

**TITLE 252. DEPARTMENT OF ENVIRONMENTAL QUALITY
CHAPTER 656. WATER POLLUTION CONTROL FACILITY CONSTRUCTION
STANDARDS**

SUBCHAPTER 1. INTRODUCTION

252:656-1-2. Definitions

In addition to terms defined in Title 27A of the Oklahoma Statutes, the following words or terms, when used in this Chapter, shall have the following meaning unless the context clearly indicates otherwise:

"25-year flood" means a flood event that has a 4 percent chance of being equaled or exceeded in magnitude in any given year.

"100-year flood" means a flood event that has a 1 percent chance of being equaled or exceeded in magnitude in any given year.

"208 Plan" means an area wide wastewater treatment management plan that states are required to submit to EPA for approval pursuant to section 208 of the Clean Water Act, 33 U.S.C. § 1288.

"ASTM" means the American Standard Testing Method and Material.

"Biosolids" means organically treated wastewater materials from municipal wastewater treatment plants that are suitable for recycling as a soil amendment. This term is within the meaning of "sludge" as defined in 27A O.S. § 2-6-101(11). Biosolids are divided into the following classes:

(A) Class A Biosolids meets the pathogen reduction requirements of 40 CFR § 503.32

(a);

(B) Class B Biosolids meets the pathogen reduction requirements of 40 CFR § 503.32

(b).

"BOD" means total 5-day biochemical oxygen demand.

"Bypass" means the intentional or unintentional diversion of a waste stream from any portion of a wastewater treatment system.

"CBOD" means 5-day carbonaceous biochemical oxygen demand.

"Cell" means an individual basin of a lagoon system.

"cfm" means cubic feet per minute.

"Collection system" means pipelines or conduits, pumping stations, force mains and all other facilities used to collect or conduct wastewater to a treatment works.

"CT" means the product of residual disinfectant concentration, (C) in (mg/l), and the corresponding disinfectant contact time (T) in minutes, i.e., C x T. CT requirements for a variety of disinfectants and conditions are in the EPA Guidance Manual to the Surface Water Treatment Rule.

"DEQ" means the Oklahoma Department of Environmental Quality.

"Design-build" means a project delivery method in which one entity works under a single contract with the project owner to provide design and construction services.

"Design package" means a submittal to DEQ for an approvable design-build flexible construction permitting process. The number and scope of design packages is defined and set in the approved engineering report with the last design package encompassing the final and completed 100% project design.

"Discharge point" means the point at which wastewater enters Waters of the State or become Waters of the State.

"Domestic wastewater" means wastewater from drinking fountains, showers, toilets,

lavatories and kitchens.

"End-of-pipe" means the terminal points in all reclaimed water users' distribution systems.

"Engineer" means a person licensed to practice engineering in Oklahoma.

"Flexible permitting process" means construction permitting for a design-build project that is approved to start construction with multiple design packages, noting that an approved DEQ construction permit is required before construction or modification of a wastewater collection system or treatment works begins. Construction is limited to the scope of the approved design package(s).

"fps" means feet per second.

"Freeboard" means the vertical distance from the surface water level to the overflow elevation in a treatment unit.

"GPM" means gallons per minute.

"Land application" means the controlled application of treated wastewater onto the land surface for beneficial use.

"MGD" or "mgd" means million gallons per day.

"MLSS" means mixed liquor suspended solids.

"MLVSS" means mixed liquor volatile suspended solids.

"New technology" means any method, process or equipment which is used to treat or convey sewage which is not addressed in this Chapter. This does not refer to innovative technology as defined by 40 CFR Part 35.

"NPDES" means the National Pollution Discharge Elimination System.

"OAC" means Oklahoma Administrative Code.

"OSHA" means the Occupational Health and Safety Administration.

"Open storage basin" means an uncovered basin, below or above ground level, that is designed, maintained and operated to store Category 2 or 3 reclaimed water.

"Person" means any individual, company, corporation, government agency, municipality, or any other entity.

"Population equivalent" and **"PE"** mean the calculated population which would normally contribute the same amount of biochemical oxygen demand (BOD) per day of wastewater. It is computed on the basis of 0.17 lb. of 5-day BOD per capita per day.

"PSRP" means process to significantly reduce pathogens.

"PVC" means polyvinyl chloride.

"Reclaimed water" means wastewater that has gone through various treatment processes to meet specific water quality criteria with the intent of being used in a beneficial manner.

