STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law (Chapter 644 RSMo, hereinafter, the Law)

Permit No.	MO-0002828
Owner:	Dairy Farmers of America, Inc.
Address:	1405 North 98th Street, Kansas City, KS 66111
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Dairy Farmers of America, Cabool, MO
Address:	958 Shelton Street, Cabool, MO 65689
Legal Description:	See following pages
Latitude/Longitude:	See following pages
Receiving Stream:	See following pages
First Classified Stream and ID:	See following pages
USGS Basin & Sub-watershed No:	See following pages

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Industrial no-discharge; SIC #2086, #2023; NAICS #312111, #311514; This permit authorizes the land application of sludge removed in the pretreatment system. Wastewater passes through a pretreatment system and is discharged to the Cabool Wastewater Treatment Plant pursuant to a local pretreatment agreement. Sludge generated from the intermediate clarifier or the dissolved air flotation (DAF) unit passes through a waste clarifier and is stored in two sludge storage tanks, and is land applied. The two steel sludge storage tanks have an overflow pipe that routes sludge back into the pretreatment system in the event that sludge levels exceed the capacity of the tanks and is pretreated and discharged through the existing pretreatment agreement. This facility does not require a certified wastewater operator per 10 CSR 20-9.030 as this facility is privately owned. Domestic wastewater is managed by sending to POTW/in a sub-surface system <3000 gallons/day. Discharges of stormwater are authorized under a separate permit, MOR130154.

This permit authorizes only land application under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas.

October 1, 2022
Effective Date

September 30, 2027
Expiration Date

Chris Wieberg
Chris Wieberg, Director, Water Protection Program

FACILITY DESCRIPTION (CONTINUED)

PERMITTED FEATURE #005 – Sludge Holding Tanks; Sludge; discharge is prohibited.

Legal Description:	NW ¼, SW ¼, Sec. 12, T28N, R11W, Texas County
UTM Coordinates:	X = 579726, Y= 4108564
Receiving Stream if Discharged:	Tributary to Big Piney River
First Classified Stream and ID:	100K Extent-Remaining Stream (C) WBID# 3960
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0101)
Storage Tank #1	
Storage Capacity, Maximum Volume:	80,000 gallons
Storage Capacity, Minimum Time:	20 days
Storage Tank #2	
Storage Capacity, Maximum Volume:	132,000 gallons
Storage Capacity, Minimum Time:	33 days

PERMITTED FEATURE #007 – Land Application Field BWB; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	NE¼, Sec.14, T28N, R11W, Texas County
UTM Coordinates (Centroid):	X = 579025, Y = 4107504
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0101)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	40 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #008 – Land Application Field BWC; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	N½, Sec.23, T28N, R11W, Texas County
UTM Coordinates (Centroid):	X = 578499, Y = 4105673
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0101)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	160 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #009 – Land Application Field JBA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	SW¼, Sec.26, T28N, R11W, Texas County
UTM Coordinates (Centroid):	X = 578285, Y = 4103478
USGS Basin & Sub-watershed No.:	North Fork White (11010006-0101)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	38 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

FACILITY DESCRIPTION (CONTINUED)

PERMITTED FEATURE #010 – Land Application Field JBB; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	SW¼, SW¼, Sec.25, T28N, R11W, Texas County
UTM Coordinates (Centroid):	X = 579762, Y = 4103366
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0101)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	65 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #011 – Land Application Field JWA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	N½, NW¼, Sec.20, T29N, R10W, Texas County
UTM Coordinates (Centroid):	X = 582954, Y = 4115851
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	58 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #012 – Land Application Field JWB; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	E½, SE¼, Sec.17, T29N, R10W, Texas County
UTM Coordinates (Centroid):	X = 583959, Y = 4116537
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	54 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #014 – Land Application Field JWE; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	W½, SW¼, Sec.9, T29N, R10W, Texas County
UTM Coordinates (Centroid):	X = 584267, Y = 4118083
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	38 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

FACILITY DESCRIPTION (CONTINUED)

PERMITTED FEATURE #016 – Land Application Field KFA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	N½, NW¼, Sec.29, T28N, R12W, Wright County
UTM Coordinates (Centroid):	X = 563806, Y = 4104837
USGS Basin & Sub-watershed No.:	North Fork White (11010006-0201)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	45 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #017 – Land Application Field TEA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	SW¼ , Sec.9, T29N, R10W, Texas County
UTM Coordinates (Centroid):	X = 584348, Y = 4118730
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	23 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #018 – Land Application Field JRA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	W½, Sec.29, T28N, R12W, Wright County
UTM Coordinates (Centroid):	X = 563797, Y = 4104230
USGS Basin & Sub-watershed No.:	North Fork White (11010006-0201)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	32 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #019 – Land Application Field JGA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	NE¼, Sec.13, T28N, R11W, Texas County
UTM Coordinates (Centroid):	X = 580649, Y = 4107558
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	12 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

FACILITY DESCRIPTION (CONTINUED)

PERMITTED FEATURE #020 – Land Application Field STA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	E½, Sec.14, T28N, R11W, Texas County
UTM Coordinates (Centroid):	X = 579055, Y = 4107162
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	72 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #021 – Land Application Field STB; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	SE¼, Sec.18, T29N, R9W, Texas County
UTM Coordinates (Centroid):	X = 577057, Y = 4116270
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	88 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #022 – Land Application Field GEA; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	E½, Sec.10, T29N, R11W, Texas County
UTM Coordinates (Centroid):	X = 577424, Y = 4118479
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	125 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

PERMITTED FEATURE #023 – Land Application Field GEB; land applied sludge or solids must meet an agronomic use as identified below.

Legal Description:	S½, Sec.3, T29N, R11W, Texas County
UTM Coordinates (Centroid):	X = 577020, Y = 4120329
USGS Basin & Sub-watershed No.:	Big Piney (10290202-0103)
Application Rate Basis:	PAN
Vegetation Type:	Pasture
Equipment Type:	Tank Truck
Sludge Applied:	21,000 gallons/acre/application (typical application amounts; however, may vary based on site-specific field conditions)
Application Area:	20 usable acres
Application Period:	90-120 days (typical application period) / 365 days (maximum dependent upon suitable days per calendar year)

A. SLUDGE QUALITY MONITORING REQUIREMENTS

PERMITTED FEATURE #005 *no discharge sludge storage tanks*	**TABLE A-1** **NO DISCHARGE: FINAL MONITORING REQUIREMENTS**

The facility is not authorized to discharge from this feature. The final requirements shall become effective on **October 1, 2022** and remain in effect until expiration of the permit. This feature shall be monitored and operationally controlled by the facility as specified below:

MONITORING PARAMETERS	UNITS	MONITORING REQUIREMENTS			
		DAILY MAXIMUM	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
Sludge Land Applied See (Note 1)					
pH	SU	*		once/year	grab
Total Kjeldahl Nitrogen as N	mg/L	*		once/year	grab
Ammonia Nitrogen as N	mg/L	*		once/year	grab
Nitrite plus Nitrate as N	mg/L	*		once/year	grab
Total Phosphorus as P	mg/L	*		once/year	grab
Percent Solids	percent	*		once/year	grab
Arsenic, Total Recoverable	mg/kg**	*		once/year	grab
Cadmium, Total Recoverable	mg/kg**	*		once/year	grab
Copper, Total Recoverable	mg/kg**	*		once/year	grab
Lead, Total Recoverable	mg/kg**	*		once/year	grab
Mercury, Total Recoverable	mg/kg**	*		once/year	grab
Molybdenum, Total Recoverable	mg/kg**	*		once/year	grab
Nickel, Total Recoverable	mg/kg**	*		once/year	grab
Selenium, Total Recoverable	mg/kg**	*		once/year	grab
Zinc, Total Recoverable	mg/kg**	*		once/year	grab

MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE JANUARY 28, 2023.
NO DISCHARGES ARE AUTHORIZED FROM THIS FEATURE

PERMITTED FEATURES #007-012, 014, & 016-023 *Land-App Fields*	**TABLE A-2 LAND APPLICATION LIMITATIONS AND MONITORING REQUIREMENTS**

The permittee is authorized to conduct land application of sludge as specified in the application of this permit. The final limitations shall become effective upon issuance and remain in effect until expiration of the permit. The land application of sludge shall be controlled, limited and monitored by the permittee as specified below:

MONITORING PARAMETERS	UNITS	MONITORING REQUIREMENTS			
		DAILY MAXIMUM	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
SLUDGE LAND APPLICATION OPERATIONAL MONITORING					
Application Area	Acres	*		daily	total
Application Rate	gal/acre	*		daily	total
Sludge Applied	Gallons	*		daily	total
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE NOVEMBER 28, 2022.					
Soil Monitoring					
pH†	SU	*		once/5 years	composite
Nitrate Nitrogen as N	mg/kg	*		once/5 years	composite
Available Phosphorus (Bray P-1 Method)	mg/kg	*		once/5 years	composite
Total Sodium	mg/kg	*		once/5 years	composite
Exchangeable Sodium	%	*		once/5 years	composite
MONITORING REPORTS SHALL BE SUBMITTED AS REQUIRED BY REPORT DUE ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE MARCH 28, 2027					

* Monitoring and reporting requirement only
** Dry weight basis. Monitoring is for metals ceiling concentrations for land application
† pH: the facility will report the minimum and maximum values; pH is not to be averaged.
Note 1 – Sludge that is land applied shall be sampled at the storage tanks or application vehicle. If no land application occurred during the report period, report as "No Application."

B. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Part I standard conditions dated August 1, 2014, respectively, and hereby incorporated as though fully set forth herein.

C. SPECIAL CONDITIONS

1. Spills, Overflows, and Other Unauthorized Discharges.
   (a) Any spill, overflow, or other discharge(s) not specifically authorized are unauthorized discharges.
   (b) Should an unauthorized discharge cause or permit any contaminants to discharge or enter waters of the state, the unauthorized discharge must be reported to the regional office as soon as practicable but no more than 24 hours after the discovery of the discharge. If the spill or overflow needs to be reported after normal business hours or on the weekend, the facility must call the Department's 24 hour spill line at 573-634-2436.

2. Electronic Discharge Monitoring Report (eDMR) Submission System. The NPDES Electronic Reporting Rule, 40 CFR Part 127, reporting of effluent monitoring data and any report required by the permit (unless specifically directed otherwise by the permit), shall be submitted via an electronic system to ensure timely, complete, accurate, and nationally consistent set of data for the NPDES program. The eDMR system is currently the only Department-approved reporting method for this permit unless specified elsewhere in this permit, or a waiver is granted by the Department. The facility must register in the Department's eDMR system through the Missouri Gateway for Environmental Management (MoGEM) before the first report is due. All reports uploaded into the system shall be reasonably named so they are easily identifiable, such as "WET Test Chronic Outfall 002 Jan 2023", or "Outfall004-DailyData-Mar2025".

3. Proper and continued operation and maintenance pursuant to 40 CFR 122.41(e). At all times the facility shall properly operate, maintain, and control all systems of treatment and control (and related appurtenances) which are installed or used by the facility to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a facility only when the operation is necessary to achieve compliance with the conditions of the permit.

4. The full implementation of this operating permit, which includes implementation of any applicable schedules of compliance, shall constitute compliance with all applicable federal and state statutes and regulations in accordance with 644.051.16 RSMo for permit shield, and the CWA §402(k) for toxic substances. This permit may be reopened and modified, or alternatively revoked and reissued to comply with any applicable effluent standard or limitation issued or approved under CWA §§301(b)(2)(C) and (D), §304(b)(2), and §307(a)(2), if the effluent standard or limitation so issued or approved contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or controls any pollutant not already limited in the permit. This permit may be modified, revoked and reissued, or terminated for cause, including determination new pollutants found in the discharge not identified in the application for the new or revised permit. The filing of a request by the facility for a permit modification, termination, notice of planned changes, or anticipated non-compliance does not stay any permit condition.

