

## Environmentally Sensitive Settings Report – October 18, 2016 - R. Rice

### **Background:**

The research on this topic started by reviewing the current Wisconsin NRCS CPS Waste Storage Facility, code 313, version 1/14, in comparison to the national standard dated May 2016, then reviewing NRCS waste storage facility standards in other states with similar agriculture industries; namely California, New York, Pennsylvania, and Minnesota. Identifying other documents with parallel definitions was also incorporated into the report. The findings, followed by supporting reference material, are outlined below for consideration by the S.O.C. 313 team.

### **National Definition:** NRCS NHCP Waste Storage Facility Code 313 May 2016

**Sensitive Environmental Settings.** Where liquid-storage is to be provided in sensitive environmental settings (i.e., tanks in areas with shallow wells in surface aquifers, high-risk karst topography, or other site-specific concerns), design the storage structure as a reinforced concrete hydraulic or environmental structure according to NRCS NEM, Part 536, Structural Design. Alternatively, use a flexible liner membrane, designed and constructed in accordance with standard engineering and industry practice, to provide secondary liquid containment for structures constructed with other methods described in NRCS NEM, Part 536, Structural Design.

### **Findings:**

The current Wisconsin 313 standard version 1/14 has no definition of Sensitive Environmental Settings. There are two similar items in sub-section VI. Considerations. Item N deals more with **secondary surface containment** of effluent. Item T deals more with **secondary sub-surface containment** and prevention of leakage. Both could be used to protect sensitive environmental settings. But again, neither give a definition.

*N. The following should be considered either singly or in combination to minimize the potential of or the consequences of sudden breach of embankments:*

- *Storage for wet-year rather than normal-year precipitation,*
- *Reinforced embankment, such as additional top width, flattened and/or armored downstream side slopes, and*
- *Secondary containment.*

*T. A secondary liner directly below concrete joints with waterstops should be considered where the site assessment indicates the area is sensitive to leakage impacts.*

Similar expanded language was found in the Wisconsin Administrative Code NR 243.15, s.s. 3.c (Page 310-10 & 11);

(c) *Leakage collection or monitoring.* 1. The permittee shall assess if a leakage collection or monitoring system or secondary containment system is necessary to prevent discharges of manure and process wastewater to groundwater or surface waters and include the assessment as part of submitted plans and specifications. If the permittee determines that these systems are necessary, it shall include plans and specifications for these systems as part of its submittal. Components of a collection or monitoring system design may include secondary containment associated with liner installation, leachate collection, leachate recirculation, monitoring sumps or monitoring wells. Components of secondary containment may include concrete or earthen berms or diversions designed to temporarily collect or divert overland flow away from surface waters or areas susceptible to groundwater contamination.

2. The department may require the installation of a leakage collection or monitoring system or secondary containment based on the following considerations:
  - a. Whether facilities are located on or near areas that are susceptible to groundwater contamination such as direct conduits to groundwater, sandy soils, and sites with minimal separations between bedrock and high water tables.
  - b. The size and depth of the facility.
  - c. The type of liner used.
  - d. Characteristics of waste being stored.
  - e. Other considerations based on potential impacts to waters of the state.

To expand on the actual definition of *sensitive environmental settings* things such as Wisconsin Administrative Code NR 121, ATCP 50, and various county planning and code enforcement documents were reviewed. None seemed to capture both surface and sub-surface language which could be critical to protect the environment.

Waste Storage Facility standards from the other states previously mentioned all have consideration language for “Sudden Breach of Embankment” or “Minimizing Pond Liner Failure”, similar to the Wisconsin considerations N & T, just greatly expanded. These sections somewhat capture the essence of Sensitive Environmental Settings. Here are the considerations from the New York 313 standard;

***Considerations for Minimizing the Potential for and Impacts of Sudden Breach of Embankment or Accidental Release from the Required Volume.***

*Features, safeguards, and/or management measures to minimize the risk of failure or accidental release, or to minimize or mitigate impact of this type of failure should be considered when any of the categories listed in Table 4 might be significantly affected.*

*The following should be considered either singly or in combination to minimize the potential of or the consequences of sudden breach of embankments when one or more of the potential impact categories listed in Table 4 may be significantly affected:*