"Retention time" means the theoretical time required to displace the contents of a tank or treatment unit at a given rate of flow (volume divided by rate of flow).

"Riprap" means a permanent, erosion resistant ground cover that consists of hard, sound durable stones that average in weight between thirty to fifty pounds (30-50 lbs), with no more than twenty percent (20%) weighing less than twenty pounds (20 lbs).

"Service line" means a wastewater line that connects an individual home, building or business to a permitted collection system.

"Total Kjeldahl nitrogen (TKN)" means the total of the organic and ammonia nitrogen.

"Treatment works" means any plant, disposal field, lagoon, incinerator or other facility used to treat, stabilize, hold or reclaim non-industrial wastewater.

"UL" means Underwriters Laboratories Inc.

"U.S.C." means United States Code.

"Variation" means change from the adopted or current standards for equipment, material or

process.

"Wastewater system" means a collection system and treatment works.

"Water reuse system" means a treatment and distribution system designed to treat and supply reclaimed water.

SUBCHAPTER 3. PERMIT PROCEDURES

252:656-3-1. Permitting process

(a) This Subchapter implements the permitting process of Part 4, Wastewater and Wastewater Treatment Systems, 27A O.S. § 2-6-401 et seq., and the Oklahoma Uniform Environmental Permitting Act, 27A O.S. § 2-14-101 et seq.

(b) Permits are required for the construction or modification of non-industrial wastewater and water reuse systems.

(c) The permit application is a two-step process:

(1) The first step is the submission of an engineering report (as described in 252:656-3-4); and

(2) The second step is the submission of the final design report along with the required application forms and fees. The final design report shall:

(A) include 2 sets of plans and specifications, with at least one set of plans printed on 11" x 17" paper and at least one set of specifications loosely bound and suitable for scanning, and

(B) reflect any changes from the approved engineering report.

(C) Provided, an authorized design-build project may use the flexible permitting process upon approval by DEQ as provided in these rules. If design-build is used, the final design package must encompass the entire completed project.

(d) Unless an extension is granted, a construction permit expires if construction does not begin within one year from the date the permit is issued.

(e) Permits to construct or modify non-industrial wastewater and water reuse systems shall only be issued to public entities unless all components of the proposed systems, including all service lines, are located on property:

(1) owned by the applicant, or

(2) dedicated to the applicant through a recorded easement for the installation and operation of the system.

252:656-3-4. Engineering report

(a) Applicants shall submit to DEQ two (2) copies of the engineering report for proposed new construction or modifications to sewage collection systems, or treatment works at least thirty (30) days prior to the submittal of plans and specifications. Applicants shall also submit a letter in which the applicant endorses the contents of each engineering report submitted to DEQ. For line extension and lift station construction, the submission of an Engineering Report Form, developed by DEQ, signed and sealed by an engineer licensed by the State of Oklahoma, may be submitted to meet the requirements of the necessary engineering report, unless a full engineering report is required by DEQ. Engineering reports shall include:

(1) **Volume and strength of sewage flow.** Establish the existing and anticipated design average and design peak flows and waste load for the existing and ultimate conditions. Include the basis for projecting initial current and/or future dry and wet weather flows and waste load for the existing, or initial, service area, and the anticipated future service area. For discharging facilities, the report must demonstrate that the proposed project

complies with the design flow in the 208 Plan and other applicable OPDES permit limits.

(2) **Existing system.** Describe the existing system, including the need for the project related to health and safety, system operations and maintenance, and population growth. Issues that must be addressed include, but are not limited to, suitability of existing facilities for continued use, adequacy of water supply, history of compliance with state and federal requirements, and comparison of existing treatment units with state and federal design requirements.

(3) **Project description and alternatives.** The report must contain a description of the alternatives that were considered to meet the identified need. Provide a service area and project site maps showing the existing and proposed systems. The information must describe legal and natural boundaries, major obstacles, elevations, and any other information necessary to properly evaluate the project. Describe the proposed project and, where two or more solutions exist, discuss the alternatives including cost analysis and discuss the reasons for selecting the one recommended. For each alternative considered, the report must provide the following:

(A) **Description.** A description of the collection system, pumping systems, treatment, and discharge facilities associated with each alternative as applicable.

(B) **Design criteria.** The design parameters used for evaluation purposes.

(C) **Schematic.** A schematic diagram(s) of all existing and proposed treatment processes.

