

APPENDIX A
OPEN FEEDLOT EFFLUENT CONTROL ALTERNATIVES
FOR OPEN FEEDLOT OPERATIONS

Introduction: Water pollution control requirements for animal feeding operations are given in 567 IAC 65.200. Under these rules, open feedlots meeting the NPDES permit application requirements of rule 65.202 must also comply with the minimum open feedlot effluent control requirements of subrule 65.200(2). Subrule 65.200(2) requires that all feedlot runoff and other open feedlot effluent flows resulting from precipitation events less than or equal to the 25-year, 24-hour rainfall event be collected and land-applied. For the purpose of this appendix, open feedlot effluent includes manure, process wastewater, settled open feedlot effluent and settleable solids. This appendix describes five feedlot runoff control systems that meet the requirements of subrule 65.200(2). The systems differ in the volume of open feedlot effluent storage provided and in the frequency of open feedlot effluent application. In general, the time interval between required applications increases with increased storage volume.

A feedlot operator who constructs and operates an open feedlot effluent control facility in accordance with the requirements of any of these five systems will not have additional open feedlot effluent control requirements imposed, unless open feedlot effluent discharges from the facility cause state water quality standards violations. In describing the five systems, the major features of each are first reviewed, followed by detailed information on the construction and operation requirements of the system. The system descriptions are presented in this appendix as follows:

	System
System 1:	One Open Feedlot Effluent Application Period Per Year
System 2:	July and October Open Feedlot Effluent Application
System 3:	April, July, and October Open Feedlot Effluent Application
System 4:	Application After Each Significant Precipitation Event
System 5:	April/May and October/November Open Feedlot Effluent Application

Figures 1-4

SYSTEM 1: ONE OPEN FEEDLOT EFFLUENT APPLICATION PERIOD PER YEAR

MAJOR SYSTEM FEATURES:

- Adequate capacity must be provided to collect and store the average annual runoff from all feedlot and nonfeedlot areas which drain into the open feedlot effluent control system (additional storage is required if open feedlot effluent from other sources also drains into the control system).
- Collected open feedlot effluent must be removed from the control system and land-applied at least once annually (interval between successive applications cannot exceed 12 months).

DETAILED SYSTEM REQUIREMENTS:

Open Feedlot Effluent Control System: The open feedlot effluent control system must be constructed to meet or exceed the following requirements:

1. Solids Settling Facilities: Solids settling facilities which meet or exceed the requirements of subrule 65.101(1) must precede the feedlot runoff control system.
2. Feedlot Runoff Control System: The feedlot runoff control system shall, as a minimum, have adequate capacity to store the total wastewater volume determined by summing the following:
 - A. The volume determined by multiplying the unpaved feedlot area which drains into the control system by the appropriate runoff value from Figure 1.
 - B. The volume determined by multiplying the paved feedlot area which drains into the control system by 1.5 times the appropriate runoff value from Figure 1.
 - C. The volume determined by multiplying the total area of cropland, pasture and woodland draining into the control system by the greater of the following:
 - The amount of runoff expected from these areas as a result of the 25-year, 24-hour precipitation event.*
 - The average annual runoff expected from these areas.*

- D. The volume determined by multiplying the total roof, farmstead, and driveway area draining into the control system by the average annual runoff expected from these areas.*
- E. The volume of process wastewater which drains into the control system during a 12-month period.
- F. The volume of open feedlot effluent from other sources which discharges into the control system during a 12-month period.

*Expected 25-year, 24-hour and average annual runoff values shall be determined using runoff prediction methodologies of the NRCS (or equivalent methodologies).

Open Feedlot Effluent Application Requirements: Open feedlot effluent must be removed from the open feedlot effluent control system and land-applied in accordance with the following requirements:

- 1. Solids Settling Facilities: Collected settleable solids must be removed from the solids settling facilities as necessary to maintain adequate capacity to handle future runoff events. As a minimum, settleable solids shall be removed at least once annually.
- 2. Feedlot Runoff Control System: Accumulated open feedlot effluent shall be removed from the feedlot runoff control system and disposed of by land application at least once annually. The interval between successive application periods shall not exceed 12 months.