5. All permitted features must be clearly marked in the field.

6. Reporting of Non-Detects.
   (a) Compliance analysis conducted by the facility or any contracted laboratory shall be conducted in such a way the precision and accuracy of the analyzed result can be enumerated. See sufficiently sensitive test method requirements in Standard Conditions Part I, §A, No. 4 regarding proper testing and detection limits used for sample analysis. The reporting limits established by the laboratory must be below the lowest effluent limits established for the specified parameter (including any parameter's future limit after an SOC) in the permit unless the permit provides for an ML.
   (b) The facility shall not report a sample result as "non-detect" without also reporting the detection limit of the test or the reporting limit of the laboratory. Reporting "non-detect" without also including the detection/reporting limit will be considered failure to report, which is a violation of this permit.
   (c) For the daily maximum, the facility shall report the highest value; if the highest value was a non-detect, use the less than "<" symbol and the detection/reporting limit (e.g. <6).
   (d) When calculating monthly averages, zero shall be used in place of any value(s) not detected. Where all data used in the average are below the detection/reporting limit, the detection/reporting limit shall be reported as "<#" for the average as indicated in item (c).

7. Failure to pay fees associated with this permit is a violation of the Missouri Clean Water Law (644.055 RSMo).

8. This permit does not cover land disturbance activities.

9. This permit does not apply to fertilizer products receiving a current exemption under the Missouri Clean Water Law and regulations in 10 CSR 20-6.015(3)(B)8, and are land applied in accordance with the exemption.

10. This permit does not authorize in-stream treatment, the placement of fill materials in flood plains, placement of solid materials into any waterway, the obstruction of stream flow, or changing the channel of a defined drainage course.

11. All records required by this permit may be maintained electronically per 432.255 RSMo. These records should be maintained in a searchable format.

12. Changes in Discharges of Toxic Pollutant.
    In addition to the reporting requirements under 40 CFR 122.41, all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director per 40 CFR 122.42(a)(1) and (2) as soon as they know or have reason to believe:
    (a) An activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:
        (1) One hundred micrograms per liter (100 µg/L);
        (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile;
        (3) Five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol;
        (4) One milligram per liter (1 mg/L) for antimony;
        (5) Five (5) times the maximum concentration value reported for the pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or
        (6) The notification level established by the Department in accordance with 40 CFR 122.44(f).
    (b) Any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) Five hundred micrograms per liter (500 µg/L);
(2) One milligram per liter (1 mg/L) for antimony;
(3) Ten (10) times the maximum concentration value reported for the pollutant in the permit application in accordance with 40 CFR 122.21(g)(7).
(4) The level established by the Director in accordance with 40 CFR 122.44(f).

(c) Authorization of new or expanded pollutant discharges may be required under a permit modification or renewal, and may require an antidegradation review.

13. This permit does not authorize the facility to accept, treat, or discharge wastewater from other sources unless explicitly authorized herein. If the facility would like to accept, treat, or discharge wastewater from another activity or facility, the permit must be modified to include external wastewater pollutant sources in the permit.

14. Any discharges (or qualified activities such as land application) not expressly authorized in this permit, and not clearly disclosed in the permit application, cannot become authorized or shielded from liability under CWA section 402(k) or Section 644.051.16, RSMo, by disclosure to EPA, state, or local authorities after issuance of this permit via any means, including any other permit applications, funding applications, the SWPPP, discharge monitoring reporting, or during an inspection. Submit a permit modification application, as well as an antidegradation determination if appropriate, to request authorization of new or expanded discharges.

15. Renewal Application Requirements.
(a) This facility shall submit an appropriate and complete application to the Department no less than 180 days prior to the expiration date listed on page 1 of the permit.
(b) Application materials shall include complete Form A. If the form names have changed, the facility should ensure they are submitting the correct forms as required by regulation.
(c) This facility must submit Form R for land application of wastewater/industrial solids.
(d) The facility may use the electronic submission system to submit the application to the Program, if available.
(e) This facility must submit all soil testing with the application for permit renewal.

D. LAND APPLICATION CONDITIONS

1. Surficial land application of sludge materials listed in the Facility Description of this permit is authorized and shall be conducted according to the following conditions. These land application conditions do not apply to fertilizer products receiving a current exemption under the Missouri Clean Water Law and regulations in 10 CSR 20-6.015(3)(B)8, and are land applied in accordance with the exemption. The minimum application requirements enumerated here, when followed, exempt stormwater runoff sampling requirements pursuant to 10 CSR 20-6.200(2)(B)3.B.

2. Land Application Equipment Minimum Requirements
(a) Application equipment shall be visually inspected daily during land application to check for equipment malfunctions and leaks. The application system shall be operated so as to provide uniform distribution of wastes over the entire land application site.
(b) Equipment shall be calibrated at least once per calendar year to ensure even distribution of sludge.

3. Land Application Field(s) Minimum Requirements
(a) No land application shall occur when the soil or ground is frosted, frozen, snow covered, or saturated. Application activities shall cease if these conditions occur.
(b) There shall be no application during a precipitation event or if a precipitation event likely to create runoff is forecasted to occur within 24 hours of a planned application.
(c) Public Access Restrictions; this permit does not authorize application of wastewater to public use areas.
(d) Grazing and Harvesting Deferment.
(1) May 1 to October 31, the minimum grazing or forage harvest deferment shall be fourteen (14) days from application;
(2) November 1 to April 30, the minimum grazing or forage harvest deferment shall be thirty (30) days from application;
(3) If deferment period spans two timeframes, the minimum grazing or forage harvest deferment shall be thirty (30) days from most recent application.
(4) Lactating dairy animal grazing is generally not recommended for application areas unless there has been a much longer deferment period.
(e) Land application shall occur only during daylight hours unless nighttime application is necessary and the Water Protection Program has approved a nighttime application plan.
(f) Land application fields shall be checked daily during land application for runoff.
(g) Setback distances from sensitive features. There shall be no land application within:
(1) The 10 year floodplain;
(2) 50 feet inside of the property line, public road, or drainage ditch;

(3) 100 feet of any classified or unclassified gaining perennial or intermittent stream, any wetland, or any public or privately owned pond or lake;
(4) 150 feet of any dwelling, residence, public building, or public use area (excluding roadways);
(5) 300 feet of any potable water supply well not located on the property, adequate protections shall be implemented and maintained for any potable water supply well located within the application area;
(6) 300 feet from any sinkhole, losing stream, or any other physiographic structure with a conduit to groundwater;

4. Application Rate(s) and Loading
   (a) This permit does not authorize application of materials in concentrations known to cause, or having the potential to cause, phytotoxicity in plants per 10 CSR 20-6.015(4)1. If plant stress is observed, the facility may need to reduce application of sludge. If phytotoxicity is observed, the facility shall cease land application activities and evaluate the applied substances to determine the cause of phytotoxicity.
   (b) Applications shall not exceed any agronomic rates listed in the facility description to ensure plant use of nutrients and prevent contamination of surface and groundwater. The agronomic rate is the amount of sludge applied to a field to meet the fertilization needs of the plants.
   (c) Runoff and ponding is prohibited.
   (d) This permit does not authorize land disposal or the application of hazardous waste.
   (e) Application shall be conducted according to the following nutrient-based management practices for Nitrogen.
      (1) Plant Available Nitrogen (PAN) based application. The amount of sludge to be applied shall be adjusted annually based on the PAN calculation using the current sludge nutrient analysis and the following:
      (2) PAN = [Ammonia Nitrogen x volatilization factor*] + [Organic Nitrogen x 0.2] + [Nitrate Nitrogen]
      *Volatilization factor is 0.7 for surface application and 1 for subsurface application.

5. Soil Monitoring
   (a) Composite soil samples shall be collected every five years from each field listed in this permit where land application has occurred in the last 12 months. No land application shall occur on fields listed in this permit if soil sample results are more the five years old.
   (b) Soil sampling shall be in accordance with University of Missouri (MU) Guides G9215, Soil Sampling Pastures or G9217, Soil Sampling Hayfields and Row Crops or other methods approved by the Department. The recommendation of one composite sample per 20 acres in G9215 and G9217 is not required by this permit, however, this is a useful method to identify soil fertility fluctuations in large fields due to past management practices, soil type, and variability of crop yields. There shall be at least one composite sample per 80 acres.
   (c) Testing shall conform to Recommended Chemical Soil Testing Procedures for North Central Region (North Central Regional Research Publication 221 Revised), or Soil Testing in Missouri (MU Extension Guide EC923), or other methods approved by the Department.

6. Record Keeping. The following record keeping shall occur, be maintained for at least five years, and be made available to the Department upon request.
   (a) Daily land application log showing, at a minimum: date(s) of application, field identified, acres used, volume applied, weather condition (sunny, overcast, air temperature, etc), soil moisture condition, application method, and any runoff that occurred as a result of the application event and the location of the runoff;
   (b) Equipment inspections and calibration records;

7. Annual Report on Operation and Land Application. An annual report is required in addition to other reporting requirements under Section A of this permit. The annual report shall be submitted by January 28th of each year. The report shall include, but is not limited to, a summary of the following:
   (a) Record of maintenance and repairs during the year;
   (b) Description of any unusual operating conditions encountered, narrative summary of any problems or deficiencies identified, corrective action taken, or improvements planned;
   (c) Summary for each field used for land application showing: number of days application occurred, the crop grown, and total amount of sludge applied (gallons).
   (d) For fields where total nitrogen application exceeded 150 pounds per acre, the facility must submit PAN calculations to document the applied nitrogen was utilized.

E. NOTICE OF RIGHT TO APPEAL

If you were adversely affected by this decision, you may be entitled to pursue an appeal before the administrative hearing commission (AHC) pursuant to 621.250 and 644.051.6 RSMo. To appeal, you must file a petition with the AHC within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Any appeal should be directed to:

Administrative Hearing Commission
U.S. Post Office Building, Third Floor
131 West High Street, P.O. Box 1557
Jefferson City, MO 65102-1557
Phone: 573-751-2422
Fax: 573-751-5018
Website: https://ahc.mo.gov

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL OF
MO-0002828
DAIRY FARMERS OF AMERICA, CABOOL, MO

The Federal Water Pollution Control Act (Clean Water Act (CWA) §402 Public Law 92-500 as amended) established the National Pollutant Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (§301 of the Clean Water Act). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal Clean Water Act and Missouri Clean Water Law 644 RSMo as amended). MSOPs may also cover underground injection, non-discharging facilities, and land application facilities. Permits are issued for a period of five (5) years unless otherwise specified for less.

As per 40 CFR Part 124.8(a) and 10 CSR 20-6.020(1)(A)2. a factsheet shall be prepared to give pertinent information regarding applicable regulations, rationale for the development of limitations and conditions, and the public participation process for the Missouri State Operating Permit (MSOP or permit) listed below. A factsheet is not an enforceable part of a permit.

PART I. FACILITY INFORMATION

Facility Type: Industrial: No-discharge
SIC Code(s): 2086; 2023
NAICS Code(s): 312111; 311514
Application Date: 06/11/2021
Expiration Date: 12/31/2021
Last Inspection: 07/16/2019

FACILITY DESCRIPTION:
Dairy Farmers of America, Cabool, Missouri is a food manufacturing facility that utilizes dry and wet ingredients to blend into a variety of liquid drinks including infant formulas, adult nutritional and adult recreational. The mixture of dry and wet ingredients is blended, canned, sterilized, packaged and shipped from the facility. The facility also includes milk-condensing operations taking raw milk and pasteurizing, separating and condensing it for product ingredient use as well as outside customer sales. Items listed in the facility description, applicable to the operation maintenance, control, and resultant effluent quality are required to be enumerated in the facility description. The facility description ensures the facility continues to operate the sludge controls listed in the permit to preserve and maintain the sludge quality. Any planned changes to the facility (which changes the facility description) are required to be reported to the Department pursuant to 40 CFR 122.41(l)(1)(ii).

PERMITTED FEATURES TABLE:

PERMITTED FEATURE	TREATMENT LEVEL	EFFLUENT TYPE
#005, #007-012, #014, #016-#023	Land Application	Sludge

FACILITY PERFORMANCE HISTORY & COMMENTS:
The electronic discharge monitoring reports were reviewed for the last permit term. No exceedances were noted.