- An auxiliary (emergency) spillway
- Additional freeboard
- Storage for wet year rather than normal year precipitation
- Reinforced embankment -- such as, additional top width, flattened and/or armored downstream side slopes
- Secondary containment

***Table 4 - Potential Impact Categories from Breach of Embankment or Accidental Release***

1. Surface water bodies -- perennial streams, lakes, wetlands, and estuaries
2. Critical habitat for threatened and endangered species.
3. Riparian areas
4. Farmstead, or other areas of habitation
5. Off-farm property
6. Historical and/or archaeological sites or structures that meet the eligibility criteria for listing in the National Register of Historical Places.

*The following options should be considered to minimize the potential for accidental release from the required volume through gravity outlets when one or more of the potential impact categories listed in Table 4 may be significantly affected:*

- Outlet gate locks or locked gate housing
- Secondary containment
- Alarm system
- Another means of emptying the required volume

***Considerations for Minimizing the Potential of Waste Storage Pond Liner Failure.***

*Sites with categories listed in Table 5 should be avoided unless no reasonable alternative exists. Under those circumstances, consideration providing an additional measure of safety from pond*

seepage when any of the potential impact categories listed in Table 5 may be significantly affected.

**Table 5 - Potential Impact Categories for Liner Failure**

1. Any underlying aquifer is at a shallow depth and not confined
2. The vadose zone is rock
3. The aquifer is a domestic water supply or ecologically vital water supply
4. The site is located in an area of solutionized bedrock such as limestone or gypsum.

Should any of the potential impact categories listed in Table 5 be affected, consideration should be given to the following:

- A clay liner designed in accordance with procedures of AWMFH Appendix 10D with a thickness and coefficient of permeability so that specific discharge is less than  $1 \times 10^{-6}$  cm/sec
- A flexible membrane liner over a clay liner
- A geosynthetic clay liner (GCL) flexible membrane liner
- A concrete liner designed in accordance with slabs on grade criteria for fabricated structures requiring water tightness

To further the thought process, items that could be considered sensitive environmental features applicable to the installation of a waste storage facility in Wisconsin, are outlined here:

- All DNR wetlands less than 2 Acres; (DNR – Wetland Delineation)
- All DNR wetland over 2 Acres; (DNR – Wetland Delineation)
- All FSA wetlands; (NRCS Delineation)
- All Floodways; (313)
- All Navigable water courses; (313)
- Perennial or intermittent streams; (313)
- Areas of Karst soils; (313)
- Areas with Sandy soils; (Soils investigations identify)
- Areas with sink holes; (313)
- Areas susceptible to Artesian water features; (Soils investigations identify)
- Critical habitat for threatened and endangered species; (NRCS WI Natural Heritage Inventory )
- Farmstead, or other areas of habitation; (313 – well distance)
- Off-farm property; (313 – well distance)
- Historical and / or archaeological sites or structures that meet the eligibility criteria for listing in the National Register of Historical Places; (NRCS / DATCP Initial Cultural Resources Review)

Comparing the above items to the current Wisconsin NRCS 313 standard, or other statutes / procedures already in place if followed by the designer, should cover vetting the environmental concerns listed. An example beyond the 313 standard could include a wetland delineation for a potential DNR wetland. See verbiage in parentheses that evaluates the particular feature.

**Recommendations:**

- 1.) To include the federal definition of a “Sensitive Environmental Setting” in Section VI. Considerations.
- 2.) To replace the existing language in items N & T Section VI. Considerations with verbiage similar to the expanded New York language for “Sudden Breach of Embankment” or “Minimizing Pond Liner Failure”.
- 3.) If time allows, discuss with the entire 313 team “Temporary” Secondary Surface Containment as it pertains to current best management practices. For example, allowing a pond structure to

temporarily contain a manure spill where, after further examination of the floodway or sensitive environmental feature downstream from the manure storage facility, extra precautions are warranted.

It is my opinion that the New York language covers both secondary surface and sub-surface containment, has similar qualities to the verbiage in NR 243, expands on what was already agreed upon in the current standard, and most importantly maintains consistency with the national standard.

Respectfully submitted, Ryan P. Rice