During application periods, land application shall be conducted at rates sufficient to ensure complete removal of accumulated open feedlot effluent from the runoff control system in ten or fewer application days. Open feedlot effluent removal is considered complete when the open feedlot effluent remaining in the runoff control system occupies less than 10 percent of the system's design open feedlot effluent storage volume.

Land application of open feedlot effluent shall be conducted on days when weather and soil conditions are suitable. Weather and soil conditions are normally considered suitable for open feedlot effluent application if:

- Land application areas are not frozen or snow-covered.
- Temperatures during application are greater than 32 degrees Fahrenheit.
- Precipitation has not exceeded the water-holding capacity of the soil to accept the manure application without the possibility of runoff.

SYSTEM 2: JULY AND OCTOBER OPEN FEEDLOT EFFLUENT APPLICATION

MAJOR SYSTEM FEATURES:

- Adequate capacity must be provided to collect and store the average runoff expected to occur over the nine-month period from November 1 through July 31 from all feedlot and nonfeedlot areas which drain into the open feedlot effluent control system (additional storage is required if open feedlot effluent from other sources also drains into the control system).
- Collected open feedlot effluent may be removed from the control system and land-applied during any period of the year that conditions are suitable. While application during other periods will minimize the need for July and October application, sufficient open feedlot effluent must still be disposed of during July and October to reduce the volume of open feedlot effluent remaining in the control system during these months to less than 10 percent of the system's design open feedlot effluent storage volume.

DETAILED SYSTEM REQUIREMENTS:

Open Feedlot Effluent Control System: The open feedlot effluent control system must be constructed to meet or exceed the following requirements:

- 1. Solids Settling Facilities: Open feedlot effluent solids settling facilities which meet or exceed the requirements of subrule 65.200(1) must precede the feedlot runoff control system.
- 2. Feedlot Runoff Control System: The feedlot runoff control system shall, as a minimum, have adequate capacity to store the total wastewater volume determined by summing the following:
 - A. The volume determined by multiplying the unpaved feedlot area which drains into the control system by the appropriate runoff value from Figure 2.
 - B. The volume determined by multiplying the paved feedlot area which drains into the control system by 1.5 times the appropriate runoff value from Figure 2.

C. The volume determined by multiplying the total area of cropland, pasture and woodland draining into the control system by the greater of the following:

- The amount of runoff expected from these areas as a result of the 25-year, 24-hour precipitation event.*
- The average runoff expected to occur from these areas during the nine-month period from November 1 to July 31.*

D. The volume determined by multiplying the total roof, farmstead and driveway area draining into the control system by the average runoff expected to occur from these areas during the nine-month period from November 1 to July 31.*

E. The volume of process wastewater which drains into the control system during the nine-month period from November 1 through July 31.

F. The volume of open feedlot effluent from other sources which discharges into the control system during the nine-month period from November 1 through July 31.

*Expected 25-year, 24-hour runoff and average runoff for the nine-month period from November 1 through July 31 shall be determined using runoff prediction methodologies of the NRCS (or equivalent methodologies).

Open Feedlot Effluent Application Requirements: Open feedlot effluent must be removed from the open feedlot effluent control system and land-applied in accordance with the following requirements:

1. Solids Settling Facilities: Collected settleable solids must be removed from the solids settling facilities as necessary to maintain adequate capacity to handle future runoff events. As a minimum, settleable solids shall be removed at least once annually.

2. Feedlot Runoff Control System:

A. A feedlot operator must comply with the following open feedlot effluent application requirements if application operations are limited to the months of July and October.

During these months, land application shall be conducted at rates sufficient to ensure complete removal of accumulated open feedlot effluent from the runoff control system in ten or fewer application days. Open feedlot effluent removal is considered complete when the open feedlot effluent remaining in the runoff control system occupies less than 10 percent of the system's design open feedlot effluent storage capacity.

During July and October, open feedlot effluent application operations shall be initiated on the first day that conditions are suitable for land application of open feedlot effluent, and application must continue on subsequent days that suitable conditions exist. If unfavorable weather conditions prevent complete application of open feedlot effluent to be accomplished during July or October, application must be continued into the following month. Open feedlot effluent application operations may cease when complete application has been achieved.