CONTINUING AUTHORITY:
Pursuant to 10 CSR 20-6.010(2)(A) and (E), the Department has received the appropriate continuing authority authorized signature from the facility. The Missouri Secretary of State continuing authority charter number for this facility is Z00000196; this number was verified by the permit writer to be associated with the facility and precisely matches the continuing authority reported by the facility.

Pursuant to 10 CSR 20-6.010(2)(B)4, this facility is a Level 4 Authority.
- ✓ Pursuant to 10 CSR 20-6.010(2)(D), the facility demonstrated non-response of the higher level authority under 10 CSR 20-6.010(2)(C)2.
  - ✓ This provision does not supersede or prohibit any domestic wastewater already routed, or proposed to be routed to the accepting wastewater treatment service. The acceptance of domestic wastewater does not meet the definition of becoming managed by a preferential higher authority.

- ✓ This provision does not prohibit pretreatment or industrial user negotiation this facility may have with the local accepting wastewater treatment service. An industrial user status is not a change of continuing authority. This facility may be subject to local limits applied by the accepting wastewater treatment facility.

OTHER ENVIRONMENTAL PERMITS:
In accordance with 40 CFR 122.21(f)(6), the Department evaluated other environmental permits currently held by this facility. This facility holds no other permits.

PART II. WATERSHED INFORMATION

WATERSHED TABLE:

PERMITTED FEATURE	WATERBODY NAME	CLASS	WBID	DESIGNATED USES	DISTANCE TO SEGMENT	12-DIGIT HUC
PF #005	Tributary to Big Piney River	n/a	n/a	GEN	0.0 mi	10290202-0101 Big Piney
	100K Extent-Remaining Stream	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	1.2 mi	

Classes are representations of hydrologic flow volume or lake basin size as defined in 10 CSR 20-7.031(1)(F). L1: Lakes with drinking water supply - wastewater discharges are not permitted to occur to L1 watersheds per 10 CSR 20-7.015(3)(C); L2: major reservoirs; L3: all other public and private lakes; P: permanent streams; C: streams which may cease flow in dry periods but maintain pools supporting aquatic life; E: streams which do not maintain surface flow; and W: wetlands. Losing streams are defined in 10 CSR 20-7.031(1)(O) and are designated on the losing stream dataset or determined by the Department to lose 30% or more of flow to the subsurface.

WBID: Waterbody Identification Number: Missouri Use Designation Dataset per 10 CSR 20-7.031(1)(Q) and (S) as 100K Extant-Remaining Streams or newer; data can be found as an ArcGIS shapefile on MSDIS at ftp://msdis.missouri.edu/pub/Inland_Water_Resources/MO_2014_WQS_Stream_Classifications_and_Use_shp.zip; New C streams described on the dataset per 10 CSR 20-7.031(2)(A)3 as 100K Extent Remaining Streams.

HUC: Hydrologic Unit Code https://water.usgs.gov/GIS/huc.html

Designated Uses:
10 CSR 20-7.031(1)(C)1: **ALP** – Aquatic Life Protection (formerly AQL); current uses are defined to ensure the protection and propagation of fish shellfish and wildlife, further subcategorized as: WWH – Warm Water Habitat; CLH – Cool Water Habitat; CDH – Cold Water Habitat; EAH – Ephemeral Aquatic Habitat; MAH – Modified Aquatic Habitat; LAH – Limited Aquatic Habitat. This permit uses ALP effluent limitations in 10 CSR 20-7.031 Table A1-B3 for all habitat designations unless otherwise specified.
10 CSR 20-7.031(1)(C)2: Recreation in and on the water
WBC is Whole Body Contact recreation where the entire body is capable of being submerged;
WBC-A – whole body contact recreation supporting swimming uses and has public access;
WBC-B – whole body contact recreation not included in WBC-A;
SCR = Secondary Contact Recreation (like fishing, wading, and boating)
10 CSR 20-7.031(1)(C)3 to 7:
HHP (formerly HHF) – Human Health Protection as it relates to the consumption of fish and drinking of water;
IRR – irrigation for use on crops utilized for human or livestock consumption, includes aquifers per 10 CSR 20-7.031(6)(A);
LWW – Livestock and Wildlife Watering (current narrative use is defined as LWP = Livestock and Wildlife Protection), includes aquifers per 10 CSR 20-7.031(6)(A);
DWS – Drinking Water Supply, includes aquifers per 10 CSR 20-7.031(6)(A);
IND – industrial water supply
10 CSR 20-7.031(1)(C)8 to 11: Wetlands (10 CSR 20-7.031 Tables A1-B3) do not have corresponding habitat use criteria for these defined uses: WSA – storm- and flood-water storage and attenuation; WHP – habitat for resident and migratory wildlife species; WRC – recreational, cultural, educational, scientific, and natural aesthetic values and uses; WHC – hydrologic cycle maintenance.
10 CSR 20-7.015(7) and 10 CSR 20-7.031(6): **GRW** = Groundwater

Other Applicable Criteria:
10 CSR 20-7.031(4): **GEN** – general criteria; acute toxicity criteria applicable to all waters even those lacking designated uses
10 CSR 20-7.031(5)(N)6: **NNC** – lake numeric nutrient criteria apply
Water Quality Standards Search https://apps5.mo.gov/mocwis_public/waterQualityStandardsSearch.do

WATERS OF THE STATE DESIGNATIONS:
Waters of the state are divided into seven categories per 10 CSR 20-7.015(1)(B)1 through 7. The applicable water of the state category is listed below. Missouri's technology-based effluent regulations are found in [10 CSR 20-7.015] and are implemented in 10 CSR 20-7.015(2) through (8). When implementing technology regulations, considerations are made for the facility type, discharge type, and category of waters of the state. Stormwater discharges and land application sites are not subject to limitations found in 10 CSR 20-7.015. Effluent limitation derivations are discussed in PART IV: EFFLUENTS LIMITS DETERMINATIONS.
- ✓ All other waters; identified at 10 CSR 20-7.015(B)7 and 10 CSR 20-7.015(8)

EXISTING WATER QUALITY & IMPAIRMENTS:
The waterbody(s) segment(s), upstream, and downstream confluence water quality for waters in the same watershed as the sludge holding tanks was reviewed. No relevant water quality data was available. The USGS https://waterdata.usgs.gov/nwis/sw or the Department's quality data database was reviewed. https://apps5.mo.gov/mocwis_public/wqa/waterbodySearch.do and https://apps5.mo.gov/wqa/ The Department's quality data database was reviewed. https://apps5.mo.gov/mocwis_public/wqa/waterbodySearch.do and https://apps5.mo.gov/wqa/ Impaired waterbodies which may be impacted by discharges from this facility were determined. Impairments include waterbodies on the 305(b) or 303(d) list and those waterbodies or watersheds under a TMDL. https://dnr.mo.gov/water/what-were-doing/water-planning/quality-standards-impaired-waters-total-maximum-daily-loads/tmdls Section 303(d) of the federal Clean Water Act requires each state identify waters not meeting water quality standards and for which adequate water pollution controls have not been required. https://dnr.mo.gov/water/what-were-doing/water-planning/quality-standards-impaired-waters-total-maximum-daily-loads/impaired-waters Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock, and wildlife. The 303(d) list helps state and federal agencies keep track of impaired waters not addressed by normal water pollution control programs. A TMDL is a calculation of the maximum amount of a given pollutant a water body can absorb before its water quality is affected; hence, the purpose of a TMDL is to determine the pollutant loading a specific waterbody can assimilate without exceeding water quality standards. If a water body is determined to be impaired as listed on the §303(d) list, then a watershed management plan or TMDL for that watershed may be developed. The TMDL shall include the WLA calculation.

✓ The permit writer has noted no upstream or downstream impairments near this facility.

WATERBODY MONITORING REQUIREMENTS:

✓ No waterbody monitoring requirements are recommended at this time.

WATERBODY MIXING CONSIDERATIONS:
This is a no discharge sludge land application permit. Thus, mixing considerations are not applicable.

PART III. RATIONALE AND DERIVATION OF PERMIT CONDITIONS

ANTIBACKSLIDING:
Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(l)] require a reissued permit to be as stringent as the previous permit with some exceptions. Backsliding (a less stringent permit limitation) is only allowed under certain conditions.

✓ Limitations in this operating permit reissuance conform to the anti-backsliding provisions of CWA §402(o), and 40 CFR 122.44.
- The previous permit's special conditions required sampling of total petroleum hydrocarbons (TPH) under the decision model to discharge stormwater having a sheen in secondary containment. The special condition has been revised in all permits beginning in 2015 to remove TPH as 40 CFR 136 does not contain any approved methods for the TPH parameter nor are there water quality standards for TPH. This permit requires oil and grease and BTEX (benzene, toluene, ethylbenzene, and xylene) sampling of the potentially contaminated stormwater in secondary containment. The facility need only sample for these constituents prior to release when a sheen or petroleum odor is present.
- The previous permit special condition stated: "Any pesticide discharge from any point source shall comply with the requirements of Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 136 et. seq.) and the use of such pesticides shall be in a manner consistent with its label."
  The permit writer has determined this special condition was outside the scope of NPDES permitting and was removed.
- The previous permit special condition indicated spills from hazardous waste substances must be reported to the department. However, this condition is covered under standard conditions therefore was removed from special conditions.

ANTIDEGRADATION REVIEW:
Process water discharges with new, altered, or expanding flows, the Department is to document, by means of antidegradation review, if the use of a water body's available assimilative capacity is justified. In accordance with Missouri's water quality regulations for antidegradation [10 CSR 20-7.031(3)], degradation may be justified by documenting the socio-economic importance of a discharge after determining the necessity of the discharge. Facilities must submit the antidegradation review request to the Department prior to establishing, altering, or expanding discharges. See https://dnr.mo.gov/document-search/antidegradation-implementation-procedure Per [10 CSR 20-7.015(4)(A)], new discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream, or connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

✓ Not applicable; this permit addresses no discharge land application of sludge. Therefore, antidegradation for new or expanded discharges does not apply.

COST ANALYSIS FOR COMPLIANCE (CAFCOM):
Pursuant to 644.145 RSMo, when incorporating a new requirement for discharges from publicly owned facilities, or when enforcing provisions of this chapter or the CWA, pertaining to any portion of a publicly owned facility, the Department shall make a finding of affordability on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the CWA. This process is completed through a CAFCom. Permits not including new requirements may be deemed affordable.

CHANGES IN DISCHARGES OF TOXIC POLLUTANT:
This special condition reiterates the federal rules found in 40 CFR 122.44(f) for technology treatments and 122.42(a)(1) for all other toxic substances. In these rules, the facility is required to report changes in amounts of toxic substances discharged. Toxic substances are defined in 40 CFR 122.2 as "…any pollutant listed as toxic under section 307(a)(1)" or, in the case of "sludge use or disposal practices," any pollutant identified in regulations implementing section 405(d) of the CWA." Section 307 of the clean water act then refers to those parameters listed in 40 CFR 401.15 and any other toxic parameter the Department determines is applicable for reporting under these rules in the permit. The facility should also consider any other toxic pollutant in the discharge as reportable under this condition and must report all increases to the Department as soon as discovered in the effluent. The Department may open the permit to implement any required effluent limits pursuant to CWA §402(k) where sufficient data was not supplied within the application but was supplied at a later date by either the facility or other resource determined to be representative of the discharge, such as sampling by Department personnel.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.
✓ Not applicable; the facility is not currently under WPP enforcement action.

