Midwest Injection Inc.
AGRICULTURE • INDUSTRIAL SERVICES • MUNICIPAL
SLUDGE/RESIDUALS TRANSPORTATION
LAGOON CLEANING • DIGESTERS • LAND APPLICATIONS

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40 CFR Part 503

DOMESTIC SEWAGE SLUDGE RE-USE AND DISPOSAL REGULATIONS

2025
YEAR

LAND APPLICATION FORMS

Jake McAllister
Authorized Official Signature

July 9, 2025
Date

Facility

City of Monticello, IA

Raw Data Entry Worksheet

Data Entry: All Data Entry for Form LA-ANR and LA-CPL (Orange Tabs) will be entered on this worksheet. Data entered on this worksheet will automatically populate the LA-ANR and LA-CPL forms.

General Information

Facility Name: City of Monticello

City: Monticello, IA

Reporting Year: 2025

NPDES No.:

Click here to ESTIMATE the nitrogen loading rate for next years crop

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
Previous Year*										
Next Year										

*If you DID NOT apply sludge in the previous year DO NOT enter data, please leave the cell BLANK.

			Application Period		Sludge Applied*				
Site Number	Site Name	Site Location	From (mm/dd/yy)	Through (mm/dd/yy)	Gallons*	Pounds (DRY)*	Percent Solids of Sludge Applied	Acres Applied / Site	Sludge App Rate DRY TONS / ACRE**
Site No. 1	Kraus-East	1	4/7/2025	4/8/2025	617,155		17.4	93.00	4.82
Site No. 2									
Site No. 3									
Site No. 4									
Site No. 5									
Site No. 6									
Site No. 7									
Site No. 8									
Site No. 9									
Site No. 10									

**

*If you applied sludge in gallons ONLY list the gallons applied, DO NOT calculate the pounds applied.

*Program will calculate theses values.

** No land application was conducted on soil types 175B or 293C.

Heavy Metals Calculations

	If the result is less than the analytical detection limits enter the less than sign (<) followed by the minimum reportable limit but DO NOT enter acronym's such as, "ND", "BPQL", "BMRL", etc.									
Pollutant	**Site No 1**	**Site No 2**	**Site No 3**	**Site No 4**	**Site No 5**	**Site No 6**	**Site No 7**	**Site No 8**	**Site No 9**	**Site No 10**
Arsenic										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	17.1									
Cadmium										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	4.27									
Copper										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	652									
Lead										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	28.4									
Mercury										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	0.364									
Molybdenum										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	61.3									
Nickel										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	18.3									
Selenium										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	21.4									
Zinc										
mg/kg (WET)										
mg/L (WET)										
mg/kg (DRY)	1130									

Previous Years Lbs/acre (If you DID NOT apply sludge on any of the sites below, please leave the cell BLANK)

Pollutant	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
	Lbs/acre	Lbs/acre	Lbs/acre	Lbs/acre	Lbs/acre	Lbs/acre	Lbs/acre	Lbs/acre	Lbs/acre	Lbs/acre
Arsenic										
Cadmium										
Copper										
Lead										
Mercury										
Molybdenum										
Nickel										
Selenium										
Zinc										

For Calculating the Agronomic Rate for the Land Application of Sewage Sludge

Step 1: From analysis of the sewage sludge to be land applied, determine the amount of each nitrogen compound, based on dry weight, in pounds per ton (lbs/ton)

Nitrogen compound	Concentration of Nitrogen Compounds									
	Site 1 (mg/kg)	Site 2 (mg/kg)	Site 3 (mg/kg)	Site 4 (mg/kg)	Site 5 (mg/kg)	Site 6 (mg/kg)	Site 7 (mg/kg)	Site 8 (mg/kg)	Site 9 (mg/kg)	Site 10 (mg/kg)
Total Kjeldahl Nitrogen (TKN as N)	62,800									
Ammonium Nitrogen (NH_4 as N)	3,510									
Nitrate Nitrogen (NO_3 as N)	436									
Total Phosphorus (mg/kg or mg/L)	8,110									

Step 2: Assume that the available fraction (Kv) is dependent upon operations at the site (see Table 1). Use the following table and enter the appropriate Kv Factor

If Sewage Sludge is:	Factor K_v Is:
Liquid and Surface Applied	0.25
Liquid and Incorporated into the Soil	1.00
Dewatered and Applied in any Manner	1.00

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
Factor K_v Is:	1									

Step 3: **Calculate the amount of organic nitrogen available in the sewage sludge to be applied.** The factor f, used for determining the amount of Org as N present due to mineralization, is provided below in Table 2. The value of F is dependent upon how the sludge is treated (i.e., aerobic digestion, composted, etc.).

F Values				
Time After Sludge Application (Year)	Stabilized Primary and Waste Activated Sewage Sludge's, Fraction of Org as N	Aerobically Digested Sewage Sludge Fraction of Org as N	Anaerobically Digested Sewage Sludge Fraction of Org as N	Composted Sewage Sludge Fraction of Org as N
0 to 1	0.40	0.30	0.20	0.10

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
F Values	0.30									

Step 4 Calculation is determined on data entered in Steps 1 through Steps 3

Step 5: **Nitrogen Credits**. The available nitrogen credits from previous legume crops and existing residuals must be determined. under, there will be a previous crop nitrogen credit in the soil. Select the appropriate nitrogen credit based upon the Step 5A: Previous Legume Crop, Nprevious crop. If the crop for the previous year was a legume and was plowed data shown in Table 3.

Table 3. Nitrogen Credits from Legumes in Rotations	
Legume Crop	**Nitrogen Credit**
Alfalfa (1st year after)	
>80% stand	100-140 lbs/acre
60-80% stand	60-100 lbs/acre
<60% stand	0-60 lbs/acre
Alfalfa (2nd year after)	Half of 1st year credit
Sweet Clover	100-120 lbs/acre
Red Clover	40-80 lbs/acre
Soybeans*	30-60 lbs/acre
*(Allow 1 pound of N credit per bushel of yield. No credit for wheat double-cropped after soybean harvest.)	

If you do not have a "nitrogen credit" please enter 0 for the appropriate site

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
Nitrogen Credit	0									

Step 5B: **Existing Nitrate Content of Soil, $N_{residual}$**. The nitrogen credit for the existing nitrate level in the soil can be accounted for by using the soil test nitrate results in the following equations. (See soil testing procedures for soil sampling methods.)

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
Depth of Sample (inches)	6									
NO_3 as N_{soil}	0									

Step 5C: Previous Sludge, Available Organic Nitrogen, Previous Org!Navailable. Because the mineralization of organic nitrogen in sludge occurs over a long time, there will be a nitrogen credit for mineralization of previously applied sludge. This nitrogen credit is 0.5 of the previous year's calculated total available organic nitrogen.

Abbreviations	Definition	Location of Information
PYCONA	Previous Year Current Organic (lbs/ton) $N_{available}$	Step 3 of Last Years Report
PYSAR	Previous Years Sludge Application Rate (Dry Tons / Acre)	Last Year Data Entry - General Information Section

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
PYCONA										
PYSAR										

Step 5D: Calculation is determined on data entered in Steps 5A, Step 5B and Step 5C.

Step 6: Determine the crop nitrogen requirements

Table 4.	
CROP	**CROP FACTOR**
Wheat	1.75 lbs N/bushel
Corn	1.35 lbs N/bushel
Oats	1.15 lbs N/bushel
Grain Sorghum/Milo	1.35 lbs N/bushel
Barley	1.50 lbs N/bushel
Soybeans	5.4 lbs N/bushel
Alfalfa	56 lbs N/ton
Orchard Grass	50 lbs N/ton
Brome Grass	33 lbs N/ton
Sunflowers	50 lbs N/1000 lbs seed
Tall Fescue	39 lbs N/ton
Forage Sorghum	9 lbs N/ton

Table 5. Soil Factor	
Soil Type	**Factor**
Sandy	1.1
All Other	1

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
Select Crop (Table 4)	soybeans									
Crop Factor (Table 4)	5.4									
Crop Yield	60									
Soil Type (Table 5)	all other									
Soil Factor (Table 5)	1									

Step 7: Calculation is determined on data entered in Steps 5D and Step 6.

Step 8: Calculation is determined on data entered in Steps 7and Step 4.

Step 9: Calculation is determined on data entered in Step 8.