Weather and soil conditions are normally considered suitable for land application of open feedlot effluent if:

- Land application areas are not frozen or snow-covered.
- Temperatures during application are greater than 32 degrees Fahrenheit.
- Precipitation has not exceeded the water-holding capacity of the soil to accept the manure application without the possibility of runoff.

B. A feedlot operator may dispose of accumulated open feedlot effluent during any period of the year that conditions are suitable. While application during other periods will minimize the need for application during July and October, the feedlot operator will still need to dispose of sufficient open feedlot effluent during July and October to reduce the open feedlot effluent volume remaining in the runoff control system during these months to less than 10 percent of the system's design open feedlot effluent storage capacity.

A feedlot operator who does not limit open feedlot effluent application operations to the months of July and October is not required to comply with the specific open feedlot effluent application requirements which apply when application is limited to those months. However, this does not relieve the feedlot operator of the responsibility to conduct application operations at rates and times which are sufficient to ensure that the open feedlot effluent volume remaining in the runoff control system during July and October will be reduced to less than 10 percent of the system's design open feedlot effluent storage capacity.

SYSTEM 3: APRIL, JULY AND OCTOBER OPEN FEEDLOT EFFLUENT APPLICATION

MAJOR SYSTEM FEATURES:

- Adequate capacity must be provided to collect and store the average runoff expected to occur during the six-month period from November 1 through April 30 from all feedlot and nonfeedlot areas which drain into the open feedlot effluent control system (additional storage is required if open feedlot effluent from other sources also drains into the control system).
- Collected open feedlot effluent may be removed from the control system and land-applied during any period of the year that conditions are suitable. While application during other periods will minimize the need for application during the specified application months, sufficient open feedlot effluent must still be disposed of during April, July and October to reduce the volume of open feedlot effluent remaining in the control system during these months to less than 10 percent of the system's design open feedlot effluent storage volume.

DETAILED SYSTEM REQUIREMENTS:

Open Feedlot Effluent Control System: The open feedlot effluent control system must be constructed to meet or exceed the following requirements:

1. Solids Settling Facilities: Solids settling facilities which meet or exceed the requirements of subrule 65.101(1) must precede the feedlot runoff control system.
2. Feedlot Runoff Control System: The feedlot runoff control system shall, as a minimum, have adequate capacity to store the total wastewater volume determined by summing the following:
 - A. The volume determined by multiplying the unpaved feedlot area which drains into the control system by the appropriate runoff value from Figure 3.
 - B. The volume determined by multiplying the paved feedlot area which drains into the control system by 1.5 times the appropriate runoff value from Figure 3.
 - C. The volume determined by multiplying the total area of cropland, pasture and woodland draining into the control system by the greater of the following:
 - The amount of runoff expected from these areas as a result of the 25-year, 24-hour precipitation event.*
 - The average annual runoff expected to occur from these areas during the six-month period from November 1 to April 30.*
 - D. The volume determined by multiplying the total roof, farmstead, and driveway area draining into the control system by the average runoff expected to occur from these areas during the six-month period from November 1 to April 30.*
 - E. The volume of process wastewater which drains into the control system during the six-month period from November 1 through April 30.
 - F. The volume of open feedlot effluent from other sources which discharges into the control system during the six-month period from November 1 through April 30.

*Expected 25-year, 24-hour runoff and average runoff for the six-month period from November 1 through April 30 shall be determined using runoff prediction methodologies of the NRCS (or equivalent methodologies).

Open Feedlot Effluent Application Requirements: Open feedlot effluent must be removed from the open feedlot effluent control system and land-applied in accordance with the following requirements:

1. Solids Settling Facilities: Collected settleable solids must be removed from the solids settling facilities as necessary to maintain adequate capacity to handle future runoff events. As a minimum, settleable solids shall be removed at least once annually.
2. Feedlot Runoff Control System:
 - A. A feedlot operator must comply with the following open feedlot effluent application requirements if application operations are limited to the months of April, July and October.

During these months, land application shall be conducted at rates sufficient to ensure complete removal of accumulated open feedlot effluent from the runoff control system in ten or fewer application days. Open feedlot effluent removal is considered complete when the open feedlot effluent remaining in the runoff control system occupies less than 10 percent of the system's design open feedlot effluent storage capacity.

