

SUBCHAPTER J: SLUDGE PROCESSING
§§217.241 - 217.252
Effective December 4, 2015

§217.241. General Requirements.

(a) For purposes of this subchapter, sludge processing includes thickening, stabilization, and dewatering.

(b) A design must base the selection and operation of the sludge processing units on the desired final sludge product.

(c) A wastewater treatment facility that disposes of sludge under Chapter 312 of this title (relating to Sludge Use, Disposal, and Transportation) must stabilize the sludge according to the requirements of that chapter.

(d) A wastewater treatment facility that disposes of sludge under Chapter 330 of this title (relating to Municipal Solid Waste) must comply with the requirements of that chapter.

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§217.242. Control of Sludge and Supernatant Volumes.

(a) Supernatant, filtrate, or centrate resulting from sludge processing must be returned to the headworks of the wastewater treatment facility, the influent lift station, or to a point preceding an aeration system or secondary treatment unit.

(b) A sludge processing unit must limit digester supernatant liquor volume to the greatest extent practicable.

(c) Returned supernatant, filtrate, or centrate from a sludge processing unit must not interfere with wastewater treatment processes in another treatment unit.

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§217.243. Sludge Pipes.

(a) Each pipe associated with a sludge processing unit must have a slope that ensures the flow of sludge.

(b) A pipe under a stationary structure must allow a blockage to be easily eliminated by rodding or a sewer-cleaning device.

(c) A gravity pipe must have uniform grade and alignment.

(d) The slope of a gravity discharge pipe must not be less than 3.0%.

(e) The minimum diameter for a pipe associated with sludge processing is shown in Figure: 30 TAC §217.243(e):

Figure: 30 TAC §217.243(e)

Table J.1. Sludge Processing Minimum Pipe Diameter

Pipe	Diameter
Sludge drainpipe	4.0 inches
Pipe in a sludge digester	4.0 inches
Suction pump pipe	4.0 inches
Discharge pipe	4.0 inches
Gravity withdrawal pipes associated with an anaerobic digester or gravity thickener	6.0 inches

(f) The available head on a discharge using a gravity withdrawal pipe must be at least 4.0 feet.

(g) A gravity withdrawal pipe from a clarifier must allow for the removal of sludge.

(h) Each sludge pipe must include a means to observe the quality of the supernatant from each of the withdrawal outlets.

(i) Each individual sludge processing unit must have a dedicated means of dewatering.

(j) Pipes located inside a digestion tank must be designed for use in corrosive environments and must be sufficiently supported to prevent damage to the pipe or adjacent equipment.

(k) A sludge pipe must not contain any bends that form an acute angle with the pipe.

§217.244. Sludge Pumps.

(a) A sludge transfer pump size must be based on the quantity and character of the solids load.

(b) A mechanical pumping system must provide the required firm pumping capacity with the largest sludge pumping unit out of service.

(c) A centrifugal sludge pump must have a positive suction head, unless the pump includes a priming device.

(d) A positive displacement pump or other type of pump must have demonstrated solids handling capability for handling sludge.

(e) A positive suction head of 24 inches or more is required for all sludge pumps.

(f) An air lift pump may be used as a sludge pump, and must comply with requirements of §217.162 of this title (relating to Air Lift Pump Design).

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§217.245. Exclusion of Grit, Grease, and Debris from Sludge Processing Units.

(a) A wastewater treatment facility must minimize the amount of grit, debris, oil, and grease entering a sludge processing unit.

(b) A sludge processing unit must be designed for the final use or final disposal of the various solids generated during the treatment of domestic sewage.

(c) If sludge will be land applied, a sludge processing unit must remove and separately dispose of debris, grit, and grease before land application of the sludge.

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§217.246. Ventilation and Odor Control.

(a) A design must include sufficient ventilation to eliminate an accumulation of fumes or gases at a level that could adversely impact human health, safety, welfare, or the environment.

(b) An enclosed area that is accessible to individuals must have automatic mechanical ventilation. Automatic mechanical ventilation consists of:

(1) a continuous ventilation system that provides at least one complete air exchange every 10 minutes; or

(2) an intermittent ventilation system that provides at least one complete air exchange every two minutes.

(c) A sludge processing unit must prevent nuisance odors.

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§217.247. Chemical Pretreatment of Sludge.

(a) All chemicals used to treat sludge must be compatible with the operation of the sludge processing unit and must not adversely affect any other treatment unit or the receiving waters.

(b) The engineering report must justify appropriate chemicals and feed ranges. A pilot plant study or data from a treatment unit must be used. The organic, metal, and hydraulic loadings at the pilot plant must be within 25% of the design organic, metal, and hydraulic loadings.

(c) Each chemical must be handled, stored, and disposed of according to its safety data sheet.

(d) A liquid chemical storage tank must have:

(1) a liquid level indicator; and

(2) an emergency overflow receiving basin or drain capable of retaining any spill.

(e) Powdered activated carbon must be stored in an isolated fireproof area.

(f) A storage or handling area where potentially volatile chemicals are present must have electrical outlets, lights, and motors that meet the National Fire Protection Association 70 National Electrical Code® in effect at the time the storage or handling area was constructed, including explosion prevention requirements.

(g) Systems for transport, transfer, storage, and use of any volatile chemical must prevent volatile chemicals from discharging to the atmosphere.

(h) A wastewater treatment facility must have at least a 30-day supply of each chemical in dry storage conditions, unless the engineering report justifies a reduced amount.

(i) A solution storage tank or direct-feed day tank must have sufficient capacity for operation at the design flow of the wastewater treatment facility.

(j) The procedures for measuring the quantity of each chemical used to prepare each feed solution must be included in the wastewater treatment facility's operation and maintenance manual.

(k) A chemical storage tank, pipe, or other equipment must be compatible with the chemical it is designed to handle.

(l) Chemicals must only be combined in a feed solution. Intermixing of chemicals prior to preparing a feed solution is prohibited.

(m) Concentrated liquid acid must not be stored in an open vessel, and must be pumped in undiluted form from the original container to a point of treatment, to an enclosed acid-resistant day tank, or to an enclosed acid resistant storage tank.

(n) Concentrated liquid acid must be kept in a closed, acid-resistant shipping container or storage unit.

(o) The transfer of a toxic material must be controlled by an actuating device.

(p) A wastewater treatment facility must have one or more of the following control methods to ensure that dust will be minimized during the transfer of a dry chemical:

(1) a closed conveyor system with vacuum pneumatic equipment;

(2) a facility for emptying shipping containers in a special enclosure; or

(3) an exhaust fan and dust filter that uses a hopper or bin under negative pressure to eliminate chemical particles in the air.

