



# IOWA DEPARTMENT OF NATURAL RESOURCES

---

LEADING IOWANS IN CARING FOR OUR NATURAL RESOURCES

**Iowa Wastewater Facilities Design Standards Update**

**Chapter 18C – Wastewater Treatment Ponds (Lagoons)**

**Emy Liu, PhD, P.E.**

# Ch. 18C - Proposed Changes

- **Section 18C.2.6 – Water Supply Characteristics**
  - **Changed determination of sulfate level in the basic water supply to consideration (by design engineer) of sulfate content in the basic water supply when designing a lagoon.**
- **Section 18C.3.5.2 – Vertical Separation**
  - **Specified groundwater separation measurement from ‘the top of the pond seal’ to the maximum groundwater table.**

# Ch. 18C - Proposed Changes

- **Section 18C.3.5.3 – Perched Groundwater**
  - **Included a description of perched groundwater in order to justify adequacy of lowering the perched groundwater table. Added a requirement of where to install groundwater lowering tile system.**
- **Section 18C.3.6.1 – Karst Features**
  - **Added a requirement of a special hydrogeologic site review if the lagoon is located in a Karst area before facility plan approval.**

# Ch. 18C - Proposed Changes

- **Section 18C.3.6.2 – Bedrock Separation**
  - **Specified bedrock separation measurement being from ‘the top of the pond seal’ to the bedrock formation.**
- **Section 18C.6.5 – Modifications to Existing Lagoons**
  - **Eliminated the outdated condition of conversion of the controlled discharge lagoon to aerated lagoon in Modification to Existing Lagoons. Added when the existing lagoon seal is subject to the new percolation rate in the amended standards.**

# Ch. 18C - Proposed Changes

- **Section 18C.7.2.1 – Material**
  - **95% Standard Proctor Density in soil compaction for pond bottom and dikes is required. The current standards require 90% Standard Proctor Density.**
- **Section 18C.7.2.5 – Freeboard**
  - **Added a clarification of measuring freeboard vertically between the maximum water level to the top of the dike.**

# Ch. 18C - Proposed Changes

- **Section 18C.7.3.2 – Pond Bottom Seal**
  - 1. Changed pond bottom seal percolation rate from not exceeding 1/16 inch per day at a water depth of 6 feet to not exceeding 500 gal per acre per day (gpad) at a water depth of 6 feet. This is the same as the percolation rate used in Ten State Standards at a water depth of 6 feet and a liner thickness of 1 foot, using Darcy's Law.**
  - 2. Changed the pond seal thickness from a minimum of four inches to a minimum of twelve inches.**

# Ch. 18C - Proposed Changes

- **Section 18C.7.3.2 - Pond Bottom Seal (continued)**
  - 3. Added pond bottom synthetic liner thickness requirement to be 60 mils for HDPE.**
  - 4. Added a greater liner thickness or double liners may be required for industrial wastewater.**
  - 5. Added synthetic liner installment requirement.**

# Ch. 18C - Proposed Changes

- **Section 18C.7.3.2 - Pond Bottom Seal (continued)**
  - 6. When pond seal testing using water balance test, the amended design standards added allowing a margin of error of up to 1,000 gallons per day per acre in water balance to the design pond seal percolation rate of 500 gallons per acre per day at a water depth of six feet.**
  - 7. Pond leakage test when performed on undisturbed soil sample should collect soil sample with a minimum depth of twelve inches instead of the current six inches.**



# Ch. 18C - Proposed Changes

- **Section 18C.7.4.4 – Influent Lines Location**
  - **Allowed the influent line to be placed above lagoon pond bottom for control discharge lagoon.**
- **Section 18C.7.4.6 – Influent Discharge Apron**
  - **Allowed influent lines discharge to a splash pad anchored and erosion protected when the line is placed above the pond seal.**

# Ch. 18C - Proposed Changes

- **Section 18C.7.6.1 – Pond Piping Material**
  - Updated the pond piping material.
- **Section 18C.7.6.2 – Hydraulic Capacity**
  - Updated the hydraulic capacity of the lagoon pond piping.
- **Section 18C.7.7 - Prefilling**
  - Added a registration with Water Supply (IDNR) when more than 25,000 gallons per day is used for pond prefilling.

# Ch. 18C - Proposed Changes

- **Section 18C.9 - Disinfection**
  - **Re-worked the disinfection for lagoon paragraph. Updated the appendix diagram.**
- **Section 18C.11 (new) – Lagoon Sludge Removal and Disposal**
  - **Added lagoon sewage sludge disposal requirement in the design standards.**