Step 10: **From the soil analysis record the following parameters:**

	0 to 6 Inches			6 to 24 Inches
Site Number	Available Phosphorus (mg/L)	Exchangeable Potassium (mg/L)	pH (SU)	Nitrate as Nitrogen
Site No. 1	18	90	7.5	14
Site No. 2				
Site No. 3				
Site No. 4				
Site No. 5				
Site No. 6				
Site No. 7				
Site No. 8				
Site No. 9				
Site No. 10				

FORM LA-SD

LAND APPLICATION - SITE DESCRIPTIONS

FACILITY: City of Monticello **CITY:** Monticello, IA

Provide a complete description of each land application site being used to dispose / re-use domestic sewage sludge as follows:

Name: **Provide name of owner of property and operator if different from owner.**

Legal: **Provide quarter section, section, township, range, county and state.**

Map: **Provide internet map showing the location of each site.**

Other: **Provide direction from a town or other significant landmark, highway direction, etc. which could be used by someone driving to the site.**

Site 1	Name:	Kraus-East	Acres Applied:	93
	Legal Description:	T86-R3-S26 in Jones County, IA		
	Other Description:	Mike Kraus		
Site 2	Name:		Acres Applied:	
	Legal Description:			
	Other Description:			
Site 3	Name:		Acres Applied:	
	Legal Description:			
	Other Description:			
Site 4	Name:		Acres Applied:	
	Legal Description:			
	Other Description:			
Site 5	Name:		Acres Applied:	
	Legal Description:			
	Other Description:			
Site 6	Name:		Acres Applied:	
	Legal Description:			
	Other Description:			

FORM LA-MP

LAND APPLICATION - MANAGEMENT PRACTICES

FACILITY: City of Monticello **CITY:** Monticello, IA

How are the land application management practices requirements met?

Site Identification:

Are the site identification for this form the same as previously identified on the site description form?

X Yes ____ No If no, provide a correct site description form for each site and attach it to this form.

Indicate all sites on which sludge was applied during the year.

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

1) Regulations provide that the land application of bulk sewage sludge must not cause adverse effects to a threatened or endangered species of plant, fish, or wildlife or their critical habitat. Was this criteria met?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

2) Was bulk sewage sludge land applied to flooded, frozen or snow-covered ground?

Site	All	1	2	3	4	5	6	7	8	9	10
No		X									
Yes											

If no to all sites, go to question 3.
If yes to any site, review the following and answer question 2A.

Bulk sewage sludge shall not be applied to land application site that is flooded, frozen or snow-covered so that the bulk sewage sludge enters a wetland or other waters of the United States.

2A) What measures were implemented to prevent bulk sewage sludge applied to a flooded, frozen, or snow covered land application site from entering a wetland or other waters of the United States? From the choices A-G, provide the appropriate measures implemented for each site listed below.

MEASURES TAKEN

A Application site is isolated from wetlands and waters of the United States.

B Application Site has less than 5% slope.

C Application site has grass/crop residue cover.

D Application site is terraced to prevent rapid runoff.

E Application site is bermed to prevent runoff.

F Application site has grass/tree filter strip at potential runoff points

G Other - Identify each site and provide description of measures taken.

Site Number	1	2	3	4	5
Measures Taken					
Site Number	6	7	8	9	10
Measures Taken					

3) Was the bulk sewage sludge applied to the land application site kept at least 32.8 feet from waters of the United States?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

4) Was the sludge application rate equal to or less than the agronomic rate for the land application site?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

4A) Were any of the sites, KDHE approved reclamation sites?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		N/A									

If yes to any site, go to question 4B.
If no to all sites, go to statement 5.

4B) What was the approved and actual loading rate in dry tons/acre for each reclamation site? Identify site and provide requested data.

Site Number	1	2	3	4	5
Approved Rate, dry tons/acre					
Actual Rate, dry tons/acre					

Site Number	6	7	8	9	10
Approved Rate, dry tons/acre					
Actual Rate, dry tons/acre					

5) Provide the calculations for the agronomic sludge application rate used at each site on the KDHE forms for the agronomic rate calculation - Form LA-ANR.

CERTIFICATION

I certify under the penalty of law that the information as listed above is complete and accurate to the best of my knowledge. This determination has been made under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information used to determine the management practices have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.

Midwest Injection Inc

Name and Official Title (type or print)

Jake McAllister 7/9/2025

Signature Date Signed

FORM LA-PR

FACILITY: City of Monticello **CITY:** Monticello, IA

CLASS B PATHOGEN REDUCTION AND SITE RESTRICTIONS

How were the class B pathogen reduction and site restriction requirements met?

Site Identification:

Are the site identification for this form the same as previously identified on the site description form?

X Yes ____ No If no, provide a correct site description form for each site and attach it to this form.

CHECK ALL THAT APPLY

1) X The geometric mean of the density of fecal coliform in the samples is less than 2,000,000 Most Probable Number (MPN) / Colony Forming Units (CFU) per gram of total solids (dry weight basis).

Fecal Coliform geometric mean was 8,600 MPN / CFU per dry gram total solids for the reporting period.

Go to question 4

2) ____ A Process to Significantly Reduce Pathogens (PSRP) was used to meet Class B pathogen reduction.

CHECK ALL PSRP USED TO MEET THE CLASS B PATHOGEN REDUCTION REQUIREMENT.

____ Aerobic Digestion

Aerobic conditions were maintained for a mean cell residence time and temperature between 40 days at 20 C (68 F) or 60 days at 15 C (59 F).

____ Air drying

Sewage sludge was dried on sand beds or on paved basins. The sewage sludge dried for a minimum of three (3) months. During two (2) of the three (3) months, the ambient average daily temperature was above 0 C (32 F).

____ Anaerobic Digestion

Sewage sludge was treated in the absence of air for a specific mean cell residence time and temperature between 15 days at 35 to 55 C (95 to 131 F) or 60 days at 20 C (68 F).

____ Composting

Using either the within-vessel, static aerated pile, or windrow composting methods, the temperature of the sewage sludge was raised to 40 C (104 F) or higher and remained at 40 C (104 F) or higher for five (5) days. For four (4) hours during the five (5) days, the temperature in the compost pile exceeded 55 C (131 F).

____ Lime Stabilization

Sufficient lime was added to the sewage sludge to raise the pH of the sewage sludge to 12 after two (2) hours of contact.

3) ____ An Equivalent PSRP was used to meet Class B pathogen reduction.

____ EPA Equivalency Statement is included.

____ EPA Equivalency Statement was provided previously.

CLASS B SITE RESTRICTIONS

4) Are food crops grown on the site receiving Class B sludge?
(Food crops are human food normally eaten raw or with little processing.)

Site	All	1	2	3	4	5	6	7	8	9	10
No		X									

If no to all sites, go to question 6.

Yes											

4A) Do harvested parts above the surface of the land touch the soil/sludge mixture?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

If **no** to all sites, go to question 4C.
If **yes** to any site, read the following and answer question 4B.

Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

4B) Is food harvest prohibited for 14 months or more after the last sludge application?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

4C) Are harvested parts below the surface of the land?

Site	All	1	2	3	4	5	6	7	8	9	10
No		X									
Yes											

If **no** to all sites, go to question 5
If **yes** to any site, read the following and answer question 4D.

Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for four (4) months or longer prior to incorporation into the soil.

4D) Does the sewage sludge remain on the land surface for four (4) months or longer prior to the incorporation into the soil?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

If **no** to all sites, go to question 4F.
If **yes** to any site, read the following and answer question 4E.

4E) Is food harvest prohibited for 20 months or more after the last sludge application?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

Go to question 5.

4F) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than four (4) months prior to incorporation into the soil.

Is food harvested prohibited for 38 months or more after the last sludge application?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

Go to question 5.

5) Food crops shall not be harvested for 30 days after application of sewage sludge.

Is all food crop harvesting prohibited for 30 days or more after the last sludge application?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

6) Are animal feed (such as corn, milo, wheat, soybeans, grasses, hay, alfalfa, etc.) or fiber crops grown on the site receiving Class B sludge?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

If **no** to all sites, go to question 7.
If **yes** to any site, read the following and answer question 6A.

Feed crops and fiber crops shall not be harvested for 30 days after application of sewage sludge.

6A) Are harvest of feed and fiber crops prohibited for 30 days or more after the last sludge application?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

Go to question 7.

7) Are animals allowed to graze on the site receiving Class B sludge?

Site	All	1	2	3	4	5	6	7	8	9	10
No		X									
Yes											

If **no** to all sites, go to question 8.
If **yes** to any site, read the following and answer question 7A.
Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

7A) Are animals prohibited from grazing on the land for 30 days after the last sludge application?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

Go to question 8.

8) Is turf grown on the site receiving Class B sludge?

Site	All	1	2	3	4	5	6	7	8	9	10
No		X									
Yes											

If **no** to all sites, go to question 9.
If **yes** to any site, read the following and answer question 8A.

Turf grown on land where sewage sludge is applied shall not be harvested for one (1) year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority. A high potential for public exposure area is a private or public lawn, cemetery, ball field, playground, park, golf courses, etc…

8A) Was turf harvest prohibited for one (1) year after the last sludge application date?

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

Go to question 9.

9) Public access to land with a high potential for public exposure shall be restricted for one (1) year after application of sewage sludge. Was this requirement met

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											
N/A*		X									

*Not Applicable

Go to question 10.

10) Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge. Was this requirement met?

Site	All	1	2	3	4	5	6	7	8	9	10
No											

Yes		X										
N/A*												

*Not Applicable

Go to question 11.

11) Indicate the method of restricting public access.

CHECK ALL THAT APPLY.