(q) Disposing of a chemical or an empty chemical container must be done in a manner that minimizes the potential for harmful exposure and in compliance with Chapter 335 of this title (relating to Industrial Solid Waste and Municipal Hazardous Waste).

(r) A chemical delivery system must meet the following requirements:

(1) Structures housing equipment.

(A) A floor surface must be smooth, slip resistant, impervious, and must have a minimum slope of 1/8 inch per foot.

(B) An open basin, tank, or conduit must be protected from a chemical spill or accidental drainage.

(C) An area that houses a chemical delivery system must provide access for servicing, repair, and observation of operations.

(2) Redundancy. A chemical delivery system must have at least two feeders and must be able to supply the amount of chemicals needed for process reliability throughout the feed range. Chemical delivery equipment must be able to maintain operation at design flow with the largest operational unit out of service.

(3) Design and Capacity.

(A) A chemical delivery system must be able to deliver a proportional amount of chemical feed based on the rate of flow.

(B) A chemical delivery system must not use positive displacement type solution feed pumps to feed chemical slurries, unless the engineering report justifies such use.

(C) If using potable water, the potable water supply must be protected by at least the equivalent of two backflow preventers, including at least one air gap between a supply pipe and a solution tank.

(D) A chemical delivery system component must be resistant to the chemical it is designed to apply.

(E) A dry chemical delivery system must:

- (i) measure the chemical volumetrically or gravimetrically;
- (ii) provide effective mixing and solution of the chemical in a solution pot;
- (iii) provide gravity feed from a solution pot;
- (iv) completely enclose chemicals; and

(v) prevent emission of dust to the operation room.

(4) Spill Containment. The chemical delivery equipment must have protective curbing to contain a chemical spill.

(5) Control Systems.

(A) All chemical delivery systems must have an automatic control system that is capable of manual control.

(B) A chemical delivery system must have manual starting equipment.

(C) A chemical delivery system may be designed with an automatic chemical dose or residual analyzer.

(D) If an automatic chemical dosing or residual analyzer is used, the design must require both recording charts and an alarm for any critical value.

(6) Weighing Scales. A volumetric dry chemical feeder or a non-volumetrically calibrated carboy must have weighing scales that measure in increments of no greater than 0.5% of the load.

(7) Chemical Delivery System Protection. A chemical delivery system must have freeze protection and must be accessible for cleaning.

(8) Water Supply.

(A) A water supply for chemical mixing may be potable water or reclaimed water.

(B) A chemical delivery system must protect its water supply from contamination. If using potable water, the potable water supply must be protected by at least the equivalent of two backflow preventers, including at least one air gap between a supply pipe and a solution tank.

(C) A water supply must have sufficient pressure to ensure dependable operations.

(D) A water supply must include a means for measuring solution concentrations.

(E) A water supply design must include sufficient duplicate equipment to ensure process reliability.

(F) A water supply design may include a booster pump to maintain water pressure.

(9) Solution Tanks.

(A) A solution tank must be able to maintain uniform strength of solution consistent with the nature of the chemical solution and must provide continuous agitation.

(B) A chemical delivery system must have at least two solution tanks.

(C) The solution tank(s) must provide storage for at least one full day of operation at design flow.

(D) A solution tank must have a drain and a solution level indicator.

(E) An intake point for potable water must have an air gap.

(F) A chemical solution tank must be covered and have an access opening that is curbed and fitted with a tight cover.

(G) Each subsurface solution tank must:

(i) be impermeable;

(ii) be protected against buoyancy;

(iii) include a means to drain groundwater or other accumulated water away from the tank;

(iv) include leak detection; and

(v) allow for containment and remediation of any chemical spill.

(H) An emergency overflow pipe must:

(i) be turned downward;

(ii) have an unobstructed discharge;

(iii) be clearly visible;

(iv) drain to a containment area; and

(v) must not contaminate the wastewater or receiving stream.

(10) Chemical Application.

(A) A chemical application system must be efficient and operate safely.

(B) The chemical application system must prevent backflow or back-siphoning between multiple points of feed through common manifolds.

(C) The application of a pH-affecting chemical to the wastewater must be done before the addition of a coagulant.

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§217.248. Sludge Thickening.

(a) If a sludge thickening system is used, the following criteria are required:

(1) Capacity. The maximum monthly sludge production rate must be used as the basis for sludge thickening system sizing and design.

(2) Flexibility.

(A) A sludge thickening system must have a bypass to the digester.

(B) A wastewater treatment facility with a design flow greater than 1.0 million gallons per day must have:

(i) at least two sludge thickening units;

(ii) an alternate means of sludge thickening; or

(iii) an alternate sludge disposal method.

(b) Specific Requirements for a Mechanical Gravity Thickener.

(1) Equipment Features.

(A) A mechanical gravity thickener must have:

(i) a low-speed stirring mechanism for continuous mixing and flocculation;

(ii) sufficient sludge storage, or sufficient additional storage in other external tanks; and

(iii) a means of controlling the rate of sludge withdrawal.

(B) A mechanical gravity thickener must use either a chemical addition or dilution water feed system.

(C) A scraper mechanical train must be capable of withstanding any expected torque load. The working torque load must not exceed 10% of the manufacturer's recommended torque load.

(2) Design Basis.

(A) The design of a mechanical thickener must be justified in the engineering report.

(B) The executive director may require data from a pilot study or similar mechanical gravity thickener operating under similar conditions.

(C) The mechanical gravity thickener surface loading rate must be at least 400 gallons per day per square foot, but not more than 800 gallons per day per square foot.

(D) The minimum side water depth for a mechanical gravity thickener is 10 feet.

(E) A circular mechanical gravity thickener must have a minimum bottom slope of 1.5 inches per foot.

(F) The peripheral velocity of a scraper must be at least 15 feet per minute but no more than 20 feet per minute.

(G) A mechanical gravity thickener must prevent short-circuiting.

(c) Specific Requirements for a Dissolved Air Flotation (DAF) Basin.

(1) Equipment Features.

(A) A DAF basin must have a bottom scraper that functions independently of the surface skimmer.

(B) A recycle pressurization system for a DAF basin must use effluent instead of potable water.

(C) A DAF basin must have a polymer feed system that meets the requirements of §217.247(r) of this title (relating to Chemical Pretreatment of Sludge).

(D) A DAF basin must be located in a covered building with positive air ventilation.

(2) Design Basis.

(A) The design of a DAF basin must be justified in the engineering report.

(B) The executive director may require data from a pilot study or similar DAF basin operating under similar conditions.