During April, July and October, open feedlot effluent application operations shall be initiated on the first day that conditions are suitable for land application of open feedlot effluent, and application must continue on

subsequent days that suitable conditions exist. If unfavorable weather conditions prevent complete application of open feedlot effluent to be accomplished during any of these months, open feedlot effluent application must be continued into the following month. Open feedlot effluent application operations may cease when complete application has been achieved.

Weather and soil conditions are normally considered suitable for land application of open feedlot effluent if:

- Land application areas are not frozen or snow-covered.
- Temperatures during application are greater than 32 degrees Fahrenheit.
- Precipitation has not exceeded the water-holding capacity of the soil to accept the manure application without the possibility of runoff.

B. A feedlot operator may dispose of accumulated open feedlot effluent during any period of the year that conditions are suitable. While application during other periods will minimize the need for application during April, July and October, the feedlot operator will still need to dispose of sufficient open feedlot effluent during April, July and October to reduce the open feedlot effluent volume remaining in the runoff control system during these months to less than 10 percent of the system's design open feedlot effluent storage capacity.

A feedlot operator who does not limit open feedlot effluent application operations to the months of April, July and October is not required to comply with the specific open feedlot effluent application requirements which apply when application is limited to those months. However, this does not relieve the feedlot operator of the responsibility to conduct application operations at rates and times which are sufficient to ensure that the open feedlot effluent volume remaining in the runoff control system during April, July and October will be reduced to less than 10 percent of the system's design open feedlot effluent storage capacity.

SYSTEM 4: OPEN FEEDLOT EFFLUENT APPLICATION AFTER EACH SIGNIFICANT PRECIPITATION EVENT

MAJOR SYSTEM FEATURES:

- Adequate capacity must be provided to collect and store the runoff expected to occur as a result of the 25-year, 24-hour precipitation event from all feedlot and nonfeedlot areas which drain into the open feedlot effluent control system (additional storage is required if open feedlot effluent from other sources also drains into the control system).
- Collected open feedlot effluent must be removed from the control system and land-applied whenever the available (unoccupied) storage capacity remaining in the control system is less than 90 percent of that needed to store runoff from the 25-year, 24-hour precipitation event; land application must begin on the first day that conditions are suitable and must continue until application is completed.

DETAILED SYSTEM REQUIREMENTS:

Open Feedlot Effluent Control System: The open feedlot effluent control system must be constructed to meet or exceed the following requirements:

1. Solids Settling Facilities: Solids settling facilities which meet or exceed the requirements of subrule 65.101(1) must precede the feedlot runoff control system.
2. Feedlot Runoff Control System: The feedlot runoff control system shall, as a minimum, have adequate capacity to store the total wastewater volume determined by summing the following:
 - A. The volume determined by multiplying the total feedlot area which drains into the control system by the amount of runoff expected to occur from this area as a result of the 25-year, 24-hour precipitation event.*
 - B. The volume determined by multiplying the total area of cropland, pasture and woodland draining into the control system by the amount of runoff expected to occur from these areas as a result of the 25-year, 24-hour precipitation event.*
 - C. The volume determined by multiplying the total roof, farmstead and driveway area draining into the control system by the amount of runoff expected to occur from these areas as a result of the 25-year, 24-hour precipitation event.*
 - D. The volume of process wastewater which drains into the control system during the six-month period from November 1 through April 30.

E. The volume of open feedlot effluent from other sources which discharges into the control system during the six-month period from November 1 through April 30.

*Expected 25-year, 24-hour runoff shall be determined by using runoff prediction methodologies of the NRCS (or equivalent methodologies).

Open Feedlot Effluent Application Requirements: Open feedlot effluent must be removed from the open feedlot effluent control system and land-applied in accordance with the following requirements:

1. Solids Settling Facilities: Collected settleable solids must be removed from the solids settling facilities as necessary to maintain adequate capacity to handle future runoff events. As a minimum, settleable solids shall be removed at least once annually.
2. Feedlot Runoff Control System: Accumulated open feedlot effluent shall be removed from the feedlot runoff control system and disposed of by land application following each precipitation or snowmelt runoff event which results in significant open feedlot effluent accumulations in the control system. Open feedlot effluent accumulations will be considered significant whenever the available (unoccupied) storage capacity remaining in the control system is less than 90 percent of that required to store the runoff from the 25-year, 24-hour precipitation event.