____ Information Signs
____ Fenced
____ Rural Area / posted at entrances
__X__ Rural Remote
____ Other _____

_____

CERTIFICATION

I certify under the penalty of law that the information as listed above is complete and accurate to the best of my knowledge. This determination has been made under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information used to determine the management practices have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.

Midwest Injection Inc.

Name and Official Title (type or print)

Jake McAllister 7/9/2025

Signature Date Signed

LAND APPLICATION - VECTOR ATTRACTION REDUCTION

FACILITY: City of Monticello **CITY:** Monticello, IA

How were the vector attraction reduction requirements met?

Site Identification:

Are the site identification for this form the same as previously identified on the site description form?

X Yes ____ No If no, provide a correct site description form for each site and attach it to this form.

CHECK ALL THAT APPLY.

NOTE: ONLY ONE (1) OF THE VECTOR ATTRACTION REDUCTION REQUIREMENTS MUST BE MET.

1) ____ The mass of volatile solids in the sewage sludge was reduced by a minimum of 38 percent.

$$\text{Volatile Solids Reduction} = \frac{\text{VS in - VS out}}{\text{VS in - (VS in X VS out)}} \text{ X } 100$$

Volatile Solids Reduction = _____ %

VS in and VS out in decimal, e.g. 50% = 0.50

2) ____ When the 38 percent volatile solids reduction requirement could not be met for an anaerobically digested sewage sludge, vector attraction reduction was demonstrated by digesting a portion of the previously digested sewage sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 C (90 to 99 F). At the end of the 40 days, the volatile solids in the sewage sludge at the beginning of that period was reduced by less than 17 percent.

Volatile Solids Reduction = _____ %

3) ____ When the 38 percent volatile solids reduction requirement could not be met for an aerobically digested sewage sludge, vector attraction reduction was demonstrated by digesting a portion of the previously digested sewage sludge that has a percent solids of two (2) percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 C (68F). At the end of the 30 days, the volatile solids in the sewage sludge at the beginning of that period was reduced by less than 15 percent.

Volatile Solids Reduction = _____ %

4) ____ The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process was equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 C (68 F).

Specific Oxygen Uptake Rate = _____ mg/hr/gram

5) ____ Sewage sludge was treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge was higher than 40 C (104 F) and the average temperature of the sewage sludge was higher than 45 C (113 F).

6) ____ The pH of the sewage sludge was raised to 12 SU or higher by alkali addition and, without the addition of more alkali, remained at a pH of 12 SU or higher for two (2) hours and then at a pH of 11.5 SU or higher for an additional 22 hours.

Indicate the individual sites that receive alkali/lime treated sludge.

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

7) ____ The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process was equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials.

8) ____ The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process was equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials.

9) X Sewage sludge was injected below the surface of the land
No significant amount of the sewage sludge was present on the land surface within one (1) hour after the sewage sludge was injected.

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes		X									

10) ____ Sewage sludge applied to the land surface was incorporated into the soil within six (6) hours after application to the land.

Site	All	1	2	3	4	5	6	7	8	9	10
No											
Yes											

CERTIFICATION

I certify under the penalty of law that the information as listed above is complete and accurate to the best of my knowledge. This determination has been made under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information used to determine the management practices have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.

Midwest Injection Inc

Name and Official Title (type or print)

Jake McAllister 7/9/2025

Signature Date Signed

LAND APPLICATION

POLLUTANT METALS CONCENTRATIONS

Facility Name: City of Monticello **NPDES Permit No.:** **Year:** 2025

Pollutant	Celling Concentration	Time Period From: 4/7 To: 4/8	Time Period From: To:	Time Period From: To:	Time Period From: To:	Time Period From: To:	Time P From: To:
	mg/kg dry basis	Concentration in Sewage Sludge, mg/kg dry basis	Concentration in Sewage Sludge, mg/kg dry basis	Concentration in Sewage Sludge, mg/kg dry basis	Concentration in Sewage Sludge, mg/kg dry basis	Concentration in Sewage Sludge, mg/kg dry basis	Concer in Se Sludge, dry b
% Solids							
Arsenic	75	17.10					
Cadmium	85	4.27					
Copper	4,300	652.00					
Lead	840	28.40					
Mercury	57	0.36					
Molybdenum	75	61.30					
Nickel	420	18.30					
Selenium	100	21.40					
Zinc	7,500	1,130.00					

CALCULATION WORK SHEET

FOR TRACKING THE CUMULATIVE POLLUTANT LOADING RATES ON LAND APPLICATION SITES

Site Number:	1	Application Time Period		Amount of Sludge Applied:	617,155 Gallons
Site Name:	Kraus-East	From:	4/7/2025	Amount of Sludge Applied:	Lbs
Site Location:	1	Through:	4/8/2025	Acres Sludge Applied:	93 Acres
Facility:	City of Monticello			Amount of Sludge / Acre:	6,636

Pollutant	Maximum Cumulative Pollutant Loading Rates, CPLR, Lbs/acre	CALCULATION FOR DETERMINING CUMULATIVE LOADING										
	100%	COLUMN 1 Concentration in Sewage Sludge		COLUMN 2 Amount of Sludge Applied/Acre		COLUMN 3 Conversion Factor CF*		COLUMN 4 Amount Applied in Past, Lb/acre		COLUMN 5 Total Amount Applied to Date, Lb/acre	
Arsenic	36	2.9754	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	0.16	Lb/acre
Cadmium	34	0.74298	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	0.04	Lb/acre
Copper	1,320	113.448	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	6.27	Lb/acre
Lead	264	4.9416	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	0.27	Lb/acre
Mercury	15	0.063336	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	0.00	Lb/acre
Molybdenum	16	10.6662	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	0.59	Lb/acre
Nickel	370	3.1842	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	0.18	Lb/acre
Selenium	88	3.7236	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	0.21	Lb/acre
Zinc	2,464	196.62	mg/kg	6,636	Gal	0.00000833	CF	0.0	=	10.87	Lb/acre

City of Monticello **2025**

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE

Site No.: 1 Site Name: Kraus-East Site Location: 1

Procedure: A procedure used to calculate the agronomic rate for application of sewage sludge at which the nitrogen supplied by the sludge and available to the plant does not exceed the requirement for nitrogen of the crop or vegetation. To calculate the agronomic rate, the available ammonium nitrogen (NH_4 as N_{avail}), nitrate nitrogen (NO_3 as N_{avail}), organic nitrogen (Org as N_{avail}), must all be determined to calculate the total available nitrogen (TN_{avail}) in the sludge. The nitrogen used (N_{used}) by the crop is calculated basis the crop selected, crop yield, soil type, previous crop residual and nitrate nitrogen retained in the soil. Then the amount of nitrogen used by the plant (N_{used}) is divided by the total nitrogen available (TN_{avail}) to find the annual loading rate.

Step 1: From analysis of the sewage sludge to be land applied, determine the amount of each nitrogen compound, based on dry weight, in pounds per ton (lbs/ton)

Nitrogen Compound	Concentration of Nitrogen Compound (mg/kg)			Current Amount of Nitrogen in Sludge (lb/dry ton of sludge)	
Total Kjeldahl Nitrogen (TKN as N)	62,800 mg/kg	x 0.002	=	**125.60**	**lbs/ton TKN as N**
Ammonium Nitrogen (NH_4 as N)	3510 mg/kg	x 0.002	=	**7.02**	**lbs/ton NH_4 as N**
Nitrate Nitrogen (NO_3 as N)	436 mg/kg	x 0.002	=	**0.87**	**lbs/ton NO_3 as N**
Organic Nitrogen	TKN as N - NH_4 as N	x 0.002	=	**118.58**	**lbs/ton Organic N**

Total Phosphorous (sludge) = 8,110 **mg/kg or ppm**

Step 2: Calculate the amount of ammonium-nitrogen available in the sewage sludge to be applied. Assume that the available fraction (Kv) is dependent upon operations at the site (see Table 1). Use the following equation:

$$NH4\ as\ N_{available} = (NH_4\ as\ N)(K_v)$$

Where,

NH4 as N = is the amount of ammonium nitrogen in the sewage sludge to the land applied, lb/ton
K_v = is a volatilization factor for determining the availability of ammonium nitrogen based on how the sewage sludge is applied (see Table 1)

$NH_4\ as\ N_{available}$ = 7.02 (from Step 1) lbs/ton x 1 (K_v) = **7.02** **lbs/ton**

Table 1. Factors for K_v

If Sewage Sludge is:	Factor K_v Is:
Liquid and Surface Applied	0.25
Liquid and Incorporated into the Soil	1.00
Dewatered and Applied in any Manner	1.00

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE
(Continued)

Step 3: **Calculate the amount of organic nitrogen available in the sewage sludge to be applied.** The factor F, used for determining the amount of Org as N present due to mineralization, is provided below in Table 2. The value of F is dependent upon how the sludge is treated (i.e., aerobic digestion, composted, etc.).