(C) The hydraulic loading rate must not exceed 2.0 gallons per minute per square foot.

(D) The solids loading rate must be at least 1.0 pound per hour per square foot, but not more than 4.0 pounds per hour per square foot.

(E) The air to solids weight ratio must be at least 0.02, but not more than 0.04.

(F) A retention tank system must have a minimum pressure of 40 pounds per square inch, gauge.

(G) A skimmer must have multiple or variable speeds that allow an operational range of at least 1.0 foot per minute, but not more than 25.0 feet per minute.

(d) Specific Requirements for a Centrifugal Thickener.

(1) The design of a centrifugal thickener must be justified in the engineering report.

(2) The executive director may require data from a pilot study or data from a similar centrifugal thickener operating under similar conditions.

(3) A centrifugal thickener must be preceded by pretreatment to prevent plugging of a nozzle or excessive wear in the bowl.

(4) The centrate is subject to the requirements of §217.242 of this title (relating to Control of Sludge and Supernatant Volumes).

(e) Specific Requirements for a Gravity Belt Thickener.

(1) Equipment Features.

(A) A gravity belt thickener must include a wash water system capable of providing 60 gallons per minute of flow per meter of belt width at a pressure of at least 60 pounds per square inch. Booster pumps may be used.

(B) A gravity belt thickener must include a polymer feed system that meets the requirements of §217.247(r) of this title.

(C) A filtrate drainage system must be sized to remove the full hydraulic capacity of a gravity belt thickener without accumulation or ponding of filtrate.

(2) Design Basis. Unless otherwise justified in the engineering report, gravity belt thickener sizing must be based upon:

(A) a maximum solids loading of 1,250 pounds per meter of belt width; or

(B) a maximum hydraulic loading of 250 gallons per minute per meter of belt width.

(3) Gravity belt thickener filtrate is subject to the requirements of §217.242 of this title.

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§217.249. Sludge Stabilization.

(a) Design Requirements. The design requirements for the stabilization processes in this section are based on only one stabilization process being used at the wastewater treatment facility.

(b) Variance. An owner must request a variance in accordance with §217.4 of this title (relating to Variances) if a design includes a series of two or more stabilization processes. Any deviations from the requirements of this section must be documented in the variance request.

(c) Anaerobic Digestion.

(1) A wastewater treatment facility with a design flow exceeding 0.4 million gallons per day must have at least two anaerobic digesters.

(2) Anaerobic digesters may be operated in series or in parallel. Each anaerobic digester may be used for treating sludge from both primary and secondary clarifiers.

(3) Each anaerobic digester must have a means for transferring a portion of its contents to another anaerobic digester.

(4) A wastewater treatment facility that has been granted a variance to operate without multiple anaerobic digesters must have an emergency storage basin for storing sludge during times when the anaerobic digester needs to be taken out of service.

(d) Depth. An anaerobic digester must provide a minimum of 6.0 feet of storage depth for supernatant liquor.

(e) Maintenance Provisions. A digester design must allow access to each unit for maintenance.

(f) Digester Configuration.

(1) The bottom of a digester must slope towards a drainpipe.

(2) A flat-bottomed digestion chamber is prohibited.

(g) Access Manholes.

(1) The top of a digester must have at least two access manholes and a gas dome.

(2) One manhole must have a sufficient diameter to permit the use of mechanical equipment to remove grit and sand.

(3) A digester system must have a separate sidewall manhole at ground level.

(h) Safety.

(1) The wastewater treatment facility operation and maintenance manual must require the use of non-sparking tools, rubber soled shoes, a safety harness, and gas detectors for flammable and toxic gases when working in a digester.

(2) At least one self-contained breathing apparatus must be maintained in operational condition and kept on site.

(i) Sludge Inlets and Outlets. To facilitate effective mixing of the digester contents a digester must have:

(1) multiple sludge inlets located to prevent short-circuiting and at least one inlet located in the center of the digester above the liquid level at design flow;

(2) at least three recirculation sections; and

(3) at least three outlets.

(j) Digester Capacity.

(1) The digester capacity must be calculated using the expected volume and character of the sludge. The engineering report must include the calculations used to justify the design.

(2) The total digester volume must be based upon:

(A) the volume of sludge added;

(B) the percent solids and character of the sludge;

(C) the temperature to be maintained in the digester;

(D) the degree or extent of mixing to be obtained; and

(E) the size of the installation with appropriate allowance for sludge and supernatant storage.

(3) A digester must be able to maintain a minimum sludge digestion temperature of 35 degrees Celsius, plus or minus 4 degrees.

(4) Sludge that will be disposed of in a landfill must undergo at least 15 days of digestion for stabilization in the primary digester. Sludge that will be land-applied must undergo at least 60 days of digestion for stabilization, or the period required to achieve the necessary level of pathogen control and vector attraction reduction as required by Chapter 312, Subchapter D of this title (relating to Pathogen and Vector Attraction Reduction), whichever is less.

(5) A Completely Mixed System.

(A) A digester must have an average feed loading rate of less than 200 pounds of volatile solids per 1,000 cubic feet of volume per day in the active digestion volume.

(B) Complete mixing in 30 minutes or less is required for:

(i) a confined mixing system, if gas or sludge flow is directed through a vertical channel;

(ii) a mechanical stirring or pumping system; and

(iii) an unconfined continuously discharging gas mixing system.

(C) A digester tank over 60 feet in diameter must have multiple mixing devices.

(D) The minimum gas flow supplied for complete mixing must be 15 cubic feet per minute per 1,000 cubic feet of digestion volume.

(E) A complete mixing system must have a flow-measuring device and a throttling valve.

(F) The minimum power supply for a mixing system is 0.5 horsepower per 1,000 cubic feet of digestion volume.

(6) Moderately Mixed Systems.

(A) A digestion system where mixing is accomplished only by circulating sludge through an external heat exchanger must be loaded at less than 40 pounds of volatile solids per 1,000 cubic feet of volume per day in the active digestion volume. A design must be based on the volatile solids loading in accordance with the degree of mixing.

(B) The engineering report must include a justification for the loading rates, if mixing is accomplished by another method.

(k) Gas Collection, Pipes, Storage, and Appurtenances.

(1) General Requirements. Each portion of a gas system must maintain positive gas pressure under all normal operating conditions, including sludge withdrawal.

(2) Safety Equipment.

(A) A gas system must include a pressure valve, vacuum relief valve, a flame trap, and an automatic safety shut-off valve.

(B) Installation of water seal equipment on a gas pipe is prohibited.

(3) Gas Pipes and Condensate.