Once the available storage capacity remaining in the open feedlot effluent control system is reduced to the point that open feedlot effluent application is necessary, open feedlot effluent application operations must be initiated on the first day that conditions are suitable for land application of open feedlot effluent, and application must continue on subsequent days that suitable conditions exist. Application operations may cease when the storage capacity available in the control system has been restored to greater than 90 percent of that required to store runoff from the 25-year, 24-hour precipitation event.

During application periods, land application shall be conducted at rates sufficient to ensure complete removal of accumulated open feedlot effluent from the control system in ten or fewer application days.

Weather and soil conditions are normally considered suitable for land application of open feedlot effluent if:

- Land application areas are not frozen or snow-covered.
- Temperatures during application are greater than 32 degrees Fahrenheit.
- Precipitation has not exceeded the water-holding capacity of the soil to accept the manure application without the possibility of runoff.

SYSTEM 5: APRIL/MAY AND OCTOBER/NOVEMBER OPEN FEEDLOT EFFLUENT APPLICATION

MAJOR SYSTEM FEATURES:

- Adequate capacity must be provided to collect and store the average runoff expected to occur over the eight-month period from October 1 through May 31 from all feedlot and nonfeedlot areas which drain into the open feedlot effluent control system (additional storage is required if open feedlot effluent from other sources also drains into the control system).
- Collected open feedlot effluent may be removed from the control system and land-applied during any period of the year that conditions are suitable. While application during other periods will minimize the need for application during the April/May and the October/November periods, sufficient open feedlot effluent must still be disposed of during each of these two-month periods to reduce the volume of open feedlot effluent remaining in the control system during these periods to less than 10 percent of the system's design open feedlot effluent storage volume.

DETAILED SYSTEM REQUIREMENTS:

Open Feedlot Effluent Control System: The open feedlot effluent control system must be constructed to meet or exceed the following requirements:

1. Solids Settling Facilities: Open feedlot effluent solids settling facilities which meet or exceed the requirements of subrule 65.200(1) must precede the feedlot runoff control system.
2. Feedlot Runoff Control System: The feedlot runoff control system shall, as a minimum, have adequate capacity to store the total open feedlot effluent volume determined by summing the following:
 - A. The volume determined by multiplying the unpaved feedlot area which drains into the control system by the appropriate runoff value from Figure 4.

B. The volume determined by multiplying the paved feedlot area which drains into the control system by 1.5 times the appropriate runoff value from Figure 4.

C. The volume determined by multiplying the total area of cropland, pasture and woodland draining into the control system by the greater of the following:

- The amount of runoff expected from these areas as a result of the 25-year, 24-hour precipitation event.*
- The average runoff expected to occur from these areas during the eight-month period from October 1 to May 31.*

D. The volume determined by multiplying the total roof, farmstead, and driveway draining into the control system by the average runoff expected to occur from these areas during the eight-month period from October 1 to May 31.*

E. The volume of process wastewater which drains into the control system during the eight-month period from October 1 through May 31.

F. The volume of open feedlot effluent from other sources which discharges into the control system during the eight-month period from October 1 through May 31.

*Expected 25-year, 24-hour runoff and average runoff for the eight-month period from October 1 through May 31 shall be determined using runoff prediction methodologies of the NRCS (or equivalent methodologies).

Open Feedlot Effluent Application Requirements: Open feedlot effluent must be removed from the open feedlot effluent control system and land-applied in accordance with the following requirements:

1. Solids Settling Facilities: Collected settleable solids must be removed from the solids settling facilities as necessary to maintain adequate capacity to handle future runoff events. As a minimum, settleable solids shall be removed at least once annually.

2. Feedlot Runoff Control System: At a minimum, accumulated open feedlot effluent shall be removed from the feedlot runoff control system and disposed of by land application during the periods April 1 through May 31 and October 1 through November 30.

During each of these periods, land application shall be conducted at rates sufficient to ensure complete removal of accumulated open feedlot effluent from the runoff control system in ten or fewer application days. Open feedlot effluent removal is considered complete when the open feedlot effluent remaining in the runoff control system occupies less than 10 percent of the system's design open feedlot effluent storage capacity.