Step 3A: **Current Available Organic Nitrogen, Current Org as $N_{available}$.** Current available organic nitrogen from this year's sludge is determined by the following equation:

Current Org as $N_{available}$ = Org as N (from Step 1) x F

Where,

Current Org as $N_{available}$ = the nitrogen which will be available this year from this year's sludge.
Org as N = the organic nitrogen in the sewage sludge to be land applied, lb/ton.
F = is the mineralization rate from Table 2

Current Org as $N_{available}$ = 118.58 (From Step 1) lb/ton x 0.3 = **35.6** **lb/ton**

Table 2. F Values

Time After Sludge Application (Year)	Stabilized Primary and Waste Activated Sewage Sludge's, Fraction of Org as N	Aerobically Digested Sewage Sludge Fraction of Org as N	Anaerobically Digested Sewage Sludge Fraction of Org as N	Composted Sewage Sludge Fraction of Org as N
0 to 1	0.40	0.30	0.20	0.10

Step 4: Total available nitrogen in the sludge is then determined by adding together the resulting totals from Steps 2 and 3 to the amount of NO_3 as N in Step 1 (Assuming 100% of NO_3 as N is available). The result is the following equation:

Total Nitrogen Available ($TN_{available}$) = NO_3 as N + NH_4 as $N_{available}$ + Current Org as N_{avail}

$TN_{available}$ = 0.872 (Step 1 / NO_3 as N) lb/ton + 7.02 (Step 2 / NH_4 as N_{avail}) lb/ton + 35.57 (Step 3 / Current Org as N_{avil}) lb/ton

$TN_{available}$ = **43.47** **lbs/ton of dry sludge.** This is the total available nitrogen in the sewage sludge and is used as the denominator in the equation in Step 8.

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE
(Continued)

Step 5: **Nitrogen Credits**. The available nitrogen credits from previous legume crops and existing residuals must be determined.

Step 5A: Previous Legume Crop, $N_{previous\ crop}$. If the crop for the previous year was a legume and was plowed under, there will be a previous crop nitrogen credit in the soil. Select the appropriate nitrogen credit based upon the data shown in Table 3.

$N_{previous\ crop}$ = **0** **lbs/acre**

Table 3. Nitrogen Credits from Legumes in Rotations

Legume Crop	Nitrogen Credit
Alfalfa (1st year after)	
>80% stand	100-140 lbs/acre
60-80% stand	60-100 lbs/acre
<60% stand	0-60 lbs/acre
Alfalfa (2nd year after)	Half of 1st year credit
Sweet Clover	100-120 lbs/acre
Red Clover	40-80 lbs/acre
Soybeans*	30-60 lbs/acre

*(Allow 1 pound of N credit per bushel of yield.
No credit for wheat double-cropped after soybean harvest.)

Step 5B: **Existing Nitrate Content of Soil, $N_{residual}$.** The nitrogen credit for the existing nitrate level in the soil can be accounted for by using the soil test nitrate results in the following equations. (See soil testing procedures for soil sampling methods.)

(Use the data for the top (nominal 6 inch) soil composite sample.)

Depth of Sample = 6 inches

NO_3 as N_{soil} = 0 mg/kg or (ppm)

$N_{residual}$ = NO_3 as N_{soil} x Density of Soil*

$N_{residual}$ = NO_3 as N_{soil}, mg/kg x (0.3 lb x depth of sample, inches)

$$N_{residual} = \underset{NO_3 \text{ as } N_{soil}\ (mg/kg)}{0} \times 0.30 \times \underset{\text{Depth of Sample (inches)}}{6}$$

$N_{residual}$ = **0.00** **Lbs / Acre**

*300,000 Lb/acre-inch

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE
(Continued)

Step 5C: N/A Organic Nitrogen$_{available}$. Because the mineralization of organic nitrogen in sludge occurs over a long, time there will be a nitrogen credit for mineralization of previously applied sludge. This nitrogen credit is 0.5 of the previous year's calculated total available organic nitrogen.

a. N/A (PYCONA) lbs/ton. Step 3 on previous year's form.

b. N/A (PYSAR) dry tons / acre.

N/A Organic Nitrogen$_{available}$ = (0.5) (PYCONA) (PYSLR)

c. **0** (PYONA) **lbs / acre**

Step 5D: Total Nitrogen Credits Summary

Total Nitrogen Credits = Previous Crop Credit + Existing Nitrate Content of Soil + Previous Organic Nitrogen

Total $N_{credits}$ = 0 (Previous Crop Credit (Step 5A)) + 0 (Existing Nitrate Content of Soil (Step 5 B)) + 0 (Previous Organic Nitrogen (Step 5C)) lbs/acre

Total $N_{credits}$ = **0.00 lbs/acre**

Step 6: Crop Nitrogen requirement, Ncrop. Determine the crop nitrogen requirement. The equation is: From Table 4, select the crop to be grown and it's factor. From Table 5, select the soil factor.

Table 4.

CROP	CROP FACTOR
Wheat	1.75 lbs N/bushel
Corn	1.35 lbs N/bushel
Oats	1.15 lbs N/bushel
Grain Sorghum/Milo	1.35 lbs N/bushel
Barley	1.50 lbs N/bushel
Soybeans	5.4 lbs N/bushel
Alfalfa	56 lbs N/ton
Orchard Grass	50 lbs N/ton
Brome Grass	33 lbs N/ton
Sunflowers	50 lbs N/1000 lbs seed
Tall Fescue	39 lbs N/ton
Forage Sorghum	9 lbs N/ton

Table 5. Soil Factor

Type Soil	Factor
Sandy	1.1
All Other	1

Selected Crop is: soybeans

Crop Factor is: 5.4

Crop Yield : 60

Crop Nitrogen Requirement is:

N_{crop} = (Crop Factor) (Yield) (Soil Factor)

N_{crop} = 5.4 (crop factor) x 60 (yield) x 1 (soil factor) = **324.0 lbs/acre**

CALCULATION WORKSHEET
FOR CALCULATING THE AGRONOMIC RATE FOR THE LAND APPLICATION OF SEWAGE SLUDGE
(Continued)

Step 7: Nitrogen Used, N_{used}. Based upon the previous calculations from Steps 5 and 6, the net amount of nitrogen used for the land application site can be calculated from these equations:

N_{used} = N_{crop} - Total $N_{credits}$

N_{used} = 324 (Step 6 (N_{crop})) - 0.00 (Step 5D (Total Ncredits)) = **324.00** **lbs/acre**

Step 8: Determine the Agronomic Loading Rate (AGLR) for the sewage sludge. This is determined by dividing the nitrogen used by the plants (N_{used}) (from Step 7) by the total nitrogen available (TN_{avail}) (from Step 4) in the following equation:

$$\text{AGLR (ton/acre)} = \frac{\text{Nitrogen needed by crops or vegetation } (N_{used}), \text{ lbs / acre}}{\text{Total Nitrogen Available } (TN_{avail}), \text{ lbs/ton}}$$

7.45 **tons / acre**
AGLR

Step 9: Determine the Approved Loading Rate (APLR) and the status of your agronomic rate for the land application of sewage sludge for the 2025 report.

APLR = (1.2) (AGLR)

8.94 **tons of dry sludge / acre**
APLR

4.82 **tons of dry sludge applied / acre**

2025 **agronomic rate for the land application summary.**

Based on the information provided you have met the agronomic rate for the land application of sewage sludge for this reporting year. To ensure continued compliance with the 40 CFR Part 503 Domestic Sewage Sludge Re-use and Disposal Regulations, KDHE recommends that your facility continually monitors agronomic loading rate by calculating an estimated nitrogen loading rate for the next crop year for this site.

Step 10: From the soil analysis record the following parameters

0 - 6" depth sample		6 - 24" depth (profile) sample	
Available Phosphorous	18 mg/kg	Nitrate:	14 mg/kg
Exchangeable Potassium	90 mg/kg		
pH:	7.5 S.U.		

Kansas State University, Cooperative Extension Service, Agronomy Program, currently recommends that pH be maintained between 6.5 and 7.0 for most field crops. Also, available phosphorus content of the soil should not be allowed to exceed 100 ppm to achieve maximum crop production. If high phosphorus contents are encountered, the disposal of sludge should be temporarily discontinued and an agronomist contacted to determine appropriate actions to be taken.

This completes your calculation of the Annual Nitrogen Loading rate for the Reporting Calendar Year. Please print a copy of this form as completed and submit it with your 503 sludge report. A copy of this report must also be maintained on file at your facility.