(A) A gas pipe system must be designed for the volume of gas expected.

(B) A gas pipe must be pressure tested for leakage at 1.5 times the design pressure before a digester is placed into service.

(C) A gas pipe must slope at least 1/8 inch per foot to drain condensate.

(D) The main gas pipe from a digester must have a sediment trap and a drip trap.

(E) Float controlled condensate traps are prohibited.

(F) A condensation trap must be accessible for daily servicing and draining.

(G) A drip trap must be located at each low point in the pipes.

(H) A gas pipe to each gas outlet must have a flame check or a flame trap.

(I) A burner pilot must use natural or bottled gas.

(J) Each main gas pipe must have a flame trap with a fusible shut-off.

(K) A gas pipe to a waste gas burner must have a pressure valve and a vacuum relief valve.

(4) Electrical Fixtures and Equipment. The electrical equipment near sludge digester pipes containing gas must be designed to prevent potentially explosive conditions.

(l) Waste gas.

(1) A waste gas burner must be accessible for inspection and maintenance and must be located at least 50 feet away from any structure, if placed at ground level.

(2) A waste gas burner may be located on the roof of the control building.

(3) A waste gas burner must not be located on top of a digester.

(4) A discharge of less than 100 cubic feet per hour of digester gas through a return bend screened vent with a flame trap terminating at least 10 feet above a walking surface is allowed.

(m) Ventilation.

(1) An underground enclosure connected to an anaerobic digester tank, gas pipe, or sludge equipment must have forced ventilation in accordance §217.246 of this title (relating to Ventilation and Odor Control).

(2) An underground enclosure must have a tight-fitting, self-closing door to minimize the spread of gas.

(n) Gas Meter.

(1) An anaerobic digester system must have a gas meter to measure total gas production.

(2) A meter must have a bypass.

(o) Manometer.

(1) A gas manometer must have a tight shut-off vent and vent cock.

(2) A vent pipe must be extended from a manometer to the outside of the building.

(3) A vent pipe opening must have a screen and be designed to prevent the entrance of rainwater.

(4) A manometer design must specify all safety devices that are needed for a manometer pipe system and must list the safety items in the engineering report.

(p) Gas Piping. The gas piping for an anaerobic digester must be equipped with gauges that measure the following in inches:

(1) the pressure of the main pipe;

(2) the pressure to gas-utilization equipment; and

(3) the pressure to waste burners.

(q) Digestion Temperature Control.

(1) Passive Temperature Control.

(A) A digester must be constructed above the shallowest groundwater table, including any perched water tables.

(B) A digester must be insulated to minimize heat loss.

(2) Heating Facilities.

(A) The sludge must be heated by circulating the sludge through an external heater.

(B) A piping system must allow for the preheating of feed sludge before introduction to the digesters, unless effective mixing is provided within a digester.

(C) A pipe and valve layout must facilitate cleaning.

(D) The size of a heat exchanger sludge pipe must be based on the heat transfer requirements.

(3) Heating Capacity.

(A) A digester system must have the heating capacity to maintain the temperature required for sludge stabilization established in subsection (j)(3) of this section.

(B) A digester system must be able to use an alternate source of fuel and must have an alternate source of fuel available for emergency use.

(4) Mixing. A digester system must have equipment to mix the sludge.

(5) Location of a Sludge Heating Device. A sludge heating device with an open flame must be located above grade and in an area separate from gas production and any storage area.

(r) Supernatant Withdrawal.

(1) Pipe Size. The minimum diameter for a supernatant pipe is 6.0 inches.

(2) Withdrawal Arrangements.

(A) The supernatant pipes must be arranged to allow withdrawal from three or more levels in a tank.

(B) A supernatant selector must have at least two draw-off levels located in the digester's supernatant zone, in addition to an unvalved emergency supernatant draw-off pipe.

(C) A supernatant withdrawal system must have a positive, unvalved, vented emergency overflow. The engineer must specify where overflow is routed in the engineering report.

(D) A supernatant withdrawal level design must be based on a fixed cover digester design.

(E) Supernatant withdrawal must be by means of interchangeable extensions at the discharge end of a withdrawal pipe.

(F) A supernatant piping system must have high-pressure backwash equipment.

(3) Sampling.

(A) A supernatant pipe must have sampling points at each supernatant draw-off level.

(B) The minimum diameter for a sampling pipe is 1.5 inches.

(4) Supernatant Handling.

(A) The engineering report must include how the treatment units are designed to handle shock organic loads associated with digester supernatant.

(B) Supernatant liquor from an anaerobic digester must either be returned directly to the headworks of the wastewater treatment facility for treatment, or may be chemically treated before being returned to the headworks for treatment. Any other method of treating supernatant liquor must be approved in writing by the executive director.

(C) If treating the supernatant liquor with lime, each of the following requirements must be met:

(i) Lime must be applied to obtain a pH of at least 11.5 standard units.

(ii) A lime feeder must be capable of feeding 2,000 milligrams per liter of hydrated lime or its equivalent.

(iii) Lime must be mixed with the supernatant liquor by a rapid mixer or by agitation with air in a mixing chamber.

(iv) After adequate mixing, the solids must be allowed to settle.

(D) A supernatant liquor treatment system may be either a batch or a continuous process.

(i) A batch process may have both the mixing and the settling processes in the same tank.

(ii) A sedimentation tank for a batch process must have the capacity to hold at least 36 hours of supernatant liquor at design flow, but not less than 1.5 gallons per capita based on the design population of the service area.

(iii) A sedimentation tank for a continuous process must have a detention time of not less than 8.0 hours.

(E) The solids from the supernatant liquor treatment must be returned to a digester or conveyed to a sludge handling unit.

(F) The clarified supernatant liquor must be returned to the headworks of the wastewater treatment facility in accordance with §217.242 of this title (relating to Control of Sludge and Supernatant Volumes).

(s) Anaerobic Digester Covers.

(1) An uncovered anaerobic digester is prohibited.

(2) The sludge and supernatant withdrawal pipes for a single-stage or a first-stage digester with a fixed cover must be arranged to minimize the possibility of air being drawn into a gas chamber above the liquid in a digester.

(3) A digester cover must include a gas chamber.

(4) A digester cover must be gas tight. The specifications must include a test of each digester cover for gas leakage.

(5) A digester cover must be equipped with an air vent with a flame trap, a vacuum breaker, and a pressure relief valve.

(t) Aerobic Sludge Digestion. This subsection applies to the stabilization by aerobic digestion of waste sludge to Class B biosolids, as defined in Chapter 312 of this title (relating to Sludge Use, Disposal, and Transportation).