(D) **Land requirements.** The identification of sites and easements that will be used and whether the sites:

(i) are currently owned or leased by the applicant, or

(ii) will be acquired or leased by the applicant.

(E) **Construction problems.** A discussion of concerns such as subsurface rock, high water table, limited access, or other conditions that may affect the cost of construction or the operation of the facility.

(F) **Advantages and disadvantages.** A description of the ability of each alternative to meet the owner's needs, address violations cited in any enforcement orders, satisfy public and environmental concerns, and comply with regulatory requirements. The report must demonstrate the compatibility of each alternative with existing, comprehensive, and area-wide development plans. Provide a short description of environmental impacts that may preclude any alternatives.

(G) **Selected alternative.** A complete description of the proposed project based on the general description presented in the evaluation of alternatives. The report must show that the proposed project will comply with all the requirements of this Chapter. At a minimum, the following information must be included:

(i) **Treatment.** A description of the processes, including biosolids management, in detail and the identification of the location of the plant and the site of any discharges; a status of compliance with the 208 Plan, and if applicable, include current revisions with copy of DEQ approval letter, if approved in the current 208 Plan.

(ii) **Pumping stations.** The size, type, location and any special power requirements, including provisions for emergency operations, of all pumping stations.

(iii) **Collection system layout.** Identify general location of line improvements, including: lengths, sizes and key components.

(iv) **Calculations.** Provide supporting calculations in sufficient detail to demonstrate compliance with DEQ design requirements to assure adequate capacity for the collection and treatment system as a whole to transport and treat the wastewater or reclaimed water. For collection system projects, the submittal must include a map with a list of manholes and pipes and the associated characteristics, such as elevation of inverts, pipe diameter, pipe segment length, and other information necessary to evaluate the project. The report must provide assurance that the receiving collection and treatment systems have adequate capacity.

(4) **Construction sequence.** A description of the sequence of construction and steps needed to maintain compliance during construction. If the project is not to be completed in one sequence, then provide details of the phases.

(5) **Site.** Describe the topography, soils, geologic conditions, depth to bedrock, groundwater level, floodway or floodplain considerations, and other pertinent site information. The project must be constructed on the site consistent with approved plans. Include 6 months of data on the groundwater level. Provide soil boring information pursuant to OAC 252:656-11-3 (a) for projects that include lagoons or other non-industrial impoundments.

(6) **Water supply.** Identify surface water intakes within five (5) miles of the discharge and known public and private water wells within three hundred feet (300').

(7) **Receiving stream.** Identify the receiving stream and its wasteload requirements according to the Water Quality sections of OAC 252:606 and Oklahoma's Water Quality Management Plan (208 Plan).

(8) **Disposition of biosolids.** Discuss the available alternatives for biosolids reuse and/or disposal (OAC 252:606 and OAC 252:515). Submit a sludge management or sludge disposition plan to DEQ for approval. All biosolids that will be land applied and/or disposed in a landfill must comply, at a minimum, with the Class B pathogen reduction requirements contained at 40 CFR, Part 503, adopted by reference at OAC 252:606.

(9) **Industrial wastes.** Discuss the characteristics and volume of anticipated industrial wastes.

(10) **Collection system.** Describe the area to be served by existing and proposed sewers. Sewer capacities must be designed for the estimated ultimate population that will be served. Similarly, consideration must be given to the maximum anticipated loadings from institutions, industrial parks and other similarly situated facilities.

(11) **Financing.** Provide itemized cost estimates to build, operate and maintain the proposed project including, but not limited to:

(A) development, construction, land and rights-of-way, legal services, engineering services, contingencies, refinancing, and any other factors associated with the proposed project;

(B) discuss financing methods;

(C) provide information regarding rate structures, annual operating and maintenance (O&M) cost, tabulation of users by monthly usage categories and revenue received for the last three fiscal years; and

(D) give status of existing debts and required reserve accounts. Include a schedule of short-lived assets and a recommended annual reserve deposit to fund replacement of short-lived assets such as pumps, paint and small equipment.

(12) **Enforcement orders.** Discuss all applicable enforcement orders, including the violations cited in the orders and how the project will eliminate said violations.

(13) **Conclusions and Recommendations.** Provide any additional findings and recommendations that must be considered in development of the project. This must include:

- (A) recommendations for a specific course of action to be undertaken;
- (B) any special studies to be developed;
- (C) highlight the need for special coordination, include a recommended plan of action to expedite project development, etc.