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Chad Snapp
Midwest Injection Inc
150 Industrial St
PO BOX 141
Cascade, Iowa 52033

Generated 11/4/2024 4:12:45 PM

JOB DESCRIPTION

Monticello

JOB NUMBER

310-293328-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

my EOL

Job Notes

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The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



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Table of Contents

Cover Page 1
Table of Contents 3
Case Narrative 4
Sample Summary 5
Client Sample Results 6
Chronicle 9
Definitions 12
Certification Summary 13
Method Summary 14
Chain of Custody 15
Receipt Checklists 17

Job Narrative
310-293328-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 10/22/2024 12:20 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 9.9°C.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Biology
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: Midwest Injection Inc
Project/Site: Monticello

Job ID: 310-293328-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-293328-1	1	Solid	10/22/24 10:15	10/22/24 12:20
310-293328-2	2	Solid	10/22/24 10:20	10/22/24 12:20
310-293328-3	3	Solid	10/22/24 10:25	10/22/24 12:20
310-293328-4	4	Solid	10/22/24 10:30	10/22/24 12:20
310-293328-5	5	Solid	10/22/24 10:35	10/22/24 12:20
310-293328-6	6	Solid	10/22/24 10:40	10/22/24 12:20
310-293328-7	7	Solid	10/22/24 10:45	10/22/24 12:20
310-293328-8	Comp	Solid	10/22/24 10:45	10/22/24 12:20
310-293328-9	Geomean	Solid	10/22/24 00:00	10/22/24 12:20

Client Sample ID: 1
Lab Sample ID: 310-293328-1
Date Collected: 10/22/24 10:15
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	90.6		0.1		%			10/22/24 17:17	1
Percent Solids (EPA Moisture)	9.4		0.1		%			10/22/24 17:17	1

Client Sample ID: 1
Lab Sample ID: 310-293328-1
Date Collected: 10/22/24 10:15
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 9.4

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Coliform, Fecal	1800		1000		cfu/g	☼		10/22/24 15:10	10

Client Sample ID: 2
Lab Sample ID: 310-293328-2
Date Collected: 10/22/24 10:20
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	92.6		0.1		%			10/22/24 17:17	1
Percent Solids (EPA Moisture)	7.4		0.1		%			10/22/24 17:17	1

Client Sample ID: 2
Lab Sample ID: 310-293328-2
Date Collected: 10/22/24 10:20
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 7.4

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Coliform, Fecal	1200		130		cfu/g	☼		10/22/24 15:10	1

Client Sample ID: 3
Lab Sample ID: 310-293328-3
Date Collected: 10/22/24 10:25
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	94.7		0.1		%			10/22/24 17:17	1
Percent Solids (EPA Moisture)	5.3		0.1		%			10/22/24 17:17	1

Client Sample ID: 3
Lab Sample ID: 310-293328-3
Date Collected: 10/22/24 10:25
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 5.3

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Coliform, Fecal	1700		190		cfu/g	☼		10/22/24 15:10	1

Client Sample ID: 4
Lab Sample ID: 310-293328-4
Date Collected: 10/22/24 10:30
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	90.5		0.1		%			10/22/24 17:17	1

Client Sample ID: 4
Lab Sample ID: 310-293328-4
Date Collected: 10/22/24 10:30
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (EPA Moisture)	9.5		0.1		%			10/22/24 17:17	1

Client Sample ID: 4
Lab Sample ID: 310-293328-4
Date Collected: 10/22/24 10:30
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 9.5

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Coliform, Fecal	10000		1000		cfu/g	☼		10/22/24 15:10	10

Client Sample ID: 5
Lab Sample ID: 310-293328-5
Date Collected: 10/22/24 10:35
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	93.9		0.1		%			10/22/24 17:17	1
Percent Solids (EPA Moisture)	6.1		0.1		%			10/22/24 17:17	1

Client Sample ID: 5
Lab Sample ID: 310-293328-5
Date Collected: 10/22/24 10:35
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 6.1

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Coliform, Fecal	35000		1600		cfu/g	☼		10/22/24 15:10	10

Client Sample ID: 6
Lab Sample ID: 310-293328-6
Date Collected: 10/22/24 10:40
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	90.8		0.1		%			10/22/24 17:17	1
Percent Solids (EPA Moisture)	9.2		0.1		%			10/22/24 17:17	1

Client Sample ID: 6
Lab Sample ID: 310-293328-6
Date Collected: 10/22/24 10:40
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 9.2

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Coliform, Fecal	1900		1100		cfu/g	☼		10/22/24 15:10	10

Client Sample ID: 7
Lab Sample ID: 310-293328-7
Date Collected: 10/22/24 10:45
Matrix: Solid
Date Received: 10/22/24 12:20

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	92.8		0.1		%			10/22/24 17:17	1
Percent Solids (EPA Moisture)	7.2		0.1		%			10/22/24 17:17	1

Client Sample ID: 7

Lab Sample ID: 310-293328-7
Date Collected: 10/22/24 10:45
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 7.2

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Coliform, Fecal	**8600**		1400		cfu/g	☼		10/22/24 15:10	10

Client Sample ID: Comp

Lab Sample ID: 310-293328-8
Date Collected: 10/22/24 10:45
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 4.5

Method: SW846 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<438		438		mg/Kg	☼		10/24/24 14:09	10
Nitrite as N	<438		438		mg/Kg	☼		10/24/24 14:09	10

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<17.1		17.1		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Cadmium	<4.27		4.27		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Chromium	**25.3**		4.27		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Copper	**652**		4.27		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Lead	**28.4**		21.4		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Molybdenum	**61.3**		10.7		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Nickel	**18.3**		10.7		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Potassium	**3050**		427		mg/Kg	☼	10/28/24 12:00	11/01/24 14:40	1
Selenium	<21.4		21.4		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1
Zinc	**1130**		21.4		mg/Kg	☼	10/28/24 12:00	10/31/24 18:44	1

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.364		0.364		mg/Kg	☼	10/29/24 16:35	10/30/24 12:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	**3510**		1080		mg/Kg	☼	10/23/24 10:39	10/23/24 20:21	1
Nitrogen, Kjeldahl (EPA 351.2)	**62800**		4070		mg/Kg	☼	10/24/24 06:58	10/24/24 18:44	1
Total Phosphorus as P (EPA 365.1)	**8110**		212		mg/Kg	☼	10/23/24 09:51	10/23/24 18:53	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SW846 9040C)	**6.07**	**HF**	1.00		SU			10/23/24 07:32	1
Total Solids (SM 2540G)	**5.44**		0.100		%			10/22/24 13:36	1
Total Volatile Solids (SM 2540G)	**70.1**		0.0100		%			10/22/24 13:36	1

Client Sample ID: Geomean

Lab Sample ID: 310-293328-9
Date Collected: 10/22/24 00:00
Matrix: Solid
Date Received: 10/22/24 12:20

Method: SM 9222D - Coliforms, Fecal (Membrane Filter)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fecal Coliform (Geometric Mean)	**4100**		100		cfu/g			10/23/24 15:50	1

Lab Chronicle

Client: Midwest Injection Inc
Project/Site: Monticello

Job ID: 310-293328-1

Client Sample ID: 1
Lab Sample ID: 310-293328-1
Date Collected: 10/22/24 10:15
Matrix: Solid
Date Received: 10/22/24 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	437142	A3GU	EET CF	10/22/24 17:17

Client Sample ID: 1
Lab Sample ID: 310-293328-1
Date Collected: 10/22/24 10:15
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 9.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		10	437296	HE7K	EET CF	10/22/24 15:10

Client Sample ID: 2
Lab Sample ID: 310-293328-2
Date Collected: 10/22/24 10:20
Matrix: Solid
Date Received: 10/22/24 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	437142	A3GU	EET CF	10/22/24 17:17

Client Sample ID: 2
Lab Sample ID: 310-293328-2
Date Collected: 10/22/24 10:20
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 7.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		1	437296	HE7K	EET CF	10/22/24 15:10

Client Sample ID: 3
Lab Sample ID: 310-293328-3
Date Collected: 10/22/24 10:25
Matrix: Solid
Date Received: 10/22/24 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	437142	A3GU	EET CF	10/22/24 17:17

Client Sample ID: 3
Lab Sample ID: 310-293328-3
Date Collected: 10/22/24 10:25
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 5.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		1	437296	HE7K	EET CF	10/22/24 15:10

Client Sample ID: 4
Lab Sample ID: 310-293328-4
Date Collected: 10/22/24 10:30
Matrix: Solid
Date Received: 10/22/24 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	437142	A3GU	EET CF	10/22/24 17:17

Lab Chronicle

Client: Midwest Injection Inc
Project/Site: Monticello

Job ID: 310-293328-1

Client Sample ID: 4
Lab Sample ID: 310-293328-4
Date Collected: 10/22/24 10:30
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 9.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		10	437296	HE7K	EET CF	10/22/24 15:10

Client Sample ID: 5
Lab Sample ID: 310-293328-5
Date Collected: 10/22/24 10:35
Matrix: Solid
Date Received: 10/22/24 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	437142	A3GU	EET CF	10/22/24 17:17

Client Sample ID: 5
Lab Sample ID: 310-293328-5
Date Collected: 10/22/24 10:35
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 6.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		10	437296	HE7K	EET CF	10/22/24 15:10

Client Sample ID: 6
Lab Sample ID: 310-293328-6
Date Collected: 10/22/24 10:40
Matrix: Solid
Date Received: 10/22/24 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	437142	A3GU	EET CF	10/22/24 17:17

Client Sample ID: 6
Lab Sample ID: 310-293328-6
Date Collected: 10/22/24 10:40
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 9.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		10	437296	HE7K	EET CF	10/22/24 15:10