(1) Solids Management. The engineering report must include a solids management plan.

(2) Detention Time. The design temperature of an aerobic digester system must be based on the average of the lowest consecutive seven-day water temperature from an aerobic digester at a wastewater treatment facility located within 50 miles of the proposed site.

(3) Mass Balance Requirements. Mass balance calculations must be included in the engineering report. The mass balance calculations must take into account design sludge age, wastestream concentration, operational hours, operational volume in the tanks, decant or dewatering volumes and characteristics, time needed for decanting or dewatering, and the volume needed for storage and sampling.

(4) Single Stage. Single stage aerobic digestion consists of utilizing one tank operating in continuous-mode-no-supernatant removal, continuous-mode-feeding-batch removal, or other mode detailed in a solids management plan.

(A) The size of an aerobic digester must be based on the minimum total detention time for the water temperature in the table located in subparagraph (B) of this paragraph based on Chapter 312 of this title and 40 Code of Federal Regulations Part 503.

(B) The digester size must be sufficient to provide both the detention time in the following table and to provide for the mass load received by the unit:

Figure: 30 TAC §217.249(t)(4)(B)

Table J.2. - Minimum Detention Times for Aerobic Digesters

Temperature (Degrees Celsius)	Total Detention Time
15°	60 days
20°	40 days

(5) Multiple Stage. Multiple stage aerobic digestion consists of two or more completely mixed digesters operating in series.

(6) Field Data.

(A) Any increase in flow or organic loading, or any change in process requires new testing and verification of time and temperature operating parameters.

(B) An expansion of an existing wastewater treatment facility may be designed and operated according to previously established time and temperature operating parameters.

(C) The executive director may re-rate a wastewater treatment facility under Subchapter B of this chapter (relating to Wastewater Treatment Facility Design Requirements), if an owner requests a re-rating and submits sufficient supporting data.

(7) Design Requirements.

(A) The maximum solids concentration used to calculate the total detention time for an aerobic digester that concentrates the waste sludge only in a digester tank must be 2.0% solids concentration, unless:

(i) supporting data is submitted in the engineering report to increase the solids concentration to 3.0%; or

(ii) a higher concentration is justified by the use of a sludge thickening unit upstream of a digester.

(B) A diffuser must be designed to minimize clogging.

(C) A diffuser must be removable without dewatering a tank for inspection, maintenance, and replacement. Removable diffusers are not required if the wastewater treatment facility is designed with a redundant basin.

(D) The volatile solids loading rate must be designed to be at least 100 pounds but not more than 200 pounds of volatile solids per 1,000 cubic feet per day, unless otherwise justified in the engineering report.

(E) The dissolved oxygen concentration maintained in the liquid in an aerobic digester must be at least 0.5 milligrams per liter.

(F) If mechanical aerators are used, the energy input for mixing must be at least 0.5 horsepower per 1,000 cubic feet.

(G) If diffused air mixing is used, the energy input for mixing must be at least 20 standard cubic feet per minute per 1,000 cubic feet of aeration tank.

(H) An aerobic digester must be able to separate and withdraw solids, or must decant the supernatant.

(u) Heat Stabilization.

(1) The design of a heat treatment system must be based on the anticipated sludge flow, sludge characteristics, and sludge concentration.

(2) A heat treatment system must operate continuously to minimize the additional heat input necessary to start up the system, unless justified in the engineering report.

(3) A heat treatment system must have multiple units, unless storage or an alternate stabilization method is available.

(4) A single unit heat treatment system must have a standby grinder, a fuel pump, an air compressor, and dual sludge pumps.

(5) The engineering report must identify the expected downtime for maintenance and repair, based on data from a comparable wastewater treatment facility.

(6) The engineering report must include a design for adequate storage for process feed and downtime.

(7) A heat treatment system must provide heat stabilization in a reaction vessel:

(A) at a minimum of 175 degrees Celsius (350 degrees Fahrenheit) for 40 minutes, but not more than 205 degrees Celsius (400 degrees Fahrenheit) for 20 minutes and at a pressure of not less than 250 pounds per square inch, gauge, but not more than 400 pounds per square inch, gauge; or

(B) provide for pasteurization at temperatures of 30 degrees Celsius (85 degrees Fahrenheit) or more and gauge pressure of more than 1.0 standard atmosphere (14.7 pounds per square inch) for a period of at least 25 days.

(8) A heat treatment system must have a sludge grinder to protect a heat exchanger from damage or clogging caused by rags or other debris.

(9) A heat treatment system must include an acid wash or high-pressure water wash system to remove scale from heat exchangers and reactors.

(10) A decant tank must have a sludge scraper mechanism and must be covered.

(11) A heat exchanger must be constructed of corrosion-resistant material.

(12) A heat treatment system must have a continuous temperature recorder.

(v) Recycle Loads.

(1) The engineering report must identify a method of treatment for the recycle stream from the heat treatment system.

(2) A recycle stream must not impact effluent quality or the wastewater treatment facility's treatment processes.

(w) Alkaline Stabilization.

(1) Design Basis.

(A) Alkaline Dosage. The engineering report must include the calculation of the alkaline dosage required to stabilize sludge based on the type of sludge, chemical composition of sludge, and the solids concentration in the sludge. Performance data taken from a pilot test program or from a comparable wastewater treatment facility must be used to determine the proper dosage.

(B) Temperature, pH, and Contact Time. An alkaline stabilization system must uniformly mix an alkaline additive-sludge mixture to maintain the pH, temperature, and contact time, as specified in §312.82 of this title (relating to Pathogen Reduction) and §312.83 of this title (relating to Vector Attraction Reduction).

(2) Reliability.

(A) An alkaline stabilization system must have multiple units, unless storage or an alternate stabilization method is available to continue operations when a unit is not in service.

(B) A single unit that has adequate storage or an alternate stabilization method must have a standby conveyance and mixer, a backup heat source, and dual blowers.

(C) A design must include:

(i) the expected downtime for maintenance and repair based on data from a comparable wastewater treatment facility; and

(ii) adequate storage for process, feed, and downtime.

(3) Alkaline Stabilization Housing Unit.

(A) A housing unit must meet the requirements in §217.247(r)(1) of this title (relating to Chemical Pretreatment of Sludge).

(B) A housing unit must have mechanical or air agitation to ensure uniform discharge from the storage bins.

(4) Feeding Equipment.

(A) The alkaline additive feeding equipment must meet the requirements of §217.247(r)(1) of this title.

(B) Hydrated lime must be fed as a slurry consisting of at least 6% calcium hydroxide ($\text{Ca}(\text{OH})_2$) by weight but not more than 18% $\text{Ca}(\text{OH})_2$ by weight, unless otherwise justified in the engineering report.

