

**567—65.206(455B,459A) Settled open feedlot effluent basins—investigation, design and construction requirements.** A settled open feedlot effluent basin required to be constructed pursuant to a construction permit issued pursuant to Iowa Code section 459A.205 shall meet the design and construction requirements set forth in this rule.

**65.206(1) Drainage tile investigation and removal.** Prior to constructing a settled open feedlot effluent basin, the site for the basin shall be investigated for drainage tile lines as provided in this subrule. All applicable records of known drainage tiles shall be examined for the existence of drainage tile lines. Prior to the excavation for an unformed manure storage structure, an inspection trench of at least ten inches wide shall be dug around the structure to a depth of at least 6 feet below the original grade and within 25 feet of the proposed outside of the toe of the berm. Drainage tile lines discovered during the tile inspection of a settled open feedlot effluent basin shall be removed and rerouted in the inspection trench or in an area outside of the inspection trench. All tiles within the inspection trench perimeter shall be removed or completely plugged with concrete, grout or similar materials. Drainage tile lines installed at the time of construction to lower the groundwater may remain in place as long as they are outside of the proposed toe of the berm.

**65.206(2) Soils and hydrogeologic report.** A settled open feedlot effluent basin required to be constructed pursuant to a construction permit issued pursuant to rule 567—65.203(455B,459A) shall meet design standards as required by a soils and hydrogeologic report. The report shall be submitted with the construction permit application as provided in rule 567—65.204(455B,459A). The report shall include all of the following:

*a.* A description of the steps taken to determine the soils and hydrogeologic conditions at the proposed construction site, a description of the geologic units encountered, and a description of the effects of the soil and groundwater elevation and direction of flow on the construction and operation of the basin.

*b.* The subsurface soil classification of the site. A subsurface soil classification shall be based on ASTM international designation D 2487-06 or D 2488-06.

*c.* The results of a soils investigation conducted at a minimum of three locations within the area of the basin reflecting the continuous soil profile existing within the area of the basin. The soils investigation results shall be used in determining subsurface soil characteristics and groundwater elevation and direction of flow at the proposed site. The soils investigation shall be conducted and utilized as follows:

(1) By a qualified person ordinarily engaged in the practice of performing soils investigations.

(2) At locations that reflect the continuous soil profile conditions existing within the area of the proposed basin, including conditions found near the corners and the deepest point of the proposed basin. The soils investigation shall be conducted to a minimum depth of ten feet below the proposed bottom elevation of the basin.

(3) By methods that identify the continuous soil profile and do not result in mixing of soil layers. Soil corings using hollow stem augers and other suitable methods that do not result in soil layer mixing may be used.

(4) Soil corings may be used to determine current groundwater levels by completing the corings as temporary monitoring wells as provided in subparagraph 65.206(3)“a”(1) and measuring the water levels in these wells no earlier than seven days after installation as provided in subparagraph 65.206(3)“a”(2).

(5) Upon abandonment of soil core holes, all soil core holes including those developed as temporary water level monitoring wells shall be plugged with concrete, Portland cement concrete grout, bentonite, or similar materials.

(6) If excavation methods are used in conducting the soils investigation, upon closure these excavations must be filled with suitable materials and adequately compacted to ensure they will not compromise the integrity of the basin liner.

**65.206(3) Hydrology.**

*a.* For purposes of this rule, groundwater table is the seasonal high-water table determined by a PE, a groundwater professional certified pursuant to 567—Chapter 134, or qualified staff from the

department or NRCS. If a construction permit is required, the department must approve the groundwater table determination.

(1) Current groundwater levels shall be measured as provided in this subparagraph for either a formed settled open feedlot effluent basin or an unformed settled open feedlot effluent basin. Three temporary monitoring wells shall be developed according to paragraph 65.108(6) "c." The top of the well screen shall be within five feet of the ground surface. Each well shall be extended to at least two feet below the proposed top of the liner of an unformed settled open feedlot effluent basin, or to at least two feet below the proposed bottom of the footings of a formed settled open feedlot effluent basin. In addition, the wells must be installed as follows:

1. Unformed basins. For an unformed settled open feedlot effluent basin, the monitoring wells may be installed in the soil core holes developed as part of conducting the soils investigation required in paragraph 65.206(2) "c."

2. Formed basins. For a formed settled open feedlot effluent basin, at least three temporary monitoring wells shall be installed as close as possible to three corners of the structure, with one of the wells close to the corner of deepest excavation. If the formed settled open feedlot effluent basin is circular, the three monitoring wells shall be equally spaced and one well shall be placed at the point of deepest excavation.

