- (2) a dam constructed by an agency or political subdivision of state government, other than a county, city, town, or township, before April 11, 1978; or
- (3) a dam constructed before July 1, 2002 that is 25 or more feet in height and impounds less than 30 acre-feet of water at the top of the dam.

(ss) "Primary spillway" means the uncontrolled outlet device through a dam that provides the initial outlet for storm flows, usually consisting of either of the following:

- (1) A riser structure in combination with an outlet conduit; or

(2) a canopy or hooded inlet structure in combination with an outlet conduit.

This term is also known as a "principal spillway."

(tt) "Rainfall excess" means that part of the rain in a given storm that falls at intensities exceeding the infiltration capacity of the land and that is the volume of the rain available for direct runoff.

(uu) "Reservoir" means the area upstream from a dam that contains, or can contain, impounded water.

(vv) "Repair" means any action, other than maintenance, taken to restore a dam and its appurtenant works to their original permitted condition.

(ww) "Service spillway" means an open-channel spillway constructed over or around a dam embankment to convey safely past the dam all flows entering the reservoir that cannot be stored in the reservoir behind a dam that does not have a primary spillway.

(xx) "Size factor" means the effective height of the dam, expressed in feet, multiplied by the effective storage of the reservoir, expressed in acre-feet.

(yy) "Stilling basin" means an open structure or excavation at the outlet of a spillway that dissipates the energy of fast-moving water being discharged from the spillway to protect the streambed below a dam from erosion.

(zz) "Stream" means any watercourse that has a well-defined bed and well-defined banks and that has a watershed above the point marking the site of the project that exceeds the following number of acres in the zones specified:

(1) Zone three: 640 acres for all geographic points within any county west of a line formed by the adjoining eastern boundaries of Phillips, Rooks, Ellis, Rush, Pawnee, Edwards, Kiowa, and Comanche counties;

(2) zone two: 320 acres for all geographic points within any county located east of zone three and west of a line formed by the adjoining eastern boundaries of Republic, Cloud, Ottawa, Saline, McPherson, Reno, Kingman, and Harper counties; and

(3) zone one: 240 acres for all geographic points within any county located east of zone two.

The flow of a stream is not necessarily continuous and can occur only briefly after a rain in the watershed. If the site of the project has been altered so that a determination of whether the well-defined bed and banks did exist is not possible, it shall be presumed

that the bed and banks did exist if the watershed acreage criteria specified in this subsection have been met, unless the owner of the project conclusively demonstrates that the well-defined bed and banks did not exist when the project site was in its natural state and had not been altered by human activity.

(aaa) "Stream obstruction" means any project or structure that is wholly or partially placed or constructed in a stream and that does not meet the definition of a dam in K.S.A. 82a-301 and amendments thereto.

(bbb) "Time of concentration" means the time required for runoff to flow from the hydraulically most distant point in the watershed to the watershed outlet once the soil has become saturated and minor depressions have been filled.

(ccc) "Trash rack" means a protective device installed on the inlet of a primary spillway to prevent trash and other debris from obstructing the primary spillway without obstructing the flow of water.

(ddd) "Watershed" means all of the area draining toward a selected point on a stream.

(eee) "Wing dike" means an earthen or rock structure below the toe of a dam that is constructed to protect the embankment from erosion.

(fff) "Zone," in an earthen dam, means a segment of earthen fill containing similar materials.

(ggg) "Zoned fill" means an embankment divided into two or more zones to make the best use of available materials.

(Authorized by and implementing K.S.A. 2006 Supp. 82a-303a; effective May 1, 1983; amended May 1, 1987; amended, T-5-12-30-91 Dec. 30, 1991; amended Feb. 17, 1992; amended Sept. 22, 2000; amended May 18, 2007.)

***** Authenticated Kansas Administrative Regulation *****