Client Sample ID: 7
Lab Sample ID: 310-293328-7
Date Collected: 10/22/24 10:45
Matrix: Solid
Date Received: 10/22/24 12:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	437142	A3GU	EET CF	10/22/24 17:17

Client Sample ID: 7
Lab Sample ID: 310-293328-7
Date Collected: 10/22/24 10:45
Matrix: Solid
Date Received: 10/22/24 12:20
Percent Solids: 7.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		10	437296	HE7K	EET CF	10/22/24 15:10

Lab Chronicle

Client: Midwest Injection Inc
Project/Site: Monticello

Job ID: 310-293328-1

Client Sample ID: Comp
Date Collected: 10/22/24 10:45
Date Received: 10/22/24 12:20

Lab Sample ID: 310-293328-8
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9040C		1	437165	W9YR	EET CF	10/23/24 07:32
Total/NA	Analysis	SM 2540G		1	437109	DGU1	EET CF	10/22/24 13:36

Client Sample ID: Comp
Date Collected: 10/22/24 10:45
Date Received: 10/22/24 12:20

Lab Sample ID: 310-293328-8
Matrix: Solid
Percent Solids: 4.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Soluble	Leach	DI Leach			437354	WZC8	EET CF	10/24/24 08:58
Soluble	Analysis	9056A		10	437699	HE7K	EET CF	10/24/24 14:09
Total/NA	Prep	3050B			437392	F5MW	EET CF	10/28/24 12:00
Total/NA	Analysis	6010D		1	438359	ZRI4	EET CF	10/31/24 18:44
Total/NA	Prep	3050B			437392	F5MW	EET CF	10/28/24 12:00
Total/NA	Analysis	6010D		1	438450	ZRI4	EET CF	11/01/24 14:40
Total/NA	Prep	7471B			437808	QTZ5	EET CF	10/29/24 16:35
Total/NA	Analysis	7471B		1	438109	QTZ5	EET CF	10/30/24 12:21
Total/NA	Prep	Distill/Ammonia			437220	A3GU	EET CF	10/23/24 10:39
Total/NA	Analysis	350.1		1	437314	ZJX4	EET CF	10/23/24 20:21
Total/NA	Prep	351.2			437322	W9YR	EET CF	10/24/24 06:58
Total/NA	Analysis	351.2		1	437492	ZJX4	EET CF	10/24/24 18:44
Total/NA	Prep	365.2/365.3/365			437200	HE7K	EET CF	10/23/24 09:51
Total/NA	Analysis	365.1		1	437311	ZJX4	EET CF	10/23/24 18:53

Client Sample ID: Geomean
Date Collected: 10/22/24 00:00
Date Received: 10/22/24 12:20

Lab Sample ID: 310-293328-9
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 9222D		1	437298	HE7K	EET CF	10/23/24 15:50

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Definitions/Glossary

Client: Midwest Injection Inc
Project/Site: Monticello

Job ID: 310-293328-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Midwest Injection Inc
Project/Site: Monticello

Job ID: 310-293328-1

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9040C		Solid	pH
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids
SM 9222D		Solid	Fecal Coliform (Geometric Mean)

Method Summary

Client: Midwest Injection Inc
Project/Site: Monticello

Job ID: 310-293328-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6010D	Metals (ICP)	SW846	EET CF
7471B	Mercury (CVAA)	SW846	EET CF
350.1	Nitrogen, Ammonia	EPA	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Phosphorus, Total	EPA	EET CF
9040C	pH	SW846	EET CF
Moisture	Percent Moisture	EPA	EET CF
SM 2540G	Total, Fixed, and Volatile Solids	SM	EET CF
SM 9222D	Coliforms, Fecal (Membrane Filter)	SM	EET CF
3050B	Preparation, Metals	SW846	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.2/365.3/365	Phosphorus, Total	EPA	EET CF
7471B	Preparation, Mercury	SW846	EET CF
DI Leach	Deionized Water Leaching Procedure	ASTM	EET CF
Distill/Ammonia	Distillation, Ammonia	None	EET CF

Protocol References:

ASTM = ASTM International
EPA = US Environmental Protection Agency
None = None
SM = "Standard Methods For The Examination Of Water And Wastewater"
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

eurofins | Environment Testing America

310-293328 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Midwest Injection

City/State: CITY | STATE IA | Project: Monticello

Receipt Information

Date/Time Received: 1022 | DATE 24 | TIME 1220 | Received By: [illegible]

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☑ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler?	☑ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☐ Yes	☑ No	*If yes:* Cooler # _____ of _____
Cooler Custody Seals Present?	☐ Yes	☑ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☑ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☑ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☑ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: U | Correction Factor (°C): 0.0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): | Corrected Temp (°C):

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:	250 mL NT	
Uncorrected Temp (°C):	9.9	
Corrected Temp (°C):	9.9	

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☑ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☒ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Document CED-P-SAM-FRM45521
Revision: 26
Date: 27 Jan 2022

Eurofins Cedar Falls

General temperature criteria is 0 to 6°C
Bacteria temperature criteria is 0 to 10°C

Chain of Custody Record 730820

eurofins | Environment Testing America

Address _____

Regulatory Program. ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TAL-8210

Client Contact	Project Manager	Site Contact	Date	COC No
Company Name Midwest Injection	Tel/Email	Lab Contact	Carrier	_____ of _____ COCs
Address	Analysis Turnaround Time			Sampler
City/State/Zip	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone	TAT if different from Below _____			Walk-in Client.
Fax	☐ 2 weeks			Lab Sampling
Project Name Montrello	☐ 1 week			
Site	☐ 2 days			Job / SDG No
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Fecal Coliform	503 regs	Geomean	Sample Specific Notes
1	10-22	1015						X			
2		1020						X			
3		20 1025						X			
4		1030						X			
5		1035						X			
6		1040						X			
7		1045						X			
									X		
Comp		1045							X		
Geomean										X	

Page 16 of 17

Preservation Used 1= Ice, 2= HCl 3= H_2SO_4; 4=HNO_3, 5=NaOH, 6= Other _____

Possible Hazard Identification
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No | Cooler Temp (°C) Obs'd _____ Corr'd _____ Therm ID No _____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by CC	Company 10-22-24	Date/Time 1220

11/4/2024

Login Sample Receipt Checklist

Client: Midwest Injection Inc

Job Number: 310-293328-1
SDG Number:

Login Number: 293328
List Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

REPORT NUMBER
24-290-0954
COMPLETED DATE
Oct 18, 2024
ACCOUNT
54202
RECEIVED DATE
Oct 16, 2024

Midwest Laboratories®
13611 B Street • Omaha, Nebraska 68144-3693 • (402) 334-7770
www.midwestlabs.com

TODAY'S DATE
Oct 18, 2024

Midwest Injection Inc
Chad Snapp
1621 MCCABE LANE
PO BOX 141
CASCADE IA 52033

IDENTIFICATION
MT VERNON L SHORE
SOLON IONIA WEBSTER CITY

SOIL ANALYSIS REPORT

NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)

LAB NUMBER *438*	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I. percent	RATE	PHOSPHORUS P_1 (WEAK BRAY) 1:7 ppm	RATE	PHOSPHORUS P_2 (STRONG BRAY) 1:7 ppm	RATE	OLSEN BICARBONATE P ppm	RATE	POTASSIUM K ppm	RATE	MAGNESIUM Mg ppm	RATE	CALCIUM Ca ppm	RATE	SODIUM Na ppm	RATE	pH SOIL pH 1:1	BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED) % K	% Mg	% Ca	% H	% Na
76453	1*see below	2.2	L	18	M	38	M	13	M	90	L	260	VH	2675	VH			7.5		15.8	1.5	13.7	84.8	0.0	
76454	2*	1.7	L	19	M	36	M			80	L	263	VH	2582	VH			7.4		15.3	1.3	14.3	84.4	0.0	

LAB NUMBER *438*	NITRATE-N (FIA) SURFACE ppm	SURFACE lbs/A	SURFACE depth (in)	SUBSOIL 1 ppm	SUBSOIL 1 lbs/A	SUBSOIL 1 depth (in)	SUBSOIL 2 ppm	SUBSOIL 2 lbs/A	SUBSOIL 2 depth (in)	Total lbs/A	SULFUR S ICAP ppm	RATE	ZINC Zn DTPA ppm	RATE	MANGANESE Mn DTPA ppm	RATE	IRON Fe DTPA ppm	RATE	COPPER Cu DTPA ppm	RATE	BORON B SORB. DTPA ppm	RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm	RATE
76453	8	14	0-6							14															
76454	7	13	0-6							13															

1 SHANNON MALOY IONIA; 2* MIKE KRAUS MONTICELLO;*

REV.10/17

The above analytical results apply only to the sample(s) submitted. Samples are retained a maximum of 30 days.