(14) **Project Schedule.** The report must propose a schedule to:

- (A) obtain funds to complete the proposed project;
- (B) submit construction plans, specifications, and permit application(s);
- (C) start construction;
- (D) complete construction, and
- (E) attain compliance with applicable OPDES discharge permits.

(b) **Water reuse treatment and reclaimed water distribution systems.** Applicants shall submit to DEQ two (2) copies of the engineering report for proposed new construction or modifications to water reuse treatment and reclaimed water distribution systems. Engineering reports shall be submitted at least thirty (30) days prior to the submission of plans and specifications and all engineering reports submitted to DEQ shall be signed and sealed by an engineer licensed by the State of Oklahoma. Applicants shall also submit a letter in which the applicant endorses the contents of each engineering report submitted to DEQ. For line extension and lift station construction, the submission of an Engineering Report Form, developed by DEQ, signed and sealed by an engineer licensed by the State of Oklahoma, may be submitted to meet the requirements of the necessary engineering report, unless a full engineering report is required by DEQ. Engineering reports shall include the following, as applicable:

(1) **Volume and quality of reclaimed water flow.** Describe anticipated flow from wastewater treatment works to the water reuse treatment facility. For discharging facilities, the report must demonstrate how the proposed project impacts the design flow in the 208 Plan and other applicable OPDES permit limits.

(2) **Existing system.** Describe existing wastewater treatment and water reuse systems. Descriptions shall include: the suitability of existing facilities for continued use, adequacy of water supply and the facility's history of compliance with state and federal requirements.

(3) **Project description.** Provide service area and project site maps showing the existing and proposed systems. The information shall describe legal and natural boundaries, elevations, major obstacles and any other information necessary to properly evaluate the project.

Project descriptions shall include the following:

(A) **Description.** A description of the wastewater treatment system preceding the water reuse treatment facility.

(B) **Design criteria.** The design parameters used for evaluation purposes.

(C) **Schematic.** Schematic diagrams of all existing and proposed treatment processes.

(D) **Land requirements.** Identification of the sites and easements that will be used and whether the sites:

- (i) are currently owned or leased by the applicant, or

- (ii) will be acquired or leased by the applicant.
- (E) **Treatment.** A detailed description of the treatment processes, including biosolids management, identification of the location of the plant and the site of any discharges:
 - (i) **Pumping stations.** Identify the size, type, location, any special power requirements and provisions for emergency operations of all pumping stations.
 - (ii) **Reclaimed water distribution system layout.** Identify the general locations of line improvements, including lengths, sizes and key components.
 - (iii) **Calculations.** Provide supporting calculations in sufficient detail to demonstrate compliance with DEQ design requirements.
- (4) **Construction sequence.** A description of the sequence of construction and steps needed to maintain compliance during construction. If the project is not to be completed in one sequence, then provide details of the phases.
- (5) **Site.** Describe the topography, soils, geologic conditions, depth to bedrock, groundwater level, floodway or floodplain considerations, and other pertinent site information. The project must be constructed on the site consistent with approved plans. Include 6 months of data on the groundwater level. Provide soil boring information pursuant to OAC 252:656-11-3 (a) for projects that include lagoons or other non-industrial impoundments.
- (6) **Biosolids handling.** If the proposed project will increase the production of biosolids and/or residuals, provide a description of any modifications necessary to properly treat and dispose of biosolids. All biosolids that will be land applied and/or disposed in a landfill must comply, at a minimum, with the Class B pathogen reduction requirements contained at 40 CFR, Part 503, adopted by reference at OAC 252:606. Submit a sludge management or sludge disposition plan as appropriate to the DEQ for approval.
- (7) **Reclaimed water distribution system.** A description of the following:
 - (A) The location, size, and direction of flow of all existing and proposed reclaimed water distribution lines from the point of connection with the existing or proposed treatment works or storage locations to the end user.
 - (B) A summary of quantities that includes, at a minimum, pipe size, materials and linear feet of piping, types of testing and number and size of pumps.
 - (C) The disinfection system design based on one of the following criteria:
 - (i) maintaining a chlorine residual to end-of-pipe pursuant to Appendix A of OAC 252:627; or
 - (ii) a DEQ approved calibrated model of chlorine decay rate in the distribution system to demonstrate that adequate chlorine residual will be maintained to prevent slime growth and regrowth of pathogens to end-of-pipe.
- (8) **Financing.** Itemized cost estimates to build, operate and maintain the proposed project including, but not limited to:
 - (A) development, construction, land and rights-of-way, legal services, engineering services, contingencies, refinancing, and any other factors associated with the proposed project;
 - (B) financing methods;
 - (C) information regarding rate structures, annual operating and maintenance