(2) The seasonal high-water table shall be determined by considering all relevant data, including the groundwater levels measured in the temporary monitoring wells not earlier than seven days following installation, NRCS soil survey information, soil characteristics such as color and mottling, other existing water table data, and other pertinent information. If a drainage system for artificially lowering the groundwater table will be installed in accordance with the requirements of paragraph 65.206(3) "c," the level to which the groundwater table will be lowered will be considered to represent the seasonal high-water table.

b. The settled open feedlot effluent basin shall be constructed with a minimum separation of two feet between the top of the liner of the basin and the seasonal high-water table.

c. If a drainage tile line around the perimeter of the basin is installed a minimum of two feet below the top of the basin liner to artificially lower the seasonal high-water table, the top of the basin's liner may be a maximum of four feet below the seasonal high-water table which existed prior to installation of the perimeter tile system. The seasonal high-water table may be artificially lowered by gravity flow tile lines or other similar system. However, the following shall apply:

(1) Except as provided in subparagraph 65.206(3) "b"(2), an open feedlot operation shall not use a nongravity mechanical system that uses pumping equipment.

(2) If the open feedlot operation was constructed before July 1, 2005, the operation may continue to use its existing nongravity mechanical system that uses pumping equipment or it may construct a new nongravity mechanical system that uses pumping equipment. However, an open feedlot operation that expands the area of its open feedlot on or after April 1, 2011, shall not use a nongravity mechanical system that uses pumping equipment.

(3) Drainage tile lines may be installed to artificially lower the seasonal high-water table at a settled open feedlot effluent basin, if all of the following conditions are satisfied:

1. A device to allow monitoring of the water in the drainage tile lines and a device to allow shutoff of the flow in the drainage tile lines are installed, if the drainage tile lines do not have a surface outlet accessible on the property where the settled open feedlot effluent basin is located.

2. Drainage tile lines are installed horizontally within 25 feet away from the outside toe of the berm of the settled open feedlot effluent basin. Drainage tile lines shall be placed in a vertical trench and encased in granular material that extends upward to the level of the seasonal high-water table which existed prior to installation of the perimeter tile system.

d. Open feedlot operation structures exceeding storage capacity or dam height thresholds may be required to obtain department permits, as specified in rule 567—71.3(455B) and 567—Chapter 73.

**65.206(4) Liner design and construction.** The liner of a settled open feedlot effluent basin shall comply with all of the following:

*a.* The liner shall be constructed to have a percolation rate that shall not exceed one-sixteenth inch per day at the design depth of the basin as determined by percolation tests conducted by the PE. If a clay soil liner is used, the liner shall be constructed with a minimum thickness of 12 inches or the minimum thickness necessary to comply with the percolation rate in this paragraph, whichever is greater.

*b.* The liner shall be constructed to have a percolation rate that shall not exceed one-sixteenth inch per day at the design depth of the basin. The design of the liner will specify a moisture content, compaction requirement, and liner thickness that will comply with the maximum allowable percolation requirement, and will be based on moisture content and percentage of maximum density as determined by a standard 5-point proctor test performed in accordance with ASTM D698 (Method A), effective November 11, 1991. The liner thickness will be based on laboratory tests of the compacted material, with a minimum liner thickness of 12 inches. Appropriate field or laboratory testing during construction shall be provided to verify the design requirements are met.

**65.206(5)** *Berm erosion inspection and repair.* The owner of an open feedlot operation using a settled open feedlot effluent basin shall inspect the berms of the basin at least semiannually for evidence of erosion. If the inspection reveals erosion which may impact the basin's structural stability or the integrity of the basin's liner, the owner shall repair the berms.

**65.206(6)** *Unformed basins containing confinement manure and open feedlot effluent.* Unformed basins containing confinement manure and open feedlot effluent shall meet the confinement construction standards and separation distance requirements provided in Division II of this chapter. The unformed basin design shall ensure adequate storage for the annual manure generation of confinement animals, the annual runoff from the open feedlot portion, including the basin surface area, and the open feedlot runoff resulting from the 25-year, 24-hour precipitation event below the two-foot freeboard level.

**65.206(7)** *Settled open feedlot effluent basin (SOFEB) design and operation requirements.*

*a.* All SOFEBs shall have a minimum ten-foot wide top of dike.

*b.* All SOFEBs shall have a minimum three-foot horizontal to one-foot vertical interior and exterior side slopes.

*c.* All SOFEBs shall have depth markers installed labeling each foot of depth and critical pumping depths noted according to the designed operating system.

*d.* All SOFEBs shall be designed using the latest available NOAA Atlas 14 Volume 8 Version 2, effective 2013, rainfall data for the county where the SOFEB is located. NOAA data can be obtained from the National Weather Service website.

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