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Midwest Laboratories

Midwest Laboratories, Inc.
13611 B Street, Omaha, NE 68144
402-334-7770

2 1

43876453 – 43876454

ECORD

Account Number/ Company Name: 54202

Purchase Order: MT Vernon Lisbon Webster City Solon Ionia

Chain of Custody Record: Yes ☐ No ☐

Samples for Regulatory Use: Yes ☐ No ☐

REPORT & BILL TO	
Name: Midwest Injection	
Address:	
City, State:	ZIP:
Phone:	FAX:
Email:	

IDENTIFICATION
Client Name:
Sample ID:
Sample Date:
Sample Time:

COPY TO	
Name:	
Address:	
	ZIP:
Phone:	

PROJECT INFORMATION

PROJ. NO. | Project Name/ Company

COMPANY: (Signature)

SAMPLER: (Signature)

BOTTLE ORDER INFO / TESTS REQUESTED

SAMPLE ID/ LOCATION	DATE	TIME	COMP	GRAB	No. of Containers	Proper Preservation (Y/N)	Matrix	Regulatory (Y/N)	% Solids	SINA Soil					Lab Number/ Order # (Internal Use)
MT Vernon	10-10		✓		1		SL		✓						
MT Vernon	10-11		✓		1		SL		✓						
Solon	10-8		✓		1		SL		✓						
Solon	10-9		✓		1		SL		✓						
Lisbon	10-9		✓		1		SL		✓						
Lisbon	10-10		✓		1		SL		✓						
Shannon Maloy Ionia	10-10		✓		1		SO			✓					
Mike Kraus Monticello	10-10		✓		1		SO			✓					
Ionia	10-3		✓		1		SL		✓						
Ionia	10-4		✓		1		SL		✓						
Ionia	10-5		✓		1		SL		✓						
Ionia	10-6		✓		1		SL		✓						
Webster City	9-31		✓		1		SL		✓						
Webster City	10-1		✓		1		SL		✓						
Webster City	10-2		✓		1		SL		✓						

Relinquished by: (Signature) | Date/ Time | Received by: (Signature)

Relinquished by: (Sig

Relinquished by: (Sig

SPECIAL ANALYSIS REPORTED SEPARATELY

Soil

AP 10/10/24

Cooler arrived intact: Yes ☐ No ☐

Temperature on Arrival:

Preserved in Field: Yes ☐ No ☐

Remarks:

Chain of Custody will

Distribution: Original accompanies shipment; copy to Coordinator Field Files

Code: SO-Soil, WA-Water, SL-Sludge, OT-Other

*In the absence of specific instructions to the contrary, Midwest Laboratories will analyze your sample(s) using accredited test methods (when available).

RC FORM 02 V.2 - Effective 8.29.2017

REPORT NUMBER
25-115-4073

REPORT DATE
Apr 25, 2025

SEND TO
54202

RECEIVED DATE
Apr 23, 2025

Midwest Laboratories®
13611 B Street • Omaha, Nebraska 68144-3693 • (402) 334-7770
www.midwestlabs.com

ISSUE DATE
Apr 25, 2025

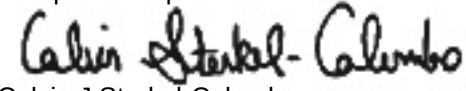
Midwest Injection Inc
Chad Snapp
1621 MCCABE LANE
CASCADE IA 52033

REPORT OF ANALYSIS

For: (54202) Midwest Injection Inc
Monticello, IA
Daily Percent Solids
Monticello, IA, Spring, Daily Percent Solids

Analysis	Level Found As Received	Level Found Dry Weight	Units	Reporting Limit	Method	Analyst-Date	Verified-Date
Sample ID: **Monticello % solids**	Lab Number: **70624292**		Date Sampled: **2025-04-07 1850**				
Percent solids	16.9		%	0.01	SM 2540 G-(2015) *	kpl8-2025/04/25	jsp9-2025/04/25
Sample ID: **Monticello % solids**	Lab Number: **70624293**		Date Sampled: **2025-04-08 1900**				
Percent solids	17.9		%	0.01	SM 2540 G-(2015) *	kpl8-2025/04/25	jsp9-2025/04/25

For questions please contact:



Calvin J Sterkel-Colombo
Account Manager
ccolombo@midwestlabs.com (402)829-9858

The result(s) issued on this report only reflect the analysis of the sample(s) submitted.

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70624292-293
Samples: 2 Page: 1/1
Evan Wragge
2025 04 23 13:21

SUBMITTAL FORM

Order Number: 5379914
Order Date: 2025-04-21 12:14:47
Submitted By: Chad Snapp

Account: 54202
Midwest Injection Inc
1621 MCCABE LANE
CASCADE, IA 52033

Sample Description: Monticello, IA
Sample Description 2: Daily Percent Solids
Project/PO Number: Monticello, IA, Spring, Daily Percent Solids
Safety Data Sheet Description: Sample Does Not Require Safety Data Sheet

SAMPLES FOR ANALYSIS

Biosolids

5379914-1
Sample ID: Monticello % solids
Time Sampled: 1850
Date Sampled: 2025-04-07
70624292

Comment: N/A
Analysis Requested:
Daily Percent Solids *(Percent solids)*

5379914-2
Sample ID: Monticello % solids
Time Sampled: 1900
Date Sampled: 2025-04-08
70624293

Comment: N/A
Analysis Requested:
Daily Percent Solids *(Percent solids)*

United States Department of Agriculture

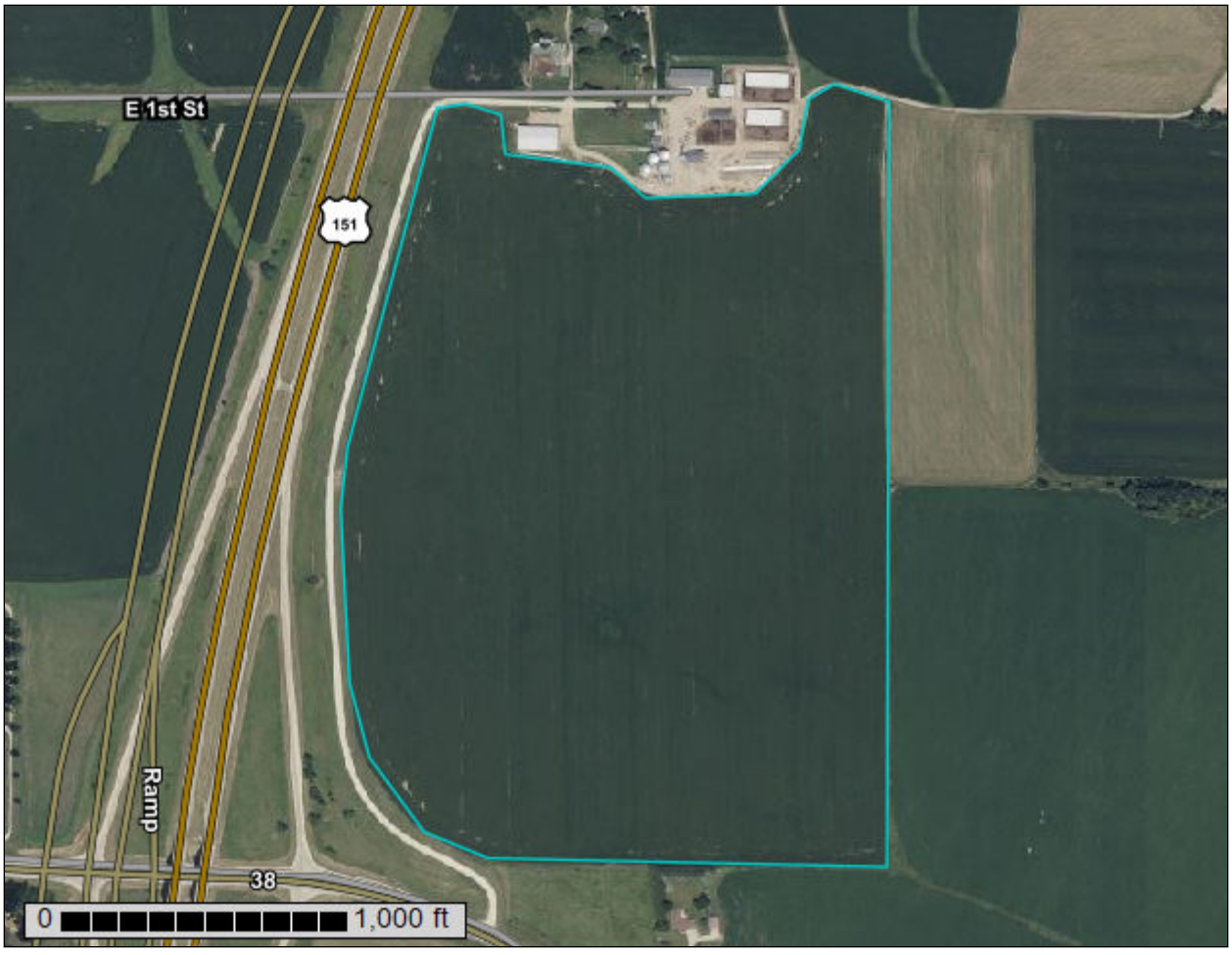
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Jones County, Iowa