DISCHARGE MONITORING REPORTING – ELECTRONIC (EDMR) SUBMISSION SYSTEM:
The U.S. Environmental Protection Agency (EPA) promulgated a final rule on October 22, 2015, to modernize Clean Water Act reporting for municipalities, industries, and other facilities by requiring electronic data reporting. To comply with the federal rule, the Department is requiring all facilities to submit discharge monitoring data and reports online. To review historic data, the Department's database has a publically facing search engine, available at https://apps5.mo.gov/mocwis_public/dmrDisclaimer.do

Registration and other information regarding MoGEM can be found at https://dnr.mo.gov/mogem. Information about the eDMR system can be found at https://dnr.mo.gov/env/wpp/edmr.htm.The first user shall register as an Organization Official and the association to the facility must be approved by the Department. To access the eDMR system, use: https://apps5.mo.gov/mogems/welcome.action For assistance using the eDMR system, contact edmr@dnr.mo.gov or call 855-789-3889 or 573-526-2082. To assist the facility in entering data into the eDMR system, the permit describes limit sets designators in each table in Part A of the permit. Facility personnel will use these identifiers to ensure data entry is being completed appropriately. For example, M for monthly, Q for quarterly, A for annual, and others as identified.

Per 40 CFR 127.15 and 127.24, permitted facilities may request a temporary waiver for up to 5 years or a permanent waiver from electronic reporting from the Department. To obtain an electronic reporting waiver, a facility must first submit an eDMR Waiver Request form available on the Department's web page. A request must be made for each operating permit. An approved waiver is not transferable. The Department must review and notify the facility within 120 calendar days of receipt if the waiver request has been approved or rejected [40 CFR 124.27(a)]. During the Department review period as well as after a waiver is granted, the facility must continue submitting a hard-copy of any reports required by their permit. The Department will enter data submitted in hard-copy from those facilities allowed to do so, and electronically submit the data to the EPA on behalf of the facility.
✓ This facility has not been granted a waiver, nor would this facility qualify for a waiver.

DOMESTIC WASTEWATER, SLUDGE, AND BIOSOLIDS:
Domestic wastewater is defined as wastewater originating primarily from the sanitary conveyances of bathrooms and kitchens. Domestic wastewater excludes stormwater, wash water, animal waste, process and ancillary wastewater.
✓ Not applicable; this facility sends domestic wastewater to the City of Cabool's sewer and eventually to their permitted wastewater treatment facility (POTW), permit under MSOP No. MO-0026301.

Sewage sludge is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Biosolids are solid materials resulting from domestic wastewater treatment meeting federal and state criteria for productive use (i.e. fertilizer) and after having pathogens removed.
Additional information: http://extension.missouri.edu/main/DisplayCategory.aspx?C=74 (WQ422 through WQ449).
✓ Not applicable; the facility does not manage domestic wastewater on-site.

EMERGENCY DISCHARGE:
For non-discharging permits, some permits may allow a small amount of wastewater discharge under very specific circumstances.
✓ Not applicable; this permit does not contain conditions allowing emergency discharges.

FEDERAL EFFLUENT LIMITATION GUIDELINES:
Effluent Limitation Guidelines, or ELGs, are found at 40 CFR 400-499. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N These are limitations established by the EPA based on the SIC code and the type of work a facility is conducting. Most ELGs are for process wastewater and some address stormwater. Effluent guidelines are not always established for every pollutant present in a point source discharge. In many instances, EPA promulgates effluent guidelines for an indicator pollutant. Industrial facilities complying with the effluent guidelines for the indicator pollutant will also control other pollutants (e.g. pollutants with a similar chemical structure). For example, EPA may choose to regulate only one of several metals present in the effluent from an industrial category, and compliance with the effluent guidelines will ensure similar metals present in the discharge are adequately controlled. All are technology based limitations which must be met by the applicable facility at all times. Should Reasonable Potential be established for any particular parameter, and water-quality derived effluent limits are more protective of the receiving water's quality, the WQS will be used as the limiting factor in accordance with 40 CFR 122.44(d) and 10 CSR 20-7.015(9)(A).
✓ Not applicable; The facility does not have an associated ELG nor does it discharge wastewater.

GENERAL CRITERIA CONSIDERATIONS:
In accordance with 40 CFR 122.44(d)(1), effluent limitations shall be placed into permits for pollutants determined to cause, have reasonable potential to cause, or to contribute to, an excursion above any water quality standard, including narrative water quality criteria. In order to comply with this regulation, the permit writer has completed a reasonable potential determination on whether discharges have reasonable potential to cause, or contribute to an excursion of the general criteria listed in 10 CSR 20-7.031(4). In instances where reasonable potential exists, the permit includes limitations to address the reasonable potential. In discharges where reasonable potential does not exist, the permit may include monitoring to later determine the discharge's potential to impact the narrative criteria. Additionally, 644.076.1 RSMo, as well as Part I §D – Administrative Requirements of Standard Conditions included in this permit state it shall be unlawful for any person to cause or allow any discharge of water contaminants from any water contaminant or point source located in Missouri in violation of §§644.006 to 644.141 of the Missouri Clean Water Law or any standard, rule, or regulation promulgated by the commission. See Part IV for specific determinations.
✓ Not applicable; The facility does not discharge wastewater or sludge.

GROUNDWATER MONITORING:
Groundwater is a water of the state according to 644.016(27) RSMo, is subject to regulations at 10 CSR 20-7.015(7) and 10 CSR 20-7.031(6), and must be protected accordingly.
✓ Not applicable; This facility is not required to monitor groundwater for the water protection program.

LAND APPLICATION:
Land application is performed by facilities as an alternative to discharging. Authority to regulate these activities is pursuant to 644.026 RSMo. The Department implements requirements for these types of operations pursuant to 10 CSR 20-6.015(4)(A)1 which instructs the Department to develop permit conditions containing limitations, monitoring, reporting, and other requirements to protect soils, crops, surface waters, groundwater, public health, and the environment.
✓ The facility disclosed they land apply sludge using a truck.
✓ The wetted application area is the land area that is normally wetted by wastewater application. The wetted application area must be: 1. Located outside of flood-prone areas having a flood frequency greater than once every 10 years; 2. Established— A. At least one hundred fifty feet (150') from existing dwellings or public use areas, excluding roads or highways; B.

At least fifty feet (50') inside the property line; C. At least three hundred feet (300') from any sinkhole, losing stream, or other structure or physiographic feature that may provide direct connection between the ground water table and the surface; D. At least three hundred feet (300') from any existing potable water supply well not located on the property. Adequate protection shall be provided for wells located on the application site; E. One hundred feet (100') to wetlands, ponds, gaining streams (classified or unclassified; perennial or intermittent); and F. If an established vegetated buffer or the wastewater is disinfected, the setbacks established in subsections (A)–(E) above may be decreased if the applicant demonstrates the risk is mitigated. 3. Fenced, or if not fenced, provide in the construction permit application or the facility plan, the— A. Method of disinfection being utilized; B. Suitable barriers in place, or C. Details on how public access is limited and not expected to be present. (C) Preapplication Treatment. At a minimum, treatment prior to irrigation shall provide performance equivalent to that obtained from a primary wastewater lagoon cell designed and constructed in accordance with sections (3) and (4) of this rule, except that the lagoon depth may be increased to include wastewater storage in addition to the primary volume.Following is a list of helpful publications; while generally geared to biosolids and domestic sludge, these documents can show operators and facilities specific best management practices which may be important to their own operations.

- State and EPA Regulations for Domestic Wastewater Sludge and Biosolids https://extension.missouri.edu/publications/eq421
- Land Application of Septage https://extension.missouri.edu/publications/eq422
- Standards for Pathogens and Vectors https://extension.missouri.edu/publications/wq424
- Interpretation of Laboratory Analysis of Samples https://extension2.missouri.edu/wq429
- Biosolids Glossary of Terms https://extension2.missouri.edu/eq449

✓ Operations and Maintenance, and equipment resources:

- Collection and Storage https://extension2.missouri.edu/eq431
- Equipment for Off-Site Application https://extension2.missouri.edu/wq432
- Equipment for On-Site Land Application https://extension2.missouri.edu/wq433
- Operating Considerations for Equipment https://extension2.missouri.edu/wq434

✓ Land application of all pollutants must consider cumulative and average limits based on how the pollutant responds in the soil environment. Limits or monitoring requirements may reflect different monthly calculations based on pollutant behavior.

✓ The facility must follow the applicable application loading rates indicated in the permit's facility description and/or special conditions. The facility must follow the applicable loading rates in the permit's facility description for each land application area. This permit dictates the most conservative calculation will be used when determining application rates so that the most abundant pollutant is not over-applied.

✓ **Nitrogen Loading Rates** – sludge application rates should not exceed a nitrogen application rate of 150 pounds total nitrogen per acre per year.

✓ Fertilizer recommendations can also be obtained by using one of the following tools:

- The University of Missouri Extension online fertilizer recommendation calculator at http://soilplantlab.missouri.edu/soil/scripts/manualentry.aspx
- Land Applications Considerations (nutrient requirements for plant growth) https://extension.missouri.edu/publications/eq202
- Crop/Nutrient Considerations https://extension2.missouri.edu/eq430
- University of Missouri Nutrient Management Home Page: https://nmplanner.missouri.edu/
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Nutrient Management technical resources https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/ecoscience/mnm/?cid=stelprdb1044741

✓ Definitions used in the land application section of the permit can be found at 644.016 RSMo, 10 CSR 20-2, and 40 CFR 503.11.

✓ This permit does not authorize land disposal or the application of hazardous waste.

✓ Soils testing. The permit's special conditions stipulate soil testing for this facility. Soil testing is performed to ensure soil accumulation rates of the specified parameters are below established soil loading rates. By adhering to the soil sampling methodology and frequency, the Department can determine reasonable potential to cause or contribute to plant toxicity required under 10 CSR 20-6.015(4).

✓ Sludge testing. 40 CFR 503.16 indicates sludge testing frequency should be based on the amount of sludge applied annually. The Program has determined these frequencies to be a suitable guideline to other sludge or high-strength wastewater as well. Sludge sampling frequency for this permit was based on the following:

Amount of sewage sludge (metric tons)	US Tons	Liquid Gallons	Frequency
Greater than zero but < 290	+0 to 319.6	+0 to 76,609.9	once per year
≥ 290 but < 1,500	319.7 to 1653.4	76,610.0 to 396,258.1	once per quarter
≥ 1,500 but < 15,000	1653.5 to 16534.6	396,258.2 to 3,962,580.7	six times per year
≥ 15,000	≥ 16534.7	≥ 3,962,580.7	once per month

LAND DISTURBANCE:
Land disturbance, sometimes called construction activities, are actions which cause disturbance of the root layer or soil; these include clearing, grading, and excavating of the land. 40 CFR 122.26(b)(14) and 10 CSR 20-6.200(3) requires permit coverage for these activities. Coverage is not required for facilities when only providing maintenance of original line and grade, hydraulic capacity, or to continue the original purpose of the facility.

✓ Not applicable; this permit does not provide coverage for land disturbance activities. The facility may obtain a separate land disturbance permit (MORA) online at https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/stormwater/construction-land-disturbance MORA permits do not cover disturbance of contaminated soils, however, site specific permits such as this one can be modified to include appropriate controls for land disturbance of contaminated soils by adding site-specific BMP requirements and additional outfalls.

MAJOR WATER USER:
Any surface or groundwater user with a water source and the equipment necessary to withdraw or divert 100,000 gallons (or 70 gallons per minute) or more per day combined from all sources from any stream, river, lake, well, spring, or other water source is considered a major water user in Missouri. https://dnr.mo.gov/water/business-industry-other-entities/reporting/major-water-users All major water users are required by law to register water use annually (Missouri Revised Statutes Chapter 256.400 Geology, Water Resources and Geodetic Survey Section). https://dnr.mo.gov/document-search/frequently-asked-major-water-user-questions-pub2236/pub2236

✓ Not applicable; this facility cannot withdraw water from the state in excess of 70 gpm or 0.1 MGD.

MODIFICATION REQUESTS:
Facilities have the option to request a permit modification from the Department at any time under RSMo 644.051.9. Requests must be submitted to the Water Protection Program with the appropriate forms and fees paid per 10 CSR 20-6.011. It is recommended facilities contact the permit writer early so the correct forms and fees are submitted, and the modification request can be completed in a timely fashion. Minor modifications, found in 40 CFR 122.63, are processed without the need for a public comment period. Major modifications, those requests not explicitly fitting under 40 CFR 122.63, do require a public notice period. Modifications to permits should be completed when: a new pollutant is found in the discharge; operational or functional changes occur which affect the technology, function, or outcome of treatment; the facility desires alternate numeric benchmarks; or other changes are needed to the permit.

