



January 31, 2017

IOWA INSTRUCTION 210-389 – REQUIREMENTS FOR SUBSURFACE GEOLOGIC INVESTIGATIONS FOR ANIMAL WASTE STORAGE FACILITIES

IA389.0 PURPOSE

This Iowa Instruction clarifies requirements for subsurface investigations for all animal waste storage facilities. It was developed in response to the FY2015 Quality Assurance Compliance Review. Finding 7 in Section 3 of the Review stated “Geologic investigations were not analyzed prior to construction of waste storage facilities.” This Instruction relates to the following two recommendations:

Recommendation 11: (partial) The State Conservation Engineer should prepare a State bulletin for the State Conservationist reminding employees of the need for a geologic investigation on waste storage facilities prior to construction.

Recommendation 13: Train the staff on geologic investigation requirements and documentation.

IA389.1 SCOPE

This Instruction will be followed by all Iowa NRCS staff and partner employees providing technical assistance under Memorandums of Understanding with NRCS. These requirements will also apply to Technical Service Providers and other non-NRCS engineers who are providing technical assistance for NRCS programs.

IA389.2 PROCESS

When Technical Service Providers or other non-NRCS engineers provide design assistance to NRCS customers, this document must be provided to the designer and reviewed with them at the pre-design conference. Compliance with this document will help ensure that geologic investigation requirements have been fulfilled when the deliverables as required by the conservation practice Statement of Work are reviewed.

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IA389.3 FILING INSTRUCTIONS

This Iowa Instruction will be posted on the Iowa NRCS Employee Website, which can be accessed under the Topics/People/NRCS Employees/Iowa NRCS eDirective, or at this link [Iowa NRCS eDirectives website](#).

IA389.4 EXHIBITS

See Attachment.

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Kurt Simon
State Conservationist

Attachment

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SUMMARY OF NRCS AND STATE REQUIREMENTS

The Iowa NRCS Statements of Work **require** site-specific subsurface geologic investigations for ***all*** animal waste storage facilities. This Instruction addresses the minimum requirements for the *main* types of waste storage facilities for which NRCS provides assistance in Iowa. Other waste storage practices applicable now or in the future will also require geologic investigations. All projects must adhere to (1) requirements specified in NRCS policy, practice standards, and handbooks, and (2) State requirements set by the Iowa Administrative Code Part 567, Chapter 65, which have been condensed in the instructions below. It is the responsibility of the designer to keep abreast of changes to these requirements and to comply with the most up-to-date rules.

1. **Fabricated manure storage structures** (in non-karst* terrain). NRCS Conservation Practice Standard 313, Waste Storage Facility, requires *site-specific* geologic investigations for fabricated structures, such as buildings with or without solid floors, post-frame buildings, and tanks. This is to (1) assess whether or not the foundation is adequate to safely support all superimposed loads; (2) determine depth to the high water table and shallow bedrock if applicable; and (3) determine whether sink holes, other solution features, or fractures are present that could potentially lead to groundwater contamination.

Soil survey maps or Web Soil Survey may *not* be used in lieu of an onsite foundation investigation. The geologic investigation, at a minimum, must consist of:

- i. Three (3) soil borings or test pits at each structure site, which are positioned in an upslope-downslope direction, i.e., perpendicular to the contour. The borings or pits must extend to a depth of at least three (3) feet below the structure foundation, or five (5) feet below the ground surface, whichever results in the greater total depth;
- ii. additional borings or test pits if the foundation cannot be adequately characterized from three test locations.

If the geologic investigation indicates the presence of a non-uniform foundation, or if highly variable foundation loads are expected, Practice Standard 313 requires site-specific soil test data. This may be fulfilled by submitting at least two (2) Shelby tube samples to a soil mechanics laboratory for unconsolidated undrained soil shear strength (Q_u) tests. As an alternative, the designer may use the conservative values shown in Table 2 of the Standard for allowable foundation pressures for the soil type(s) found at the site.