(O&M) cost, tabulation of users by monthly usage categories and revenue received for the last three fiscal years; and

(D) the status of existing debts and required reserve accounts. Include a schedule of short-lived assets and a recommended annual reserve deposit to fund replacement of short-lived assets such as pumps, paint and small equipment.

(9) **Enforcement orders.** A discussion of all enforcement orders, identifying the violations cited in orders and explaining how the project will eliminate those violations.

(10) **Conclusions and Recommendations.** All engineering reports shall include a recommendation for a specific course of action to be undertaken. The conclusions and recommendations shall also include any additional findings, identify any special studies to be developed, and any other recommendations that must be considered in development of the project.

(11) **Project Schedule.** A proposed schedule to obtain funds to:

(A) complete the proposed project;

(B) submit construction plans, specifications, and permit application(s);

(C) start construction;

(D) complete construction; and

(E) attain compliance with applicable OPDES discharge permits.

(c) Authorized design-build projects may use the flexible permitting process as approved in the engineering report, including:

(1) Label cover documents prominently as “Design-build;”

(2) Provide completed attestation form from applicant certifying that project is design-build;

(3) Description of design packages, including the number (maximum of six), scope of each package, expected schedule of each package, and expected schedule of completion for major construction items;

(4) The engineering report will address the entire scope of the project at 100% completion.

252:656-3-5. Plans and specifications

(a) **General plans.** Applicants shall submit to DEQ two (2) copies of general plans that include the following:

(1) **Plan view.** Include a plan view of the plant and any discharge points, using at least 10- foot contours.

(2) **Flood elevations.** Show both the 25-year and 100-year flood elevations and their boundaries.

(3) **Existing and proposed treatment works.** Show the physical arrangement of all treatment units on a project site plat.

(4) **Existing collection systems.** Show the location, size and direction of flow of all existing sanitary sewers at the point of connection with proposed new sanitary sewers. Show the elevations of all sewer inverts close to the manholes.

(5) **Proposed collection systems.** Show the location of all proposed sewers, sewer easements and direction of flow. Number all manholes on the layout and correspondingly on the profile. Provide a summary of quantities that includes, at a minimum, linear feet of trenching, number of manholes, size, materials and linear feet of piping, types of testing and number and size of pumps (if applicable).

(6) **Existing and proposed reclaimed water distribution systems.** Show the location, size, and direction of flow of all existing and proposed reclaimed water distribution lines from the point of connection with the existing or proposed treatment works or storage locations to

the end user. Provide a summary of quantities for proposed reclaimed water distribution lines that includes, at a minimum, pipe size, materials and linear feet of piping, types of testing and the number and size of pumps. Testing specifications shall include requirements for flushing mains to remove any construction debris before placing the system into service. Construction of reclaimed water distribution systems shall be in accordance with OAC 252:626-19-2, except as follows:

- (A) locate reclaimed waterlines at least 5 feet horizontally from any existing or proposed potable waterlines;
- (B) locate reclaimed waterlines at least 5 feet horizontally from any existing or proposed sewer lines;
- (C) locate reclaimed waterlines crossing any existing or proposed potable waterlines at least 2 feet vertically below the potable waterlines; and
- (D) locate reclaimed waterlines crossing any existing or proposed sewer lines at least 2 feet vertically above the sewer lines.

(7) **Drawings.** Show the name of the municipality, sewer district, or institution; scale in feet; north point; date; and name, telephone number, address, signature of engineer and/or imprint of engineer's seal on the drawings. In the case of bound documents, engineers must affix their seal, signature and date to the cover sheet or index page, which identifies all documents bound together for which the registrant has responsible charge. In the absence of a cover sheet or index page each sheet must have the seal, and dated signature of the registrant who has responsible charge. For bound documents involving multiple registrants, either each document in the bound set must be sealed, signed and dated by the registrant in responsible charge for that portion of the work, or the cover sheet or index page must be sealed, signed and dated by each registrant with a breakdown of responsibility for each document clearly identified. Draw general plans to a scale of 100 feet per inch. Establish and reference a permanent benchmark. The minimum plan size must be 11" x 17", one-sided and of adequate contrast sufficient for electronic imaging and storage.