Modifications are not required when utilizing or changing additives in accordance with the publication https://dnr.mo.gov/document-search/additive-usage-wastewater-treatment-facilities-pub2653/pub2653 nor are required when a temporary change or provisional discharge has been authorized by the regional office. While provisional discharges may be authorized by the regional office, they will not be granted for more than the time necessary for the facility to obtain an official modification from the Water Protection Program. Temporary provisional discharges due to weather events or other unforeseen circumstances may or may not necessitate a permit modification. The facility may ask for a Compliance Assistance Visit (CAV) from the regional office to assist in the decision-making process; CAVs are provided free to the permitted entity.

NUTRIENT MONITORING:
Nutrient monitoring is required for facilities characteristically or expected to discharge nutrients (nitrogenous compounds and/or phosphorus) when the design flow is equal to or greater than 0.1 MGD per 10 CSR 20-7.015(9)(D)8. This requirement is applicable to all Missouri waterways.

✓ Not applicable; This facility is a no discharge sludge land application operation. There is no discharge.

Water quality standards per 10 CSR 20-7.031(5)(N) describe nutrient criteria requirements assigned to lakes (which include reservoirs) in Missouri, equal to or greater than 10 acres during normal pool conditions. The Department's Nutrient Criteria Implementation Plan (NCIP) may be reviewed at: https://dnr.mo.gov/document-search/nutrient-criteria-implementation-plan-july-27-2018 Discharges of wastewater in to lakes or lake watersheds designated as L1 (drinking water use) are prohibited per 10 CSR 20-7.015(3)(C).

✓ Not applicable; this facility does not discharge in a lake watershed or the lake is less than 10 acres, let alone discharge at all.

OIL/WATER SEPARATORS:
Oil water separator (OWS) tank systems are frequently found at industrial sites where process water and stormwater may contain oils and greases, oily wastewaters, or other immiscible liquids requiring separation. Food industry discharges typically require pretreatment prior to discharge to municipally owned treatment works. Per 10 CSR 26-2.010(2)(B), all oil water separator tanks must be operated according to best management practices and USTs may be authorized in NPDES permits per 10 CSR 26-2.010(2) or otherwise may be regulated as a petroleum tank. Sludge generated by OWS is a waste pursuant to 10 CSR 25-11.279 requiring specific management standards pursuant to self-implementing regulations of 40 CFR Part 279.

✓ Not applicable; this is a no discharge sludge land application operation. The facility has not disclosed the use of any oil water separators they wish to include under the NPDES permit at this facility, therefore oil water separator tanks are not authorized by this permit.

OPERATOR CERTIFICATION REQUIREMENTS:
Operators or supervisors of operations at regulated domestic wastewater treatment facilities shall be certified in accordance with 10 CSR 20-9 and any other applicable state law or regulation.

- ✓ Not applicable; this facility is not required to have a certified operator. This permit does not cover domestic wastewater or the domestic wastewater population equivalent (PE) is less than two hundred (200) individuals. Additionally, this facility is not owned or operated by a municipality, public sewer district, county, public water supply district, or private sewer company regulated by the Public Service Commission, or operated by a state or federal agency. Private entities are exempted from the population equivalent requirement unless the Department has reason to believe a certified operator is necessary.

PERMIT SHIELD:
The permit shield provision of the Clean Water Act (Section 402(k)) and Missouri Clean Water Law (644.051.16 RSMo) provides that when a permit holder is in compliance with its NPDES permit or MSOP, it is effectively in compliance with certain sections of the Clean Water Act, and equivalent sections of the Missouri Clean Water Law. In general, the permit shield is a legal defense against certain enforcement actions, but is only available when the facility is in compliance with its permit and satisfies other specific conditions, including having completely disclosed all discharges and all facility processes and activities to the Department at time of application. It is the facility's responsibility to ensure that all potential pollutants, waste streams, discharges, and activities, as well as wastewater land application, storage, and treatment areas, are all fully disclosed to the Department at the time of application or during the draft permit review process. Previous permit applications are not necessarily evaluated or considered during permit renewal actions. All relevant disclosures should be provided with each permit application, including renewal applications, even when the same information was previously disclosed in a past permit application. Subsequent requests for authorization to discharge additional pollutants, expanded or newly disclosed flows, or for authorization for previously unpermitted and undisclosed activities or discharges, will likely require an official permit modification, including another public participation process.

PRETREATMENT:
This permit does not regulate pretreatment requirements for facilities discharging to an accepting permitted wastewater treatment facility. If applicable, the receiving entity (the publicly owned treatment works - POTW) is to ensure compliance with any effluent limitation guidelines for pretreatment listed in 40 CFR Subchapter N per 10 CSR 20-6.100. Pretreatment regulations per 644.016 RSMo are limitations on the introduction of pollutants or water contaminants into publicly owned treatment works or facilities.

- ✓ Applicable, this facility does discharge industrial wastewater to a POTW. Domestic wastewater is not subject to pretreatment requirements.

REASONABLE POTENTIAL (RP):
Regulations per 10 CSR 20-7.015(9)(A)2 and 40 CFR 122.44(d)(1)(i) requires effluent limitations for all pollutants which are (or may be) discharged at a level causing or have the reasonable potential to cause (or contribute to) an in-stream excursion above narrative or numeric water quality standards. Per 10 CSR 20-7.031(4), general criteria shall be applicable to all waters of the state at all times; however, acute toxicity criteria may be exceeded by permit allowance in zones of initial dilution, and chronic toxicity criteria may be exceeded by permit allowance in mixing zones. If the permit writer determines any given pollutant has the reasonable potential to cause or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for the pollutant per 40 CFR Part 122.44(d)(1)(iii) and the most stringent limits per 10 CSR 20-7.031(9)(A).

Permit writers use reasonable potential determinations (RPD) as provided in Sections 3.1.2, 3.1.3, and 3.2 of the TSD. An RPD consists of evaluating visual observations, non-numeric information, or small amounts of numerical data (such as 1 data point supplied in the application). A stormwater RPD consists of reviewing application data and/or discharge monitoring data and comparing those data to narrative or numeric water quality criteria. RPD decisions are based on minimal numeric samples, the type of effluent proposed for discharge, or the unavailability of numerical RPA for a parameter, such as pH, or oil and grease. Absent effluent data, effluent limits are derived without consideration of effluent variability and is assumed to be present unless found to be absent to meet the requirements of antidegradation review found in 10 CSR 20-7.031(3) and reporting of toxic substances pursuant to 40 CFR 122.44(f).

Reasonable potential determinations are also performed for WET testing in wastewater. While no WET regulations specific to industrial wastewater exist, 40 CFR 122.21(j)(5) implies the following should be considered: 1) the variability of the pollutants; 2) the ratio of wastewater flow to receiving stream flow; and 3) current technology employed to remove toxic pollutants. Generally, sufficient data does not exist to mathematically determine RPA for WET, but permit writers compare the data for other toxic parameters in the wastewater with the necessity to implement WET testing with either monitoring or limits. When toxic parameters exhibit RP, WET testing is generally included in the permit. However, if all toxic parameters are controlled via limitations or have exhibited no toxicity in the past, then WET testing may be waived. Only in instances where the wastewater is well characterized can WET testing be waived. Permit writers do not implement WET testing for stormwater as 10 CSR 20-7.015(9)(L) does not apply to stormwater. Precipitation can itself be acidic, or may contain run-in from other un-controlled areas and can provide false positives. The Department works with the Missouri Department of Conservation and has understanding of streams already exhibiting toxicity; even without the influence of industrial wastewater or stormwater. Facilities discharging to streams with historic toxicity are required to use laboratory water for dilution, instead of the receiving stream.

Permit writers use the Department's permit writer's manual (https://dnr.mo.gov/water/business-industry-other-entities/technical-assistance-guidance/wastewater-permit-writers-manual), the EPA's permit writer's manual (https://www.epa.gov/npdes/npdes-permit-writers-manual), program policies, and best professional judgment. For each parameter in each permit, the permit writer carefully considers all applicable information regarding: technology based effluent limitations, effluent limitation guidelines, water quality standards, inspection reports, stream water quality information, stream flows, uses assigned to each waterbody, and all applicable site specific information and data gathered by the facility through discharge monitoring reports and renewal (or new) application sampling. Best professional judgment is based on the experience of the permit writer, cohorts in the Department and resources at the EPA, research, and maintaining continuity of permits if necessary. For stormwater permits, the permit writer is required per 10 CSR 6.200(6)(B)2 to consider: A. application and other information supplied by the facility; B. effluent guidelines; C. best professional judgment of the permit writer; D. water quality; and E. BMPs. Part IV provides specific decisions related to this permit.

Secondly, permit writers use mathematical reasonable potential analysis (RPA) using the *Technical Support Document for Water Quality Based Toxics Control (TSD)* methods (EPA/505/2-90-001) for continuous discharges. The TSD RPA method cannot be performed on stormwater as the flow is intermittent. See additional considerations under Part II WATERBODY MIXING CONSIDERATIONS and Part III WASTELOAD ALLOCATIONS. Wasteload allocations are determined utilizing the same equations and statistical methodology.

✓ No statistical RPAs were performed for this permit, as the permit addresses no discharge land application of sludge.

REGIONAL OFFICES (ROS):
Regional Offices will provide a compliance assistance visit at a facility's request; a regional map with links to phone numbers can be found here: https://dnr.mo.gov/about-us/division-environmental-quality/regional-office. Or use https://dnr.mo.gov/compliance-assistance-enforcement to request assistance from the Region online.

RENEWAL REQUIREMENTS:
The renewal special condition permit requirement is designed to guide the facility to prepare and include all relevant and applicable information in accordance with 10 CSR 20-6.010(7)(A)-(C), and if applicable, federal regulations. The special condition may not include all requirements and requests for additional information may be made at the time of permit renewal under 644.051.13(5) RSMo and 40 CFR 122.21(h). Prior to submittal, the facility must review the entire submittal to confirm all required information and data is provided; it is the facility's responsibility to discern if additional information is required. Failure to fully disclose applicable information with the application or application addendums may result in a permit revocation per 10 CSR 20-6.010(8)(A) and may result in the forfeiture of permit shield protection authorized in 644.051.16 RSMo. Forms are located at: https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/wastewater

SAMPLING FREQUENCY JUSTIFICATION:
Sampling and reporting frequency was generally retained from previous permit. The frequency for measuring pH, total Kjeldahl nitrogen, ammonia, nitrite plus nitrate, total phosphorus, and percent solids in the sludge was reduced to once per year to align with the monitoring frequency for all other parameters for sludge.

SAMPLING TYPE JUSTIFICATION:
Sampling type was continued from the previous permit. The sampling types are representative of the sludge.

SCHEDULE OF COMPLIANCE (SOC):
A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, effluent limits, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. SOCs are allowed under 40 CFR 122.47 and 10 CSR 20-7.031(11) providing certain conditions are met. An SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed in accordance with 40 CFR 125.3.
- For a newly constructed facility in most cases per 644.029 RSMo. Newly constructed facilities must meet all applicable effluent limitations (technology and water quality) when discharge begins. New facilities are required to install the appropriate control technologies as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be specifically granted for conducting these activities.

In order to provide guidance in developing SOCs, and to attain a greater level of consistency, the Department issued a policy on development of SOCs on October 25, 2012. The policy provides guidance to permit writers on standard time frames for schedules for common activities, and guidance on factors to modify the length of the schedule.

✓ Not applicable; this permit does not contain a SOC.