Other guidance pertaining to settlement potential is outlined in the NRCS Animal Waste Management Field Handbook Chapter 7, 651.0702(j).

2. **Formed structures for storing liquid or dry manure** (in karst* terrain). The Iowa Administrative Code Part 567, Chapter 65 requires the use of formed structures in areas underlain by karst or potential karst terrain. In addition to the NRCS requirements outlined above in Item 1, Chapter 65.15 of the Code requires, at a minimum:
 - i. Two (2) soil borings or test pits at each structure site, to determine whether or not there are at least five (5) feet of low permeability soil or rock between the bottom of the concrete structure and the underlying soluble rock.

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* **KARST:** Many of the requirements for geologic investigation of waste storage facilities refer to karst terrain. Karst terrain is characterized by the presence of easily dissolved bedrock (limestone and dolomite) near the ground surface. Groundwater and surface waters in these areas are highly vulnerable to contamination. In areas identified by the Iowa DNR's online AFO Siting Atlas as karst or potential karst terrain, investigations must adhere to the rules in the Iowa Administrative Code Part 567, Chapter 65. The *DNR Guide to Alluvial and Karst Determinations for Animal Feeding Operations* provides clear guidelines to help users meet these standards.

Note: The definition of karst terrain in the Iowa Administrative Code allows for the karst designation to be removed if 25 feet of vertical separation distance can be maintained between the bottom of an unformed manure storage structure and the soluble rock.

3. **Earthen manure storage structures for confinement operations** (excluding dry manure storage) must be investigated in accordance with the Iowa Administrative Code Part 567, Chapter 65. This type of structure is not allowed in karst terrain. Chapter 65.15 requires, at a minimum:
 - i. Four (4) soil borings or test pits that do not result in mixing of soil layers, including one at the deepest part of the excavation, to a minimum depth of ten (10) feet below the bottom of the structure or basin; and
 - ii. one soil boring to a depth of at least 25 feet below the bottom of the structure or basin, or a boring or test pit to bedrock if shallower than 25 feet; and
 - iii. determination of the seasonal high water table based on water level readings from borings or pits, and soil characteristics such as color and mottling.
4. **Settled open feedlot effluent basins** must be investigated in accordance with the Iowa Administrative Code Part 567, Chapter 65. This type of structure is not allowed in karst terrain. Chapter 65.109 requires, at a minimum:
 - i. Three (3) soil borings or test pits that do not result in mixing of soil layers, to a minimum depth of ten (10) feet below the bottom of the basin; and
 - ii. measurement of water levels in the boring holes or pits no sooner than seven days after they were drilled or excavated.
5. **Short-term storage of animal waste** (i.e., dry manure stockpiling from confinement feeding operations) must be investigated in accordance with the Iowa Administrative Code Part 567, Chapter 65. In karst or potential karst terrain, Chapter 65.2 requires, at a minimum:
 - i. Two (2) soil borings or test pits, one at each end of the proposed stockpile, to determine whether or not there are at least five (5) feet of low permeability soil or rock between the bottom of the stockpile and the underlying soluble rock.
6. **Vegetated treatment areas**. Follow the geological and hydrogeological site review recommendations contained in the section "Vegetated Treatment Area Planning and Design" in the Iowa amendments or supplements to the NRCS Animal Waste Management Field Handbook.

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Vegetated treatment areas (cont'd.) Also review the Iowa Administrative Code Part 567 for details on determining site suitability of permitted vegetated treatment areas. Chapter 65.110 contains specific geologic requirements for slope, soil permeability, groundwater table characteristics, depth to sand or gravel, and depth to bedrock for VTA's.

Approved By:

Date: February 3, 2017

A handwritten signature in black ink, appearing to read 'Kurt Simon', is written over a faint rectangular box.

Kurt Simon
State Conservationist
Natural Resources Conservation Service
210 Walnut Street, Room 693
Des Moines, IA 50309-2180