(C) The engineering report must identify a means for controlling the feed rate of any other dry additive.

(5) Mixing Equipment.

(A) An additive and sludge blending or mixing vessel must be large enough to hold the mixture for a minimum of 30 minutes at the maximum feed rate.

(B) A batch process must maintain a pH greater than 12 standard units in a mixing tank during the blending period.

(C) A continuous flow process must maintain a pH greater than 12 standard units in an exit pipe.

(D) A continuous flow process must be designed for a detention time that is the tank volume divided by the volumetric input flow rate.

(E) A slurry mixture may be mixed with either a diffused air mixer or a mechanical mixer.

(F) The mixing equipment must maintain an alkaline slurry mixture in complete suspension.

(G) If using a diffused air mixer, the following requirements apply:

(i) a coarse bubble diffuser must have a minimum air supply of 20 standard cubic feet per minute per 1,000 cubic feet (cf) of tank volume; and

(ii) a mixing tank must be ventilated and include odor control equipment.

(H) If using a mechanical mixer, the following requirements apply:

(i) a mechanical mixer must provide at least 5.0 horse power per 1,000 cf of tank volume but not more than 10 horse power per 1,000 cf of tank volume; and

(ii) the impellers must minimize debris fouling in the sludge.

(6) Detention Time. A pasteurization vessel must provide a minimum detention period of 30 minutes.

(7) External Heat. The engineering report must include specifications about any supplemental external heat necessary for sludge stabilization.

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§217.250. Sludge Dewatering.

(a) The engineering report must include a justification for the proposed sludge dewatering units, including design calculations, results from any pilot studies, all assumptions, and appropriate references.

(b) The design of a dewatering unit must be based on mass balance principles.

(c) General Requirements.

(1) Centrate or Filtrate Recycle.

(A) The drainage from beds and centrate or filtrate from dewatering units must be returned to the headworks of the wastewater treatment facility for treatment.

(B) The design of a treatment unit downstream from a dewatering unit must be based on the organic load from the centrate or filtrate recycle.

(2) Sludge with Industrial Waste Contributions. A dewatering system must prevent the release of any constituent (such as a free metal, an organic toxin, or a strong reducing or oxidizing compound) that adversely impacts human health, safety, or welfare, water quality, or compliance with the associated wastewater permit.

(3) Redundancy.

(A) A mechanical dewatering system must have at least two dewatering units, unless the engineering report justifies adequate storage or an alternative means of sludge handling.

(B) Mechanical dewatering units must be able to dewater the average daily sludge flow with the largest dewatering unit out of service.

(4) Storage Requirements.

(A) A mechanical dewatering system must have separate storage if the equipment will not operate on a continuous basis and the wastewater treatment facility has no digesters with built-in short-term storage.

(B) In-line storage of stabilized or unstabilized sludge must not interfere with any treatment unit.

(C) The separate sludge storage from a primary digester must be aerated and mixed to prevent nuisance odor conditions.

(5) Sampling Points. A dewatering system must have sampling stations before and after each dewatering unit and must allow periodic evaluation of the dewatering process.

(6) Maintenance. Each dewatering system unit must have a bypass to allow for maintenance, repair, and replacement. The engineer must specify where the bypass flow will be routed in the engineering report.

(d) Sludge Conditioning.

(1) The design and location of a chemical addition point must consider interactions of the chemical with other chemicals and processes used in the wastewater treatment facility.

(2) A dewatering system must provide adequate mixing time for the reaction between an additive and the sludge. Any subsequent handling must eliminate floc shearing.

(3) The engineering report must include a pilot plant or full-size performance data used to determine the characteristics and design dosage of any sludge additive.

(4) The engineering report must justify the in-stream flocculation and coagulation system design by including comparable performance data or pilot plant data.

(5) The engineering report must include whether the mixers require conditioning tanks.

(6) The engineering report must include calculations for a range of detention times.

(7) Solution storage capacity, at maximum chemical demand, must be based on:

(A) the amount of chemical needed per shift for continuous processes; or

(B) the amount of chemical needed for a full batch for intermittent and batch processes.

(8) Solution storage capacity may be reduced if the specific chemical or additive selected is adversely affected by storage.

(9) The engineering report must justify any storage volume reduction and any other method used to ensure a continuous supply of chemicals by accounting for chemical use through a full operating day or a full batch.

(e) Sludge Drying Beds.

(1) The size of sludge drying beds must be based on data from a similar wastewater treatment facility in the same geographical area with the same influent sludge characteristics.

(2) If the data required by paragraph (1) of this subsection is not available, or if the executive director determines that the data is not appropriate for a proposed wastewater treatment facility, the design of sludge drying beds must be based on the following:

(A) Open Beds.

(i) A sludge drying bed system must have at least two sludge drying beds.

(ii) The engineering report must include the calculation of the minimum surface area for a sludge drying bed using the values in the following figure for an area of the state with less than 45 inches annual average rainfall or less than 50% annual average relative humidity, as determined by data from the nearest

National Oceanic and Atmospheric Administration's weather station that has at least ten years of data. The entire period of record for the weather station must be used.

Figure: 30 TAC §217.250(e)(2)(A)(ii)

Table J.3. - Surface Area Requirements for Sludge Drying Beds

Stabilization Process	Pounds of Digested Dry Solids <i>per square foot per year</i>
Anaerobic Digestion	20.0
Aerobic Digestion	15.0

(iii) Another method of sludge dewatering is required in lieu of a sludge drying bed in an area of the state that experiences either 45 or more inches of average annual rainfall or 50% or greater annual average relative humidity, as determined by data from the nearest National Oceanic and Atmospheric Administration's weather station that has at least ten years of data. The entire period of record for the weather station must be used.

(iv) A sludge drying bed system must:

- (I) dewater sludge during normal operations;
- (II) provide accelerated sludge dewatering during abnormally wet conditions;
- (III) store accumulated sludge during periods of extended high humidity and rainfall;
- (IV) use an alternative dewatering method to dewater the sludge during periods of extended high humidity and rainfall; and
- (V) prevent the unauthorized discharge of solids from the sludge drying beds.

(v) The engineering report must justify the use of innovative or non-conforming sludge drying beds in high rainfall, high relative humidity areas of the state, as described in clause (iii) of this subparagraph.

(B) Gravel Media Beds. A gravel media bed must be laid in two or more layers. The gravel around the underdrains must be properly sized to allow drainage. The gravel around the underdrains must be at least 12 inches deep, extending

at least 6.0 inches above the top of the underdrains. The top layer of a gravel media bed must be at least 3.0 inches thick and must consist of gravel 1/8 inch to 1/4 inch in size.