SPILLS, OVERFLOWS, AND OTHER UNAUTHORIZED DISCHARGE REPORTING:
Per 260.505 RSMo, any emergency involving a hazardous substance must be reported to the Department's 24 hour Environmental Emergency Response hotline at (573) 634-2436 at the earliest possible moment after discovery. The Department may require the submittal of a written report detailing measures taken to clean up a spill. These reporting requirements apply whether or not the spill results in chemicals or materials leaving the permitted property or reaching waters of the state. This requirement is in addition to the noncompliance reporting requirement found in Standard Conditions Part I.
https://revisor.mo.gov/main/OneSection.aspx?section=260.500&bid=13989&hl=

Any other spills, overflows, or unauthorized discharges reaching waters of the state must be reported to the regional office during normal business hours, or after normal business hours, to the Department's 24 hour Environmental Emergency Response spill line at 573-634-2436.

SLUDGE – INDUSTRIAL:
Sludge is solid, semi-solid, or liquid residue generated during the treatment of industrial process or non-process wastewater in a treatment works; including but not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment process; scum and solids filtered from water supplies and backwashed; and any material derived from sludge. Sludge could also be derived from lagoon dredging or other similar maintenance activities. Certain oil sludge, like those from oil water separators, are subject to self-implementing federal regulations under 40 CFR 279 for used oils.

✓ Applicable; this permit authorizes land application of sludge in accordance with Part A and Part C. Special Conditions of this permit; see additional information below in Part IV.

STANDARD CONDITIONS:
The standard conditions Part I attached to this permit incorporate all sections of 10 CSR 20-6.010(8) and 40 CFR 122.41(a) through (n) by reference as required by law. These conditions, in addition to the conditions enumerated within the standard conditions should be reviewed by the facility to ascertain compliance with this permit, state regulations, state statutes, federal regulations, and the Clean Water Act.

STORMWATER PERMITTING: LIMITATIONS AND BENCHMARKS:
Because of the fleeting nature of stormwater discharges, the Department, under the direction of EPA guidance, has determined monthly averages are capricious measures of stormwater-only discharges. The *Technical Support Document for Water Quality Based Toxics Control* (EPA/505/2-90-001; 1991) §3.1 indicates most procedures within the document apply only to water quality based approaches, not end-of-pipe technology-based controls. Hence, stormwater-only outfalls will generally only contain a maximum daily limit (MDL), a benchmark, or a monitoring requirement as dictated by site specific conditions, the BMPs in place, the BMPs proposed, past performance of the facility, and the receiving water's current quality.

When a permitted feature or outfall consists of only stormwater, a benchmark may be implemented at the discretion of the permit writer, if there is no RP for water quality excursions.

✓ Not applicable; this permit addresses no discharge land application of sludge and does not have any stormwater-only outfalls.

SUFFICIENTLY SENSITIVE ANALYTICAL METHODS:
Please review Standard Conditions Part 1, §A, No. 4. The analytical and sampling methods used shall conform to the reference methods listed in 10 CSR 20-7.015 and/or 40 CFR 136 unless alternates are approved by the Department and incorporated within this permit. The facility shall use sufficiently sensitive analytical methods for detecting, identifying, and measuring the concentrations of pollutants. The facility shall ensure the selected methods are able to quantify the presence of pollutants in any given discharge at concentrations low enough to determine compliance with Water Quality Standards in 10 CSR 20-7.031 or effluent limitations unless provisions in the permit allow for other alternatives. The reporting limits established by the chosen laboratory must be below the lowest effluent limits established for the specified parameter (including any parameter's future limit after an SOC) in the permit unless the permit provides for an ML or if the facility provides a written rationale to the Department. It is the facility's responsibility to ensure the laboratory has adequate equipment and controls in place to quantify the pollutant. Inflated reporting limits will not be accepted by the Department if the reporting limit is above the parameter value stipulated in the permit. A method is "sufficiently sensitive" when; 1) the method quantifies the pollutant below the level of the applicable water quality criterion or; 2) the method minimum level is above the applicable water quality criterion, but the amount of pollutant in a facility's discharge is high enough the method detects and quantifies the level of pollutant in the discharge, or 3) the method has the lowest minimum level of the analytical methods approved under 10 CSR 20-7.015 and or 40 CFR 136. These methods are also required for parameters listed as monitoring only, as the data collected may be used to determine if numeric limitations need to be established. A facility is responsible for working with their contractors to ensure the analysis performed is sufficiently sensitive.

VARIANCE:
Per the Missouri Clean Water Law §644.061.4, variances shall be granted for such period of time and under such terms and conditions as specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141. Thermal variances are regulated separately and are found under 644.

✓ Not applicable; this permit is not drafted under premise of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010; definitions], the WLA is the maximum amount of pollutant each discharger is allowed to discharge into the receiving stream without endangering water quality. Only streams with available load allocations can be granted discharge allowances. Outfalls afforded mixing allocations provide higher limits because the receiving stream is able to accept more pollutant loading without causing adverse impacts to the environment or aquatic life.

✓ Not applicable, this is a no-discharge permit therefore WLAs were not calculated.

WASTELOAD ALLOCATION (WLA) MODELING:
Facilities may submit site specific studies to better determine the site specific wasteload allocations applied in permits.

✓ Not applicable; a WLA study does not apply since this is a no discharge permit.

WATER QUALITY STANDARD REVISION:
In accordance with 644.058 RSMo, the Department is required to utilize an evaluation of the environmental and economic impacts of modifications to water quality standards of twenty-five percent or more when making individual site-specific permit decisions.

✓ Not applicable; This operating permit does not contain requirements for a water quality standard changing twenty-five percent or more since the previous operating permit.

PART IV. SLUDGE QUALITY AND LAND APPLICATION MONITORING DETERMINATIONS

PERMITTED FEATURE #005 – SLUDGE QUALITY MONITORING

SLUDGE QUALITY MONITORING TABLE:

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	MINIMUM REPORTING FREQUENCY	SAMPLE TYPE
CONVENTIONAL							
pH †	SU	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
PERCENT SOLIDS	%	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
METALS							
ARSENIC, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
CADMIUM, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
COPPER, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
LEAD, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
MERCURY, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
MOLYBDENUM, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
NICKEL, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
SELENIUM, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
ZINC, TOTAL RECOVERABLE	mg/kg	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
NUTRIENTS							
AMMONIA, NITROGEN AS N	mg/L	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
NITRATE/NITRITE AS N	mg/L	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
TOTAL KJELDAHL NITROGEN	mg/L	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB
TOTAL PHOSPHORUS AS P	mg/L	*	-	SAME	ONCE/YEAR	ONCE/YEAR	GRAB

* monitoring and reporting requirement only
† report the minimum and maximum pH values; pH is not to be averaged

SLUDGE QUALITY MONITORING DERIVATION OF REQUIREMENTS:
A sample is required annually even if no land application took place.

CONVENTIONAL:

pH
Monitoring only for sludge. Continued from previous permit.

Percent Solids
Monitoring only. Monitoring for Percent Solids is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

METALS:

Arsenic, Total; Cadmium, Total; Copper, Total; Lead, Total; Mercury, Total; Molybdenum, Total; Nickel, Total; Selenium, Total; Zinc, Total
These metals are continued from the previous permit. Monitoring is required to ensure the land application system does not have reasonable potential to cause or contribute to phytotoxicity pursuant to 10 CSR 20-6.015(4).

NUTRIENTS:

Ammonia, Nitrogen as N
Monitoring only. Monitoring for Ammonia, Nitrogen as N is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

Nitrate/Nitrite as N
Monitoring only. Monitoring for Nitrate plus Nitrite as N is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

Total Kjeldahl, Nitrogen
Monitoring only. Monitoring for Total Kjeldahl, Nitrogen is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

Total Phosphorus
Monitoring only. Monitoring for Total Phosphorus is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

PERMITTED FEATURE #007-012, 014, & 016-023 – LAND APPLICATION OPERATIONAL MONITORING

IRRIGATION OPERATIONS TABLE:

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	MINIMUM REPORTING FREQUENCY	SAMPLE TYPE
SLUDGE LAND APPLICATION ACTIVITY							
APPLICATION AREA	ACRES	*	-	SAME	ONCE/DAY ♠	ONCE/QUARTER	TOTAL
APPLICATION RATE	GAL/ACRE	*	-	SAME	ONCE/DAY ♠	ONCE/QUARTER	TOTAL
SLUDGE APPLIED	GALLONS	*	-	SAME	ONCE/DAY ♠	ONCE/QUARTER	TOTAL
SOIL MONITORING							
PH †	SU	*	-	SAME	ONCE/5 YEARS	ONCE/5 YEARS	COMPOSITE
NITRATE, NITROGEN AS N	MG/KG	*	-	SAME	ONCE/5 YEARS	ONCE/5 YEARS	COMPOSITE
AVAILABLE PHOSPHORUS (BRAY P-1 METHOD)	MG/KG	*	-	SAME	ONCE/5 YEARS	ONCE/5 YEARS	COMPOSITE
TOTAL SODIUM	MG/KG	*	-	SAME	ONCE/5 YEARS	ONCE/5 YEARS	COMPOSITE
EXCHANGEABLE SODIUM	%	*	-	SAME	ONCE/5 YEARS	ONCE/5 YEARS	COMPOSITE

♠ Facility will maintain records for each day land application occurred. If no application occurred, a record is not required.

LAND APPLICATION OPERATIONAL MONITORING:

Land Application Activity

Application Area
Recording and reporting requirement only. In order to determine compliance with 10 CSR 20-6.015 and 10 CSR 20-8.200, reporting the area utilized will allow the Department to ensure compliance with setback distances. Adhering to the required setbacks prevents illicit discharges to waterbodies.

Application Rate
Recording and reporting requirement only. In order to determine compliance with 10 CSR 20-6.015 and 10 CSR 20-8.200, monitoring the rate will allow the Department to ensure appropriate permeability and plant uptake is occurring. Rates of application must be adjusted based on soil saturation; and rate monitoring will prevent soil saturation conditions possibly resulting in runoff or illicit discharges to waterbodies.

Sludge Applied
Recording and reporting requirement only. In order to determine compliance with 10 CSR 20-6.015 and 10 CSR 20-8.200, monitoring of application activity is required. Monitoring the amount of sludge applied will allow the Department to ensure over application does not occur

Soil Monitoring

pH
Monitoring requirement only. Monitoring for pH is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

Nitrate, Nitrogen as N
Monitoring requirement only. Monitoring for Nitrate, Nitrogen as N is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

Available Phosphorus
Monitoring requirement only. Monitoring for Total Phosphorus is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

Total Sodium
Monitoring requirement only. Monitoring for Total Sodium is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

Exchangeable Sodium
Monitoring requirement only. Monitoring for Exchangeable Sodium is included to determine nutrient loading rates on the land application fields. [10 CSR 20-8.020(15)(F)7.]

PART V. ADMINISTRATIVE REQUIREMENTS

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PUBLIC NOTICE:
The Department shall give public notice a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in or with concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and facility must be notified of the denial in writing. https://dnr.mo.gov/water/what-were-doing/public-notices The Department must issue public notice of a pending operating permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wishing to submit comments regarding this proposed operating permit, please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments. All comments must be in written form.

- ✓ The Public Notice period for this operating permit started August 12, 2022 and ended September 12, 2022. No comments were received.

DATE OF FACT SHEET: JUNE 13, 2022
COMPLETED BY:
KYLE O'ROURKE, ENVIRONMENTAL SCIENTIST
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
OPERATING PERMITS SECTION - INDUSTRIAL UNIT
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STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION
REVISED
AUGUST 1, 2014

These Standard Conditions incorporate permit conditions as required by 40 CFR 122.41 or other applicable state statutes or regulations. These minimum conditions apply unless superseded by requirements specified in the permit.

Part I – General Conditions
Section A – Sampling, Monitoring, and Recording

1. **Sampling Requirements.**
   a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
   b. All samples shall be taken at the outfall(s) or Missouri Department of Natural Resources (Department) approved sampling location(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.

2. **Monitoring Requirements**.
   a. Records of monitoring information shall include:
      i. The date, exact place, and time of sampling or measurements;
      ii. The individual(s) who performed the sampling or measurements;
      iii. The date(s) analyses were performed;
      iv. The individual(s) who performed the analyses;
      v. The analytical techniques or methods used; and
      vi. The results of such analyses.
   b. If the permittee monitors any pollutant more frequently than required by the permit at the location specified in the permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring shall be included in the calculation and reported to the Department with the discharge monitoring report data (DMR) submitted to the Department pursuant to Section B, paragraph 7.