(8) Authorized design-build projects must label cover documents prominently as "Design-Build," specify the design package number, and reference the approved engineering report number.

(b) **Detailed plans.** The applicant shall submit to DEQ two (2) copies of detailed plans drawn to a suitable scale. Plans to modify or extend existing wastewater treatment systems or water reuse systems shall clearly indicate the changes.

(1) **Non-industrial wastewater systems.** Detailed plans for non-industrial wastewater systems shall include the following:

(A) **Sewer plan and profile.** Include a plan and profile of all sewers to be constructed showing all special features, such as inverted siphons, extra strength pipe, concrete encasements, outfall structures and sewer bridges. Show all stream crossings on the profile with stream bed elevations, normal flow elevation and extreme high and low water levels. Scale the profiles to not more than 100 feet per inch horizontal and 10 feet per inch vertical. Show the scale on the profiles. Show all known existing structures both above and below ground that might interfere with the proposed construction; including water mains, gas mains, storm drains, and nature of street surfacing. Show wyes on the plan view and dimensions from the nearest down-stream manhole recorded on maps.

(B) **Sewer details.** Include profiles showing manhole stationing, size of

sewers, top of rim and sewer invert elevations at each manhole and the grade and length of sewers between adjacent manholes. Show ground elevations at the house line or at approximately 50 to 75 feet from the centerline of the sewer in each direction except in the case of out-fall and/or relief sewers, where no wyes for house connections are needed.

(C) **Sewer appurtenances.** Include the details of all ordinary sewer appurtenances such as manholes, drop manholes, inverted siphons and pumping stations. A sufficiently detailed drawing of each structure must show dimensions, equipment, elevations, capacities, and any explanatory notes necessary to make them easily interpreted.

(D) **Sewer cross sections.** Include cross sections for manholes, outfall structures, headwalls, pipe cradling and encasement, and similar structures.

(E) **Sewage pumping station details.** Include complete construction details showing number and size of pumps, isolation valves, check valves, alarm system and emergency operation provisions.

(F) **Treatment works hydraulic profile.** Show hydraulic profiles with sewage, supernatant liquor and sludge flow through the plant.

(G) **Schematic diagrams.** Label schematic piping diagrams with all lines, appurtenances and direction of flow.

(H) **Treatment units.** Provide complete construction details of all treatment units including high and low water levels of receiving stream.

(I) **Fillets.** Eliminate dead spots in all tanks by designing fillets and otherwise rounding edges.

(2) **Water reuse systems.** Detailed plans for water reuse systems shall include the following information:

(A) **Treatment works hydraulic profile.** Show hydraulic profiles with sewage, supernatant liquor and sludge flow through the system.

(B) **Schematic diagrams.** Label schematic piping diagrams with all lines, appurtenances and direction of flow.

(C) **Treatment units.** Provide complete construction details of all treatment units including high and low water levels of receiving stream.

(D) **Distribution system.** Provide complete construction details of the distribution system, which shall be designed in compliance with Subchapter 27.

(c) **Specifications.** Applicants shall submit to DEQ complete detailed specifications for the proposed project with the plans and shall include a detailed summary of equipment and design data, with references to the specific applicable standards (e.g., ASTM, UL, etc.) for construction, installation and testing of said equipment.

(d) **Construction materials.** Applicants are responsible for complying with any occupational, safety and building codes. Reference in the plans or specifications where these codes require special construction materials, such as the National Electrical Code requirement for explosion- proof wiring where gases may accumulate. The DEQ will not, however, determine whether the proposed construction will meet such codes.

(e) **Redundant equipment.** Provide redundant treatment units and equipment for maintenance and repair.

(f) **Maintenance and cleaning.** For maintenance and operational controls, all units must be equipped with means for cleaning. Direct discharge of untreated sewage is prohibited.

(g) **Weather protection.** Protect the structures and all electrical and mechanical

equipment and controls from elements and a 100-year flood. Protect mechanical units, pumps, valves and piping from freezing.

(h) **Construction sequence.** Include a program for keeping existing wastewater facilities in compliance with all applicable water quality permit conditions during construction of additional facilities in accordance with OAC 252:656-3-4(a)(4) and/or OAC 252:656-3-4(b)(4).

