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September 11, 2006

## **UTAH BULLETIN UT210-06-09**

### **SUBJECT: ENG - GUIDANCE FOR LINER DECISION TABLE**

**Purpose:** The purpose of this bulletin is to provide guidance on using the liner decision table within Conservation Practice Standard 313, Waste Storage Facility. This information is also applicable to Manure Transfer (Standard 634), Solid/Liquid Separation Facility (Standard 632), and Waste Treatment Lagoon (Standard 359).

#### **Determining Groundwater Aquifer Class**

Documentation of the designer's decision-making process in determining vulnerability and risk must be included in the design report. One of the key items is determining the appropriate groundwater aquifer class. There are currently 2 ways to determine the class of the groundwater aquifer (it is anticipated a map will be available in the future).

1. The first method, if available in your area, is the Utah DEQ website. The web address is:  
<http://www.waterquality.utah.gov/aquifermap.htm>

There are currently 8 aquifers with maps showing the class of deep groundwater. This determination may not be appropriate to use because the quality of the shallow groundwater aquifer may govern (since groundwater is defined as the first water). The quality of the shallow groundwater may differ from the quality of the deep aquifer. It is up to the designer to evaluate and document accordingly if the map gives the correct class of groundwater.

2. If your watershed is not currently mapped, or you want a site specific answer, send an email with the Township, Range, and Section along with a 1:24,000 topographic map (like the SHPO map) with an outline of where the storage facility is to be constructed to Rob Herbert, DEQ Groundwater Protection Section Manager at:  
[rherbert@utah.gov](mailto:rherbert@utah.gov)

Specify you are requesting the class of the shallow groundwater aquifer to use in the design of an animal waste storage facility. If you have questions call Rob Herbert at (801) 538-6038 or Bronson Smart at (801) 524-4563.

**Determining Surface Water Class** Documentation of the designer's decision-making process in determining vulnerability and risk must be included in the design report. Another key item is determining the appropriate surface water class. The first step is to determine what body(s) of water is down gradient. Then go to the DEQ rules located under:

<http://www.rules.utah.gov/publicat/code/r317/r317-002.htm#T7>

Locate **R317-2-13. Classification of Waters of the State** which includes a table listing each river reach and reservoir in the state.

Here are some example determinations:

1. The UV Dairy is proposing to construct a 10 ft. deep waste storage facility that sits on a hillside 550 ft. away from the South Fork of the Ogden River in Huntsville. Go to the **R317-2-13. Classification of Waters of the State** table and look up **13.4 Weber River Basin** then proceed down the table until reaching **a. Weber River Drainage**. Then proceed down the table until reaching the section that best applies. The section that best applies in this case is **All tributaries to Pineview Reservoir 1C, 2B, 3A, 4**. The most limiting being class 1C. Entering this into the liner decision table, it is determined that the facility is a **“high risk”**.
2. The B-Bar Ranch in Santa Clara is proposing to construct a 2 ft. deep runoff pond on the low end of the feedlot. At the base of the feedlot there is an irrigation ditch that runs into a neighbor’s pasture where the ditch terminates. Since irrigation water is defined as class 4 surface water and the facility is 20 ft. away from the ditch, the facility would be a **“moderate risk”**.
3. Assume the same situation above except that the irrigation ditch empties into the Santa Clara River. In a flood the irrigation ditch becomes a tributary to the Santa Clara River. The facility now would be a **“high risk”** since the table says that the Santa Clara River and tributaries are class 1c surface waters.

**Difference Between Public Drinking Supply Well and Domestic Supply Well** A public drinking supply well is a well, either publicly or privately owned, providing water through constructed conveyances for human consumption and other domestic uses, which has at least 15 service connections or serves an average of at least 25 individuals daily at least 60 days out of the year and includes collection, treatment, storage, or distribution facilities under the control of the operator and used primarily in connection with the system, or collection, pretreatment or storage facilities used primarily in connection with the system but not under his control. A domestic supply well is any well supplying water for household use or human consumption. The designer should question the landowner as to the location of any known wells within 1000 feet of the location of the facility.

**Testing Requirements on Earthen Liner Material** Prior to construction of the liner, a falling head permeability test must be run from samples of the proposed liner material. This can be done for NRCS assisted projects at no cost by sending a 5 gallon bucket full of soil, and a short letter detailing what tests are needed, along with your contact information (including address and phone number) to the Soil Mechanics Center in Lincoln, Nebraska.

NRCS Soil Mechanics Center  
512 South 7th Street  
Lincoln, NE 68508

This testing will verify if the proposed borrow source will yield the required permeability when compacted properly. If bentonite, soda ash, or other amendments are needed to attain the required compaction, the Soil Mechanics Center will need to have a sample of this as well. Allow 6 to 12 weeks for a report. The report will provide the appropriate guidance to construct the liner. The Soil Mechanics Center will specify a range of moisture contents to attain the necessary compaction thereby yielding the required permeability. Special care needs to be taken during construction to assure the soil has the specified moisture content and proper compaction.

If the liner requirement states, "Design includes sampling and testing of earthen liner or in-place material including classification, standard Proctor compaction, in-place density, and sample permeability by a licensed testing firm" then the landowner is responsible for hiring a geotechnical testing firm (look under engineering or testing in the yellow pages) and have the testing firm run a falling head permeability test on the as-built material, and determine the as-built permeability and compaction. A minimum of 3 as-built samples per acre of water surface area should be taken, with at least 1 of the samples being from the sloped embankment. For example, if the surface area of the waste storage facility is 3 acres, then 9 samples would need to be taken; 3 of them being from the embankment. The testing firm must send a transmittal letter that includes the test permeability data to the landowner, documenting compliance with State law.

A copy of the Soil Mechanics Center's findings, the designer's decision-making process and the engineering testing firm's results must be included in the project design report.

If the liner requirements states, "Published permeability data and construction method specifications may be used" then the designer may use the data in the AWMFH or a Soil Mechanics Center report to design a method specification. A Construction Inspection Plan/Quality Assurance Plan must be developed to confirm the method specification was followed. A record of the design process and the Quality Assurance Plan must be included in the design report.

**Determining if Waste Storage Facility is Near a Well** The first step is for the designer to ask the landowner of the existence of any known wells near the area. If a well is within 1000 ft. of the facility, then more information must be obtained. Determine if the well is part of the community drinking water system and document accordingly. Well logs and other information can be found to assist in gathering information about the well, or the water table on the State Water Rights website:

<http://utstnrwrt6.waterrights.utah.gov/cgi-bin/mapserv.exe>

References: NRCS Utah Conservation Practice Standard 313, 634, 359 and 632.

Utah DEQ Groundwater Aquifer Maps  
<http://www.waterquality.utah.gov/aquifermap.htm>

Utah DEQ Rules

[http://www.waterquality.utah.gov/documents/DOC\\_RULE.htm](http://www.waterquality.utah.gov/documents/DOC_RULE.htm)

Utah Water Rights

<http://www.waterrights.utah.gov/>

Expiration Date: Upon the revision of NRCS Conservation Practice Standard 313

Contact: Bronson Smart, NRCS State Environmental Engineer  
(801)524-4589 or [bronson.smart@ut.usda.gov](mailto:bronson.smart@ut.usda.gov)

Niels Hansen, NRCS State Agronomist  
(801)524-4568 or [niels.hansen@ut.usda.gov](mailto:niels.hansen@ut.usda.gov)

/S/

N. ERIC FLEMING, PE  
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