3. **Sample and Monitoring Calculations.** Calculations for all sample and monitoring results which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in the permit.

4. **Test Procedures**. The analytical and sampling methods used shall conform to the reference methods listed in 10 CSR 20-7.015 unless alternates are approved by the Department. The facility shall use sufficiently sensitive analytical methods for detecting, identifying, and measuring the concentrations of pollutants. The facility shall ensure that the selected methods are able to quantify the presence of pollutants in a given discharge at concentrations that are low enough to determine compliance with Water Quality Standards in 10 CSR 20-7.031 or effluent limitations unless provisions in the permit allow for other alternatives. A method is "sufficiently sensitive" when; 1) the method minimum level is at or below the level of the applicable water quality criterion for the pollutant or, 2) the method minimum level is above the applicable water quality criterion, but the amount of pollutant in a facility's discharge is high enough that the method detects and quantifies the level of pollutant in the discharge, or 3) the method has the lowest minimum level of the analytical methods approved under 10 CSR 20-7.015. These methods are also required for parameters that are listed as monitoring only, as the data collected may be used to determine if limitations need to be established. A permittee is responsible for working with their contractors to ensure that the analysis performed is sufficiently sensitive.

5. **Record Retention.** Except for records of monitoring information required by the permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

6. **Illegal Activities.**
   a. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under the permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two (2) years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or both.
   b. The Missouri Clean Water Law provides that any person or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than six (6) months, or by both. Second and successive convictions for violation under this paragraph by any person shall be punished by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.

Section B – Reporting Requirements

1. **Planned Changes.**
   a. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility when:
      i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
      ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42;
      iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;
      iv. Any facility expansions, production increases, or process modifications which will result in a new or substantially different discharge or sludge characteristics must be reported to the Department 60 days before the facility or process modification begins. Notification may be accomplished by application for a new permit. If the discharge does not violate effluent limitations specified in the permit, the facility is to submit a notice to the Department of the changed discharge at least 30 days before such changes. The Department may require a construction permit and/or permit modification as a result of the proposed changes at the facility.

2. **Non-compliance Reporting.**
   a. The permittee shall report any noncompliance which may endanger health or the environment. Relevant information shall be provided orally or via the current electronic method approved by the Department, within 24 hours from the time the permittee becomes aware of the circumstances, and shall be reported to the appropriate Regional Office during normal business hours or the Environmental Emergency Response hotline at 573-634-2436 outside of normal business hours. A written submission shall also be provided within five (5) business days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

b. The following shall be included as information which must be reported within 24 hours under this paragraph.
   i. Any unanticipated bypass which exceeds any effluent limitation in the permit.
   ii. Any upset which exceeds any effluent limitation in the permit.
   iii. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit required to be reported within 24 hours.

c. The Department may waive the written report on a case-by-case basis for reports under paragraph 2. b. of this section if the oral report has been received within 24 hours.

3. **Anticipated Noncompliance**. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The notice shall be submitted to the Department 60 days prior to such changes or activity.

4. **Compliance Schedules.** Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date. The report shall provide an explanation for the instance of noncompliance and a proposed schedule or anticipated date, for achieving compliance with the compliance schedule requirement.

5. **Other Noncompliance.** The permittee shall report all instances of noncompliance not reported under paragraphs 2, 3, and 6 of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph 2. a. of this section.

6. **Other Information**. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

7. **Discharge Monitoring Reports.**
   a. Monitoring results shall be reported at the intervals specified in the permit.
   b. Monitoring results must be reported to the Department via the current method approved by the Department, unless the permittee has been granted a waiver from using the method. If the permittee has been granted a waiver, the permittee must use forms provided by the Department.
   c. Monitoring results shall be reported to the Department no later than the 28th day of the month following the end of the reporting period.

Section C – Bypass/Upset Requirements

1. **Definitions.**
   a. *Bypass*: the intentional diversion of waste streams from any portion of a treatment facility, except in the case of blending.
   b. *Severe Property Damage*: substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
   c. *Upset*: an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2. **Bypass Requirements.**
   a. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2. b. and 2. c. of this section.
   b. Notice.
      i. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.
      ii. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section B – Reporting Requirements, paragraph 5 (24-hour notice).
   c. Prohibition of bypass.
      i. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless:
         1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
         2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
         3. The permittee submitted notices as required under paragraph 2. b. of this section.
      ii. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three (3) conditions listed above in paragraph 2. c. i. of this section.

3. **Upset Requirements.**
   a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph 3. b. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
   b. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
      i. An upset occurred and that the permittee can identify the cause(s) of the upset;
      ii. The permitted facility was at the time being properly operated; and
      iii. The permittee submitted notice of the upset as required in Section B – Reporting Requirements, paragraph 2. b. ii. (24-hour notice).
      iv. The permittee complied with any remedial measures required under Section D – Administrative Requirements, paragraph 4.
   c. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

Section D – Administrative Requirements

1. **Duty to Comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Missouri Clean Water Law and Federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.
   a. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
   b. The Federal Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The Federal Clean Water Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement

imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than one (1) year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than two (2) years, or both. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than three (3) years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than six (6) years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

c. Any person may be assessed an administrative penalty by the EPA Director for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

d. It is unlawful for any person to cause or permit any discharge of water contaminants from any water contaminant or point source located in Missouri in violation of sections 644.006 to 644.141 of the Missouri Clean Water Law, or any standard, rule or regulation promulgated by the commission. In the event the commission or the director determines that any provision of sections 644.006 to 644.141 of the Missouri Clean Water Law or standard, rules, limitations or regulations promulgated pursuant thereto, or permits issued by, or any final abatement order, other order, or determination made by the commission or the director, or any filing requirement pursuant to sections 644.006 to 644.141 of the Missouri Clean Water Law or any other provision which this state is required to enforce pursuant to any federal water pollution control act, is being, was, or is in imminent danger of being violated, the commission or director may cause to have instituted a civil action in any court of competent jurisdiction for the injunctive relief to prevent any such violation or further violation or for the assessment of a penalty not to exceed $10,000 per day for each day, or part thereof, the violation occurred and continues to occur, or both, as the court deems proper. Any person who willfully or negligently commits any violation in this paragraph shall, upon conviction, be punished by a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both. Second and successive convictions for violation of the same provision of this paragraph by any person shall be punished by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.

2. **Duty to Reapply.**
   a. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.
   b. A permittee with a currently effective site-specific permit shall submit an application for renewal at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Department. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)
   c. A permittees with currently effective general permit shall submit an application for renewal at least 30 days before the existing permit expires, unless the permittee has been notified by the Department that an earlier application must be made. The Department may grant permission for a later submission date. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

3. **Need to Halt or Reduce Activity Not a Defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

4. **Duty to Mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

5. **Proper Operation and Maintenance**. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

6. **Permit Actions.**
   a. Subject to compliance with statutory requirements of the Law and Regulations and applicable Court Order, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
      i. Violations of any terms or conditions of this permit or the law;
      ii. Having obtained this permit by misrepresentation or failure to disclose fully any relevant facts;
      iii. A change in any circumstances or conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge; or
      iv. Any reason set forth in the Law or Regulations.
   b. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

7. **Permit Transfer.**
   a. Subject to 10 CSR 20-6.010, an operating permit may be transferred upon submission to the Department of an application to transfer signed by the existing owner and the new owner, unless prohibited by the terms of the permit. Until such time the permit is officially transferred, the original permittee remains responsible for complying with the terms and conditions of the existing permit.
   b. The Department may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Missouri Clean Water Law or the Federal Clean Water Act.
   c. The Department, within 30 days of receipt of the application, shall notify the new permittee of its intent to revoke or reissue or transfer the permit.

8. **Toxic Pollutants.** The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the Federal Clean Water Act within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

9. **Property Rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.

10. **Duty to Provide Information.** The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Department upon request, copies of records required to be kept by this permit.

11. **Inspection and Entry.** The permittee shall allow the Department, or an authorized representative (including an authorized contractor acting as a representative of the Department), upon presentation of credentials and other documents as may be required by law, to:
    a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
    d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Federal Clean Water Act or Missouri Clean Water Law, any substances or parameters at any location.

12. **Closure of Treatment Facilities.**
    a. Persons who cease operation or plan to cease operation of waste, wastewater, and sludge handling and treatment facilities shall close the facilities in accordance with a closure plan approved by the Department.
    b. Operating Permits under 10 CSR 20-6.010 or under 10 CSR 20-6.015 are required until all waste, wastewater, and sludges have been disposed of in accordance with the closure plan approved by the Department and any disturbed areas have been properly stabilized. Disturbed areas will be considered stabilized when perennial vegetation, pavement, or structures using permanent materials cover all areas that have been disturbed. Vegetative cover, if used, shall be at least 70% plant density over 100% of the disturbed area.

13. **Signatory Requirement.**
    a. All permit applications, reports required by the permit, or information requested by the Department shall be signed and certified. (See 40 CFR 122.22 and 10 CSR 20-6.010)
    b. The Federal Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six (6) months per violation, or by both.
    c. The Missouri Clean Water Law provides that any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than ten thousand dollars, or by imprisonment for not more than six months, or by both.

14. **Severability.** The provisions of the permit are severable, and if any provision of the permit, or the application of any provision of the permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of the permit, shall not be affected thereby.

37057

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
FORM A – APPLICATION FOR NONDOMESTIC PERMIT UNDER MISSOURI CLEAN WATER LAW

RECEIVED
JUN 11 2021
Water Protection Program

FOR AGENCY USE ONLY	
CHECK NUMBER	
DATE RECEIVED: 6-11-21	FEE SUBMITTED: 60 SB
JET PAY CONFIRMATION NUMBER	

PLEASE READ ALL THE ACCOMPANYING INSTRUCTIONS BEFORE COMPLETING THIS FORM. SUBMITTAL OF AN INCOMPLETE APPLICATION MAY RESULT IN THE APPLICATION BEING RETURNED.

IF YOUR FACILITY IS ELIGIBLE FOR A NO EXPOSURE EXEMPTION:
Fill out the No Exposure Certification Form (Mo 780-2828): https://dnr.mo.gov/forms/780-2828-f.pdf

1. REASON FOR APPLICATION:

☑ a. This facility is now in operation under Missouri State Operating Permit (permit) MO – 0002828, is submitting an application for renewal, and there is no proposed increase in design wastewater flow. Annual fees will be paid when invoiced and there is no additional permit fee required for renewal.

☐ b. This facility is now in operation under permit MO – _____, is submitting an application for renewal, and there is a proposed increase in design wastewater flow. Antidegradation Review may be required. Annual fees will be paid when invoiced and there is no additional permit fee required for renewal.

☐ c. This is a facility submitting an application for a new permit (for a new facility). Antidegradation Review may be required. New permit fee is required.

☐ d. This facility is now in operation under Missouri State Operating Permit (permit) MO – _____ and is requesting a modification to the permit. Antidegradation Review may be required. Modification fee is required.