(C) Sand Media Beds. A sand media bed must consist of at least 12 inches of sand with a uniformity coefficient of less than 4.0 and an effective grain size of at least 0.3 millimeters but not more than 75 millimeters above the top of the underdrain.

(D) Underdrains.

(i) The underdrains must be at least 4.0 inches in diameter and a slope of at least 1.0% to the drain.

(ii) The underdrains must not be spaced more than 20 feet apart.

(iii) The engineering report must specify where the flow from the underdrains will be routed.

(E) Decanting. A sludge drying bed may have a method of decanting supernatant installed on the perimeter of the bed. The decanted liquid from a sludge drying bed must be returned to the headworks of the wastewater treatment facility or to the beginning of the secondary treatment process.

(F) Walls.

(i) The interior walls of a sludge drying bed must be watertight and extend 12 inches to 24 inches above and at least 6 inches below the bed surface.

(ii) The exterior walls of a sludge drying bed must be watertight and extend 12 inches to 24 inches above the bed surface or ground elevation, whichever is higher.

(G) Sludge Removal.

(i) A sludge drying bed system must be arranged to facilitate sludge removal.

(ii) The sludge drying beds must have concrete pads for vehicle support tracks on 20 foot centers for all percolation type sludge beds.

(H) Sludge Influent.

(i) A sludge pipe to the sludge drying beds must terminate at least 12 inches above the surface of the media and be arranged so that the pipe drains to a sump that pumps to the headworks of the wastewater treatment facility or the influent lift station.

(ii) A sludge discharge point must have a concrete splash plate.

(I) Drying Bed Bottom.

(i) The bottom of a sludge drying bed must consist of a layer of clayey subsoil having a thickness of at least 1.0 foot and a permeability of less than 1×10^{-7} centimeters per second.

(ii) An impermeable concrete pad must be installed over a liner in locations where the groundwater table is within 4.0 feet of the bottom of the liner.

(3) Innovative or Non-Conforming Sludge Drying Beds. The executive director will review any vacuum assisted sludge drying beds or other variations to the gravity drying bed concept as innovative and non-conforming technologies subject to §217.7(b)(2) of this title (relating to Types of Plans and Specifications Approvals).

(4) Rotary Vacuum Filtration.

(A) Filtration Rate. The engineering report must justify the value calculated for the rates of filtering for various types of sludge with proper conditioning, using Table J.4. in Figure: 30 TAC §217.250(e)(4)(A)

Figure: 30 TAC §217.250(e)(4)(A)

Table J.4. - Filtration Rates

Type of Treatment	Pounds of Dry Solids per square foot per hour (minimum-maximum)
Primary	4-6
Primary and Trickling Filter	3-5
Primary and Activated Sludge	3-4

(B) Duplicate Equipment. Unless two treatment trains are provided, a feed pump, a vacuum pump, and a filtrate pump must be provided in duplicate to

allow equipment alternation. Spare filter fabric must be kept at the wastewater treatment facility, except when metal coil filters are used.

(C) Filter Equipment. Parts that will get wet must be constructed of corrosion-resistant material. Drum and agitator assemblies must be equipped with variable-speed drives, and provisions must be made for adjusting the liquid level in the filtration system.

(D) Pumps.

(i) A vacuum pump with a capacity of at least 1.5 cubic feet per minute per square foot must be provided for metal-covered drums.

(ii) A dry-type vacuum pump must have a vacuum receiver.

(iii) A filtrate pump must have adequate capacity to pump the maximum amount of liquid to be removed from the sludge.

(iv) Each filter must be fed by a separate feed pump to ensure a proper feed rate.

(5) Centrifugal Dewatering.

(A) The engineering report must justify the sizing and design of a centrifugation system. A centrifuge design must be based on performance data from a similar centrifuge when available. If no performance data is available, the results of a pilot or full-scale test must be used.

(B) Selection of a material for a scroll must include consideration of the amount of grit expected in the sludge.

(C) A centrifugation system must include adequate sludge storage, based on the disposal process.

(D) Unless two treatment trains are provided, a centrifugation system must have the following spare equipment, including necessary connecting pipes and electrical controls:

(i) drive motor;

(ii) gear assembly; and

(iii) feed pump.

(E) A feed pump must have a variable speed drive.

(F) Each centrifuge must have a separate feed system.

(G) A centrifuge must be equipped for variable scroll speed and pool depth.

(H) A centirugation system must have a crane or monorail for equipment removal and maintenance.

(I) A centrifuge system must provide access for wash down of the interior of each centrifuge.

(6) Plate and Frame Presses.

(A) Sizing.

(i) The design of a plate and frame press must be based on performance data developed from a plate and frame press of similar size with similar operational characteristics. If no performance data is available, the results of pilot scale tests or full-scale tests must be used.

(ii) The design of a plate and frame press may be based on appropriate scale-up factors for full size designs if pilot scale testing is done in lieu of full-scale testing.

(iii) The engineering report must justify the size of a plate and frame press.

(B) Duplicate Equipment and Spare Parts. Unless multiple units are provided, a plate and frame press system must include the following spare equipment:

(i) one duplicate feed pump;

(ii) two extra plates, or at least one extra plate for every ten plates required for startup, whichever is greater;

(iii) one complete filter fabric set;

(iv) one closure drive system;

(v) one air compressor; and

(vi) one washwater booster pump.

(C) Operational Requirements.

(i) The filter feed pumps must be able to handle initial high volume flow, low pressure filling, and sustained periods of operating at 100 pounds per square inch to 225 pounds per square inch.

(ii) A plate and frame press system may include an integral pressure vessel to produce initial high volume flow.

(iii) A plate and frame press system may use operating pressures less than 225 pounds per square inch if the engineering report justifies the design operating pressure using actual performance data from a plate and frame press that processes similar sludge.

(iv) A plate and frame press system may include provisions for sludge-cake breaking to protect or enhance down line processes.

(D) Maintenance.

(i) A plate and frame press system must have a crane or monorail capable of removing the plates.

(ii) A plate and frame press system must have a high-pressure water or acid wash system to clean the filter.

(7) Belt Presses.

(A) Sizing.

(i) Actual performance data developed from a wastewater treatment facility with similar operational characteristics must be used to size a belt press system. If pilot plant testing is performed in lieu of full-scale testing, appropriate scale-up factors must be used to develop a full-scale design.