SUBCHAPTER 11. LAGOON STANDARDS

252:656-11-2. Basis of design

(a) **Facultative Lagoons.** Facultative lagoons depend on the relationship between organic loading and surface area (algal photosynthesis) or on surface area and supplemental mechanical aeration to provide an aerobic layer of water at the surface. Facultative lagoons may be either total retention or flow-through (discharge) to waters of the state.

(b) **Flow-through lagoons.**

(1) **Organic loading.** Limit the organic load to 35 pounds BOD per acre (water surface area) per day for any cell depending solely on algal photosynthesis for oxygen. The total water surface area requirement based on organic loading is calculated at the average water depth. Flow-through lagoon systems will not consistently provide ammonia removal through the nitrification process so the effluent from these facilities may be toxic to aquatic life and thus cause whole effluent toxicity test failures.

(2) **Flow Control.** Provide at least two primary cells on new systems. Design the primary cells so they may be operated in either series or in parallel, with at least 60 days retention time. Provide at least two secondary cells operating in series with the primary cells and in series with each other. Provide a bypass line around any secondary cell in a series to the next cell. The secondary cells shall have at least 60 days detention for a total of at least 120 days detention in the system.

(3) **Depth.** The maximum water depth shall not exceed 6 feet in primary cells and 10 feet in secondary cells. Provide structures to allow the primary cells to operate between four foot depth and the maximum design depth plus three feet of freeboard. The operating depth for a flow-through lagoon shall be between 4 and 6 feet.

(c) **Total Retention.** Size the primary cell(s) for the expected organic loading and additional evaporation cells designed for the hydraulic load. Base the design of all cells receiving raw wastewater on an organic loading of 35 lbs BOD per surface acre per day at the average operating depth. Design the primary cells so they may be operated in either series or in parallel.

(1) **Surface evaporation.** Where more than one acre of surface area is needed, provide at least two cells. For those systems greater than five (5) acres surface area provide at least two primary cells.

(A) Provide sufficient area to evaporate the annual influent flow based on the average daily design flow with allowances for infiltration and inflow to the sewage collection system.

(B) Base the evaporation rates on the annual average pan evaporation minus the 90th percentile annual precipitation for the geographical location, as contained in Appendix E.

(C) The system shall be designed with a five (5) foot operating depth, with three (3) feet of freeboard.

(2) **Land Application.** Design two (2) primary cells and one storage cell. Follow design guidelines stated in Subchapter 25 of this Chapter.

(A) Primary cells shall have sixty (60) days of retention time.

(B) Secondary cells shall have ninety (90) days of storage with the operating depth not to exceed ten (10) feet.

(d) **Aerated lagoon systems.** The following apply to all new aerated lagoon systems. Only partial-mix systems will be considered for systems with 30 day average concentration limits for BOD and TSS of 30 mg/l and 90 mg/l, respectively, as their basic permit requirement. Aerated lagoon systems will not consistently provide ammonia removal through the nitrification process so the effluent from these facilities may be toxic to aquatic life and thus cause whole effluent toxicity test failures.

(1) **Number of cells.** At least two aerated cells, in series, followed by one settling lagoon and provide a hydraulic retention time of at least two days.

(2) **Depth.** The design water depth shall be 10 to 15 feet.

(3) **Design Requirements.** Submit design calculations to the DEQ for review, and justify the use of any constants not listed.

(4) **Aeration requirements.** Oxygen requirements will depend on organic loading, required treatment, and concentration of suspended solids to be maintained in the aerated cells. Aeration equipment shall be capable of maintaining a minimum dissolved oxygen level of 2 mg/l in the lagoons at all times. In the absence of experimentally determined values, the design oxygen requirements shall be 1.8 lb O₂/lb BOD applied at maximum loading.

(5) **Additional information.** For a more detailed discussion of aerated lagoon design see *Design Manual Municipal Wastewater Stabilization Ponds*, U.S. Environmental Protection Agency, EPA-625/1-83-015 (1983). Also use *Wastewater Engineering: Treatment, Disposal & Reuse*, Metcalf & Eddy, Inc., 4th Edition, (2003).

(6) **Disinfection.** Disinfection shall be required for all lagoon systems proposed to discharge to "waters of the state" where the beneficial use of the receiving water body is designated in Oklahoma's Water Quality Standards (OAC 785:45252:730) as either "Primary Body Contact Recreational" or "Public or Private Water Supply".