A feedlot operator may dispose of accumulated open feedlot effluent during any period of the year that conditions are suitable. While application during other periods will minimize the need for application during the April/May and October/November periods, the feedlot operator will still need to dispose of sufficient open feedlot effluent during these periods to reduce the open feedlot effluent volume remaining in the runoff control system during these periods to less than 10 percent of the system's design open feedlot effluent storage capacity.

Land application of open feedlot effluent shall be conducted on days when weather and soil conditions are suitable. Weather and soil conditions are normally considered suitable for open feedlot effluent application if:

- Land application areas are not frozen or snow-covered.
- Temperatures during application are greater than 32 degrees Fahrenheit.
- Precipitation has not exceeded the water-holding capacity of the soil to accept the manure application without the possibility of runoff.

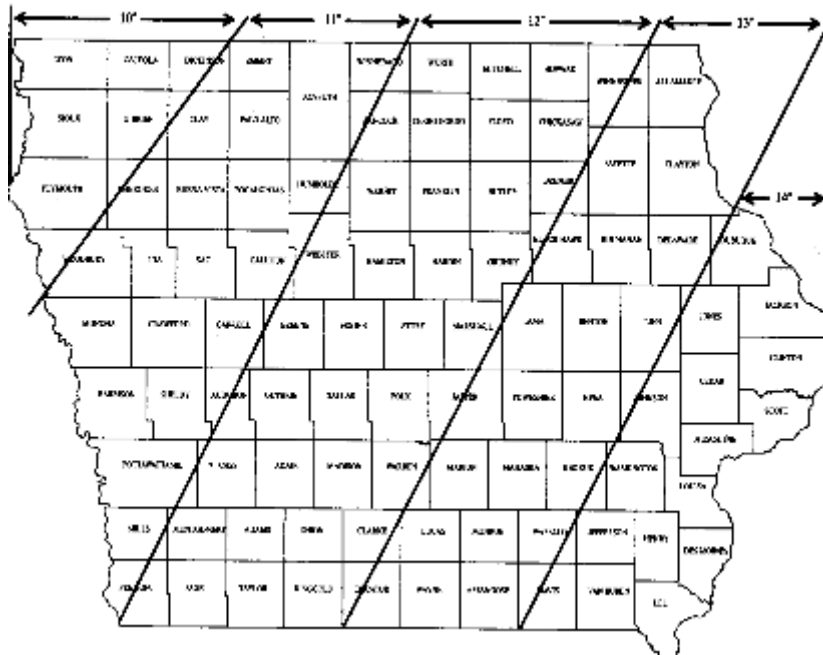


FIGURE 1. -- Feedlot runoff value, in inches, for determining required capacity of the “System 1: One Open Feedlot Effluent Application Period Per Year” manure control system.

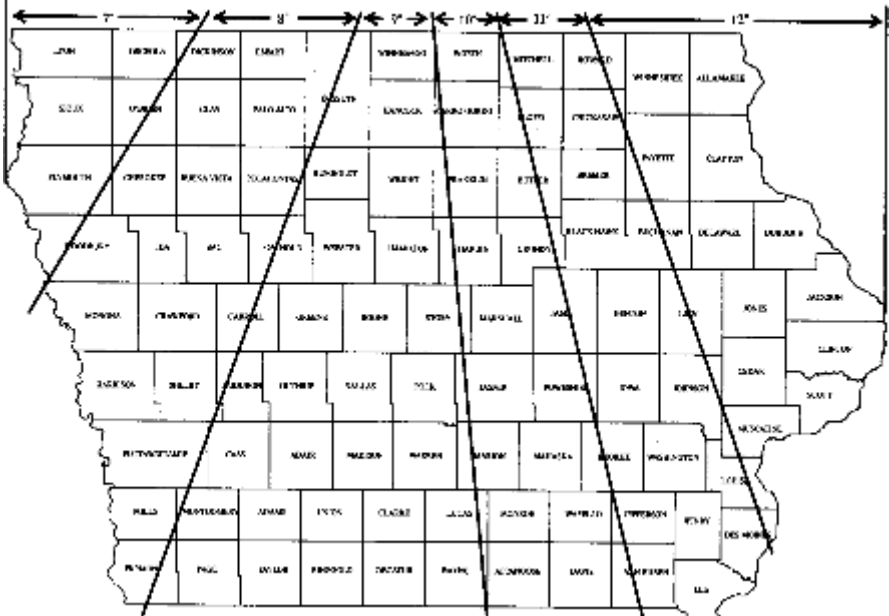


FIGURE 2. -- Feedlot runoff value, in inches, for determining required capacity of the “System 2: July and October Open Feedlot Effluent Application” manure control system.