(ii) A belt press system must have a duplicate belt press, or another method of sludge processing or disposal that has been approved in writing by the executive director, if the design flow exceeds 4.0 million gallons per day.

(iii) The engineering report must include all data used to size a belt press system.

(B) Duplicate Equipment and Spare Parts. Unless multiple belt press units are provided, a belt press system must have the following spare equipment:

- (i) one duplicate feed pump;
- (ii) one washwater booster pump;
- (iii) one complete set of belts;
- (iv) one set of bearings for each type of press bearing;
- (v) one set of tensioning equipment;
- (vi) one set of tracking sensors;
- (vii) one set of wash nozzles;
- (viii) one doctor blade; and
- (ix) conditioning or flocculation drive equipment.

(C) Conditioning. The engineering report must include the polymer selection methodology, account for sludge variability, and document the anticipated sludge loading to the belt press.

(D) Sludge Feed.

(i) The sludge must be fed at a relatively constant rate that does not interfere with polymer addition and belt press operation.

(ii) The engineering report must include the range in feed rate variability.

(iii) A belt press system may include grinders ahead of a flocculation system.

(iv) The sludge feed must provide a method for uniform sludge dispersion on a belt.

(v) A belt press system must use thickening of the feed sludge, unless the engineering report justifies separate thickening or dual purpose thickening.

(E) Filter Press Belts.

- (i) A belt must have a variable speed drive.
- (ii) A belt press system must have belt tracking and tensioning equipment.
- (iii) The engineering report must justify the weave, material, width, and thickness of the belts.

(F) Filter Press Rollers.

- (i) The rollers must have a protective finish.
- (ii) The maximum roller deflection and operating tension of the belt must be included in the engineering report to justify equipment selection.
- (iii) The roller bearings must be watertight and rated for a life of 100,000 hours.

(G) Spray Wash System.

- (i) A belt press system must use high-pressure wash water for each belt.
- (ii) The design of a spray wash system must specify the operating pressure at the point of washwater discharge.
- (iii) A spray wash system must allow cleaning without interfering with the spray wash system operation.
- (iv) The engineering report must justify the nozzle and nozzle cleaning system selection.
- (v) A belt press system must have replaceable spray nozzles and spray curtains.

(H) Maintenance Requirements.

- (i) A belt press system must have drip trays under the belt press and under the thickener when gravity belt thickening is employed.

(ii) The side and floor of a belt press must have adequate clearance for maintenance and removal of the dewatered sludge.

(iii) An electrical panel or other component subject to corrosion must be protected from splashes and corrosive gases, or be located outside of the belt press area.

(iv) A doctor blade clearance must be adjustable.

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§217.251. Sludge Storage.

(a) This section applies to the storage of sludge after processing but before final disposal or removal from the wastewater treatment facility site.

(b) Sludge in liquid, dewatered, or dry form may be stored at the wastewater treatment facility if the solids have been stabilized in a treatment process.

(c) General Storage Requirements.

(1) A sludge storage facility must prevent nuisance odor conditions and minimize vector attraction.

(2) A sludge storage facility must provide storage of waste sludge separate from a biological treatment process.

(3) The design of a sludge storage facility must be based on process design, sludge age, waste stream concentration, operational hours, operational volume in tanks, decant or dewatering volumes and characteristics, time frames needed for decanting or dewatering, and volume needed for storage and sampling.

(4) The engineering report must include a solids management plan that describes a method for managing the waste solids that will maintain the design sludge age for a biological process.

(d) Storage of Solids - Not Dewatered.

(1) Aerobically Digested Solids.

(A) A storage facility may store aerobically digested solids.

(B) A sludge storage basin must have diffused air or mechanical mixing.

(C) A diffused air-mixing unit must provide a minimum air capacity of 30 standard cubic feet per minute per 1,000 cubic feet of volume.

(D) A mechanical surface aerator must have a minimum of 1.0 horsepower per 1,000 cubic feet of volume.

(E) An earthen sludge storage basin must be lined in accordance with §217.203(d) and (e) of this title (relating to Design Criteria for Natural Treatment Units).

(2) Anaerobically Digested Solids. Anaerobically digested solids must be stored in a covered basin with gas release valves and gas control measures.

(e) Storage of Dewatered Solids.

(1) Dewatered solids must be stored in a steel or concrete container, or in an open stockpile.

(2) Dewatered solids with a solids content of less than 35% must not be stored for more than seven days. Dewatered solids with a solids content of at least 35% but not more than 50% must not be stored for more than 90 days.

(f) Open Stockpiles.

(1) An open stockpile must have an impervious pad underneath the solids to prevent groundwater contamination.

(2) An open stockpile must have a system for collecting stormwater runoff and returning it to the headworks of the wastewater treatment facility.

(g) Dried Solids Storage.

(1) A storage facility may store dewatered solids with a solids content of greater than or equal to 50% in a covered bin or covered facility for a period of time that does not exceed two years.

(2) An enclosed storage structure must be mechanically ventilated with at least 20 complete air exchanges per hour and must have an odor control system for the exhaust.

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§217.252. Final Use or Disposal of Sludge.

(a) The engineering report must identify the final use or final disposal of the sludge. The use, disposal, and transportation of sludge must be conducted in accordance with the requirements contained in Chapter 312 of this title (relating to Sludge Use, Disposal, and Transportation) or in Chapter 330 of this title (relating to Municipal Solid Waste).

(b) Quantities of Sludge. The quantity of solids generated by the treatment process must be estimated using a mass-balance approach or actual data from a similar full-scale wastewater treatment facility or pilot study. The methods, calculations, and analyses used to estimate quantities of solids must be included in the engineering report.

(c) Final Disposition. The sludge use or disposal option must be based on the pathogen and vector attraction characteristics of the sludge.

(d) Sludge Constituents.

(1) The concentrations of metals in sludge must be determined using methods approved in 40 Code of Federal Regulations §136.3 and must be less than the levels specified in §312.63 of this title (relating to Metal Limits (Other Than Domestic Septage)).

(2) A sludge processing system must reduce pathogens in sludge to levels that comply with §312.82 of this title (relating to Pathogen Reduction).

(3) A sludge processing system must produce digested sludge that complies with §312.83 of this title (relating to Vector Attraction Reduction).

(e) Emergency Provisions for Sludge Disposal. The design of a sludge processing system must include a secondary method of sludge disposal to use in the event of conditions that prevent the use of a wastewater treatment facility's primary use or primary disposal method. The secondary sludge disposal method must be included in the engineering report.

(f) Weather Factors. Weather factors such as rainfall, wind conditions, and humidity must be considered as process selection and storage constraints in the determination of the use or disposal of sludge.

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