Mike Kraus-East



July 9, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....11
Jones County, Iowa.....13
27B—Terril loam, 2 to 5 percent slopes.....13
120B—Tama silt loam, 2 to 5 percent slopes.....14
175B—Dickinson fine sandy loam, 2 to 5 percent slopes.....15
291B—Atterberry silt loam, 2 to 5 percent slopes.....16
293C—Chelsea-Fayette-Lamont complex, 2 to 9 percent slopes.....18
293D—Chelsea-Fayette-Lamont complex, 9 to 14 percent slopes.....20
981B—Worthen silt loam, 2 to 5 percent slopes.....23
P162B—Downs silt loam, paha, 2 to 5 percent slopes.....24
P162C2—Downs silt loam, paha, 5 to 9 percent slopes, eroded.....25
References.....27

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,860 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jones County, Iowa
Survey Area Data: Version 29, Aug 29, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 20, 2022—Aug 4, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
27B	Terril loam, 2 to 5 percent slopes	1.1	1.1%
120B	Tama silt loam, 2 to 5 percent slopes	32.3	31.5%
175B	Dickinson fine sandy loam, 2 to 5 percent slopes	4.2	4.1%
291B	Atterberry silt loam, 2 to 5 percent slopes	17.1	16.7%
293C	Chelsea-Fayette-Lamont complex, 2 to 9 percent slopes	4.3	4.2%
293D	Chelsea-Fayette-Lamont complex, 9 to 14 percent slopes	0.0	0.0%
981B	Worthen silt loam, 2 to 5 percent slopes	0.5	0.5%
P162B	Downs silt loam, paha, 2 to 5 percent slopes	18.1	17.7%
P162C2	Downs silt loam, paha, 5 to 9 percent slopes, eroded	24.8	24.2%
Totals for Area of Interest		**102.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different

management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Jones County, Iowa

27B—Terril loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2y8r1
Elevation: 520 to 1,310 feet
Mean annual precipitation: 23 to 41 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 155 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Terril and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terril

Setting

Landform: Alluvial fans, stream terraces, drainageways
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Convex, concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium over sandy and gravelly colluvium

Typical profile

Ap - 0 to 8 inches: loam
A1 - 8 to 23 inches: loam
A2 - 23 to 36 inches: loam
Bw - 36 to 50 inches: loam
BC - 50 to 71 inches: loam
2C - 71 to 79 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R104XY015IA - Terrace Savanna
Hydric soil rating: No

Minor Components

Waukee

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R104XY015IA - Terrace Savanna
Hydric soil rating: No

120B—Tama silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: fpmy
Elevation: 700 to 900 feet
Mean annual precipitation: 29 to 38 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 150 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Tama and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tama

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 46 inches: silty clay loam
H3 - 46 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R104XY005IA - Loamy Upland Prairie
Hydric soil rating: No

Minor Components

Atterberry

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R104XY007IA - Loamy Upland Savanna
Hydric soil rating: No

175B—Dickinson fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2vw4z
Elevation: 550 to 1,390 feet
Mean annual precipitation: 34 to 39 inches
Mean annual air temperature: 44 to 51 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dickinson and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dickinson

Setting

Landform: Stream terraces, dunes
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Sandy eolian deposits

Typical profile

Ap - 0 to 9 inches: fine sandy loam
A - 9 to 18 inches: fine sandy loam

Bw - 18 to 30 inches: fine sandy loam
BC - 30 to 36 inches: loamy sand
C - 36 to 79 inches: sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R108XC506IA - Sandy Upland Prairie
Hydric soil rating: No

Minor Components

Sparta

Percent of map unit: 5 percent
Landform: Stream terraces, dunes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R108XC506IA - Sandy Upland Prairie
Hydric soil rating: No

291B—Atterberry silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2yvk6
Elevation: 520 to 1,310 feet
Mean annual precipitation: 23 to 41 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 155 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Atterberry and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atterberry

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 14 inches: silt loam
BE - 14 to 17 inches: silt loam
Bt - 17 to 24 inches: silty clay loam
Btg - 24 to 48 inches: silty clay loam
BCg - 48 to 55 inches: silty clay loam
Cg - 55 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: R108XC517IA - Wet Loess Upland Flat Savanna
Hydric soil rating: No

Minor Components

Downs

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XC504IA - Loess Upland Savanna
Hydric soil rating: No

Walford

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve

Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R108XC517IA - Wet Loess Upland Flat Savanna
Hydric soil rating: Yes

293C—Chelsea-Fayette-Lamont complex, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2tgqs
Elevation: 710 to 1,070 feet
Mean annual precipitation: 36 to 38 inches
Mean annual air temperature: 47 to 49 degrees F
Frost-free period: 165 to 181 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chelsea and similar soils: 45 percent
Fayette and similar soils: 35 percent
Lamont and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chelsea

Setting

Landform: Dunes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian sands

Typical profile

Ap - 0 to 8 inches: loamy fine sand
E - 8 to 36 inches: fine sand
E and Bt - 36 to 70 inches: fine sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: R104XY011IA - Sandy Upland Savanna
Hydric soil rating: No

Description of Fayette

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 11 inches: silt loam
BE - 11 to 14 inches: silt loam
Bt1 - 14 to 26 inches: silty clay loam
Bt2 - 26 to 34 inches: silty clay loam
BC - 34 to 47 inches: silty clay loam
C - 47 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 8 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F108XC505IA - Loess Upland Woodland
Hydric soil rating: No

Description of Lamont

Setting

Landform: Dunes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

Ap - 0 to 8 inches: fine sandy loam

E, BE - 8 to 23 inches: fine sandy loam
Bt - 23 to 39 inches: fine sandy loam
BC - 39 to 53 inches: fine sandy loam
E and Bt - 53 to 79 inches: fine sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R104XY011IA - Sandy Upland Savanna
Hydric soil rating: No

293D—Chelsea-Fayette-Lamont complex, 9 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2tgqw
Elevation: 640 to 1,070 feet
Mean annual precipitation: 35 to 38 inches
Mean annual air temperature: 47 to 51 degrees F
Frost-free period: 165 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chelsea and similar soils: 45 percent
Fayette and similar soils: 35 percent
Lamont and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chelsea

Setting

Landform: Dunes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Eolian sands

Typical profile

Ap - 0 to 8 inches: loamy fine sand
E - 8 to 36 inches: fine sand
E and Bt - 36 to 70 inches: fine sand

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F108XC508IA - Sandy Upland Woodland
Hydric soil rating: No

Description of Fayette

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 11 inches: silt loam
BE - 11 to 14 inches: silt loam
Bt1 - 14 to 26 inches: silty clay loam
Bt2 - 26 to 34 inches: silty clay loam
BC - 34 to 47 inches: silty clay loam
C - 47 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 8 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F108XC505IA - Loess Upland Woodland
Hydric soil rating: No

Description of Lamont

Setting

Landform: Dunes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

Ap - 0 to 8 inches: fine sandy loam
E, BE - 8 to 23 inches: fine sandy loam
Bt - 23 to 39 inches: fine sandy loam
BC - 39 to 53 inches: fine sandy loam
E and Bt - 53 to 79 inches: fine sand

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F108XC508IA - Sandy Upland Woodland
Hydric soil rating: No

981B—Worthen silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: fpsl
Elevation: 340 to 1,360 feet
Mean annual precipitation: 27 to 38 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 40 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Worthen and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Worthen

Setting

Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 21 inches: silt loam
H2 - 21 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 13.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R104XY015IA - Terrace Savanna
Hydric soil rating: No

Minor Components

Downs

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XC504IA - Loess Upland Savanna
Hydric soil rating: No

P162B—Downs silt loam, paha, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2tgrs
Elevation: 610 to 1,160 feet
Mean annual precipitation: 35 to 38 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 170 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Downs and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Downs

Setting

Landform: Pahas
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 12 inches: silt loam
BE - 12 to 17 inches: silt loam
Bt1 - 17 to 24 inches: silty clay loam
Bt2 - 24 to 33 inches: silty clay loam
BC - 33 to 47 inches: silt loam
C1 - 47 to 65 inches: silt loam
C2 - 65 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 8 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R108XC504IA - Loess Upland Savanna
Hydric soil rating: No

Minor Components

Tallula

Percent of map unit: 5 percent
Landform: Pahas
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R104XY005IA - Loamy Upland Prairie
Hydric soil rating: No

P162C2—Downs silt loam, paha, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2tgrv
Elevation: 670 to 1,200 feet
Mean annual precipitation: 34 to 39 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 170 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Downs, eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Downs, Eroded

Setting

Landform: Pahas
Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 6 inches: silt loam
BE - 6 to 12 inches: silt loam
Bt1 - 12 to 24 inches: silty clay loam
Bt2 - 24 to 33 inches: silty clay loam
BC - 33 to 47 inches: silt loam
C1 - 47 to 65 inches: silt loam
C2 - 65 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 8 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R108XC504IA - Loess Upland Savanna
Hydric soil rating: No

Minor Components

Tallula, eroded

Percent of map unit: 5 percent
Landform: Pahas
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R104XY005IA - Loamy Upland Prairie
Hydric soil rating: No

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