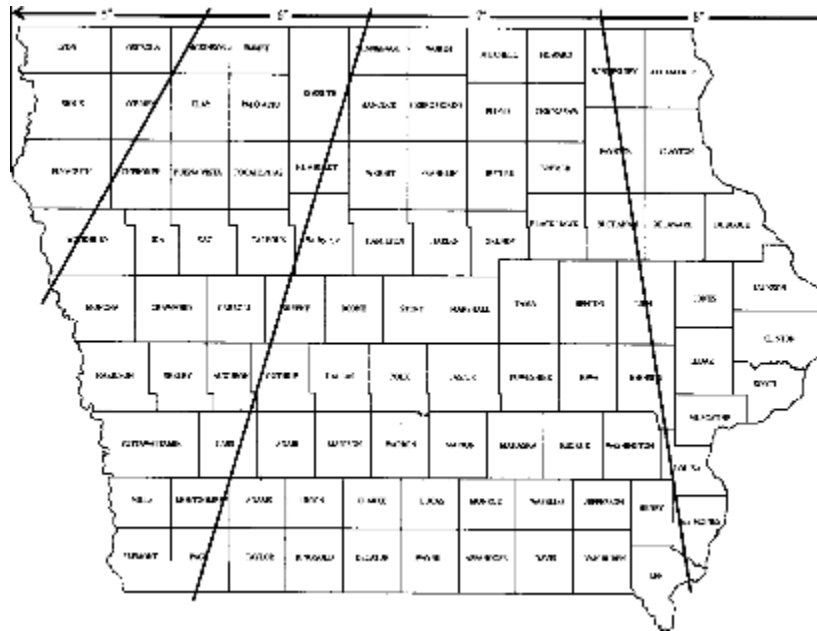


FIGURE 3. -- Feedlot runoff value, in inches, for determining required capacity of the “System 3: April, July, and October Open Feedlot Effluent Application” manure control system.

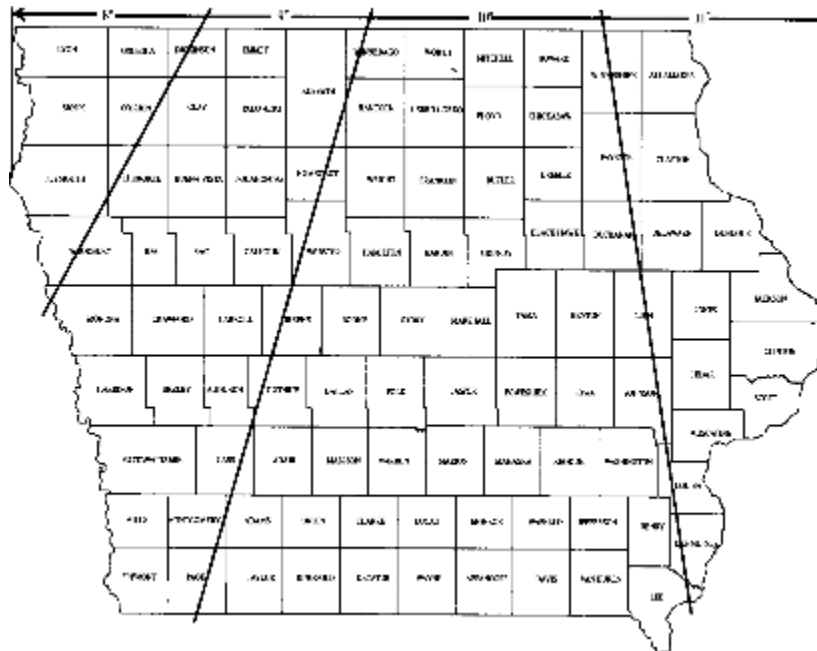


FIGURE 4. -- Feedlot runoff value, in inches, for determining required capacity of the “System 5: April/May and October/November Open Feedlot Effluent Application” manure control system.