2. FACILITY

NAME		TELEPHONE NUMBER WITH AREA CODE	
Dairy Farmers of America, Cabool, MO		417-962-4243	
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE
958 Shelton Street	Cabool	MO	65689

3. OWNER

NAME		TELEPHONE NUMBER WITH AREA CODE	
Dairy Farmers of America, Inc.		816-801-6455	
EMAIL ADDRESS			
ADDRESS (MAILING)	CITY	STATE	ZIP CODE
1405 North 98th Street	Kansas City	KS	66111

4. CONTINUING AUTHORITY

NAME		TELEPHONE NUMBER WITH AREA CODE	
Dairy Farmers of America, Inc.		816-801-6455	
EMAIL ADDRESS			
ADDRESS (MAILING)	CITY	STATE	ZIP CODE
1405 N 98th Street	Kansas City	KS	66111

5. OPERATOR CERTIFICATION

NAME	CERTIFICATE NUMBER	TELEPHONE NUMBER WITH AREA CODE	
Jason Henley	13929	417-962-0530	
ADDRESS (MAILING)	CITY	STATE	ZIP CODE
958 Shelton Street	Cabool	MO	65689

6. FACILITY CONTACT

NAME	TITLE	TELEPHONE NUMBER WITH AREA CODE
Mike Howard	Maintenance Manager	417-962-1632
E-MAIL ADDRESS		
mhoward@dfamilk.com		

7. DOWNSTREAM LANDOWNER(S) Attach additional sheets as necessary.

NAME			
N/A			
ADDRESS	CITY	STATE	ZIP CODE

8. ADDITIONAL FACILITY INFORMATION

8.1 Legal Description of Outfalls. (Attach additional sheets if necessary.) **See Attached Supplement**

For Universal Transverse Mercator (UTM), use Zone 15 North referenced to North American Datum 1983 (NAD83)

001 _____¼ _____¼ Sec _____ T _____ R _____ _____ County
UTM Coordinates Easting (X): _____ Northing (Y): _____

002 _____¼ _____¼ Sec _____ T _____ R _____ _____ County
UTM Coordinates Easting (X): _____ Northing (Y): _____

003 _____¼ _____¼ Sec _____ T _____ R _____ _____ County
UTM Coordinates Easting (X): _____ Northing (Y): _____

004 _____¼ _____¼ Sec _____ T _____ R _____ _____ County
UTM Coordinates Easting (X): _____ Northing (Y): _____

8.2 Primary Standard Industrial Classification (SIC) and Facility North American Industrial Classification System (NAICS) Codes.

Primary SIC 2086 and NAICS 312111 SIC 2023 and NAICS 311514
SIC _____ and NAICS _____ SIC _____ and NAICS _____

9. ADDITIONAL FORMS AND MAPS NECESSARY TO COMPLETE THIS APPLICATION

A. Is this permit for a manufacturing, commercial, mining, solid/hazardous waste, or silviculture facility? YES ☑ NO ☐
If yes, complete Form C.

B. Is the facility considered a "Primary Industry" under EPA guidelines (40 CFR Part 122, Appendix A) : YES ☐ NO ☑
If yes, complete Forms C and D.

C. Is wastewater land applied? YES ☐ NO ☑
If yes, complete Form I.

D. Are sludge, biosolids, ash, or residuals generated, treated, stored, or land applied? YES ☑ NO ☐
If yes, complete Form R.

E. Have you received or applied for any permit or construction approval under the CWA or any other environmental regulatory authority? YES ☑ NO ☐
If yes, please include a list of all permits or approvals for this facility. **See Attached Supplement**

F. Do you use cooling water in your operations at this facility? YES ☑ NO ☐
If yes, please indicate the source of the water: Groundwater Well

G. Attach a map showing all outfalls and the receiving stream at 1" = 2,000' scale.

10. ELECTRONIC DISCHARGE MONITORING REPORT (eDMR) SUBMISSION SYSTEM

Per 40 CFR Part 127 National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, reporting of effluent limits and monitoring shall be submitted by the permittee via an electronic system to ensure timely, complete, accurate, and nationally consistent set of data. **One of the following must be checked in order for this application to be considered complete.** Please visit http://dnr.mo.gov/env/wpp/edmr.htm to access the Facility Participation Package.

☐ - You have completed and submitted with this permit application the required documentation to participate in the eDMR system.

☑ - You have previously submitted the required documentation to participate in the eDMR system and/or you are currently using the eDMR system.

☐ - You have submitted a written request for a waiver from electronic reporting. See instructions for further information regarding waivers.

11. FEES

Permit fees may be paid by attaching a check, or online by credit card or eCheck through the JetPay system. Use the URL provided to access JetPay and make an online payment: https://magic.collectorsolutions.com/magic-ui/payments/mo-natural-resources/

12. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME AND OFFICIAL TITLE (TYPE OR PRINT)	TELEPHONE NUMBER WITH AREA CODE
Dana Lowe, Vice President, Manufacturing Operations	417-829-2638
SIGNATURE: Dana Lowe	DATE SIGNED: 6-8-2021

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

FORM C – APPLICATION FOR DISCHARGE PERMIT – MANUFACTURING, COMMERCIAL, MINING, SILVICULTURE OPERATIONS, AND STORMWATER

GENERAL INFORMATION (PLEASE SEE INSTRUCTIONS)

1.0 NAME OF FACILITY

Dairy Farmers of America, MO

1.1 THIS FACILITY IS OPERATING UNDER MISSOURI STATE OPERATING PERMIT (MSOP) NUMBER:

MO - 0002828

1.2 IS THIS A NEW FACILITY? PROVIDE CONSTRUCTION PERMIT (CP) NUMBER IF APPLICABLE.

NO

1.3 Describe the nature of the business, in detail. Identify the goods and services provided by the business. Include descriptions of all raw, intermediate, final products, byproducts, or waste products used in the production or manufacturing process, stored outdoors, loaded or transferred and any other pertinent information for potential sources of wastewater or stormwater discharges.

Dairy Farmers of America, Cabool, Missouri is a food manufacturing facility that utilizes dry and wet ingredients to blend into a variety of liquid drinks including infant formulas, adult nutritional and adult recreational. The mixture of dry and wet ingredients is blended, canned, sterilized, packaged and shipped from the facility. The facility also includes a milk condensing operation taking raw milk and pasteurizing, separating and condensing it for product ingredient use as well as outside customer sales.

FLOWS, TYPE, AND FREQUENCY

2.0 Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in item B. Construct a water balance on the line drawing by showing average and maximum flows between intakes, operations, treatment units, evaporation, public sewers, and outfalls. If a water balance cannot by determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures. **See Attached Water Balance**

2.1 For each outfall (1) below, provide: (2) a description of all operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, stormwater runoff, and any other process or non-process wastewater, (3) the average flow and maximum flow (put max in parentheses) contributed by each operation and the sum of those operations, (4) the treatment received by the wastewater, and (5) the treatment type code. Continue on additional sheets if necessary.

1. OUTFALL NO.	2. OPERATION(S) CONTRIBUTING FLOW; INCLUDE ALL PROCESSES AND SUB PROCESSES AT EACH OUTFALL	3. AVERAGE FLOW AND (MAXIMUM FLOW), INCLUDE UNITS.	4. TREATMENT DESCRIPTION	5. TREATMENT CODES FROM TABLE A
N/A	WWTP Sludge (Land Application Only)	29,399 avg gal/day*	Activated Sludge	3-A & 5-P
	* max / avg calculated based on application days	31,500 max gal/day		
	**All treated wastewater discharged to POTW			
	not included in this renewal application			

Attach additional pages if necessary.

2.2 INTERMITTENT DISCHARGES

Except for stormwater runoff, leaks, or spills, are any of the discharges described in items 2.0 or 2.1 intermittent or seasonal?

☐ Yes *(complete the following table)* ☑ No *(go to section 2.3)*

1. OUTFALL NUMBER	2. OPERATION(S) CONTRIBUTING FLOW	3. FREQUENCY		4. FLOW				C. DURATION *(in days)*
				A. FLOW RATE *(in mgd)*		B. TOTAL VOLUME (specify with units)		
		A. DAYS PER WEEK *(specify average)*	B. MONTHS PER YEAR *(specify average)*	1. MAXIMUM DAILY	2. LONG TERM AVERAGE	4. LONG TERM DAILY	3. MAXIMUM AVERAGE	

2.3 PRODUCTION

A. Does an effluent limitation guideline (ELG) promulgated by EPA under section 304 of the Clean Water Act apply to your facility? Indicate the part and subparts applicable.

☐ Yes 40 CFR_____ Subpart(s) _____ ☑ No *(go to section 2.5)*

B. Are the limitations in the effluent guideline(s) expressed in terms of production (or other measure of operation)? Describe in C below.

☐ Yes *(complete C.)* ☐ No *(go to section 2.5)*

C. If you answered "yes" to B, list the quantity representing an actual measurement of your maximum level of production, expressed in the terms and units used in the applicable effluent guideline and indicate the affected outfalls.

A. OUTFALL(S)	B. QUANTITY PER DAY	C. UNITS OF MEASURE	D. OPERATION, PRODUCT, MATERIAL, ETC. *(specify)*

2.4 IMPROVEMENTS

A. Are you required by any federal, state, or local authority to meet any implementation schedule for the construction, upgrading, or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

☐ Yes *(complete the following table)* ☑ No *(go to 2.6)*

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS	3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
			A. REQUIRED	B. PROJECTED

B. Optional: provide below or attach additional sheets describing water pollution control programs or other environmental projects which may affect discharges. Indicate whether each program is underway or planned, and indicate actual or planned schedules for construction. This may include proposed bmp projects for stormwater.

2.5 SLUDGE MANAGEMENT

Describe the removal of any industrial or domestic biosolids or sludges generated at your facility. Include names and contact information for any haulers used. Note the frequency, volume, and methods (incineration, landfilling, composting, etc) used. See Form A for additional forms which may need to be completed.

Wastewater sludge is hauled by DFA or contract haulers for land application. (See Form R)

Randy Jarrett Hauling	Hillhouse Pumping Co. LLC
102 Oak Forest Lane	21009 Lawrence 1160
Cabool, MO 65689	Verona, MO 65769
417-254-0337	417-498-6548

DATA COLLECTION AND REPORTING REQUIREMENTS FOR APPLICANTS

3.0 EFFLUENT (AND INTAKE) CHARACTERISTICS (SEE INSTRUCTIONS)

A. & B. See instructions before continuing – complete one Table 1 for **each outfall** (and intake) – annotate the outfall (intake) number or designation in the space provided. The facility is not required to complete intake data unless required by the department or rule.

C. Use the space below to list any pollutants listed in the instructions section 3.0 C. Table B which you know or have reason to believe is discharged or may be discharged from any outfall not listed in parts 3.0 A or B on Table 1. For every pollutant listed, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	3. OUTFALL(S)	4. ANALYTICAL RESULTS (INCLUDE UNITS)
N/A			

3.1 Whole Effluent Toxicity Testing

A. To your knowledge, have any Whole Effluent Toxicity (WET) tests been performed on the facility discharges (or on receiving waters in relation to your discharge) within the last three years?

☐ Yes (go to 3.1 B) ☑ No (go to 3.2)

3.1 B

Disclose wet testing conditions, including test duration (chronic or acute), the organisms tested, and the testing results. Provide any results of toxicity identification evaluations (TIE) or toxicity reduction evaluations (TRE) if applicable. Please indicate the conclusions of the test(s) including any pollutants identified as causing toxicity and steps the facility is taking to remedy the toxicity.

3.2 CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported herein, above, or on Table 1 performed by a contract laboratory or consulting firm?

☑ Yes (list the name, address, telephone number, and pollutants analyzed by each laboratory or firm.) ☐ No *(go to 4.0)*

A. LAB NAME	B. ADDRESS	C. TELEPHONE *(area code and number)*	D. POLLUTANTS ANALYZED *(list or group)*
Consulting Analytical Services International	3378 S. Scenic Ave, Suite A, Springfield, MO 65807	(417) 882-1017	TKN, Ammonia, Nitrate/Nitrite, % Solids, Phosphorus, pH, Chloride and Metals
MU Extension Soil Testing Laboratory	23 Mumford Hall, MU Columbia, MO 65211	(573) 882-0623	pH, Phosphorus, Calcium, Sodium, Magnesium, Nitrate-N, Potassium, Exchangeable Sodium

4.0 STORMWATER

4.1
Do you have industrial stormwater discharges from the site? If so, attach a site map outlining drainage areas served by each outfall. Indicate the following attributes within each drainage area: pavement or other impervious surfaces; buildings; outdoor storage areas; material loading and unloading areas; outdoor industrial activities; structural stormwater control measures; hazardous waste treatment, storage, and disposal units; and wells or springs in the area.

OUTFALL NUMBER	TOTAL AREA DRAINED (PROVIDE UNITS)	TYPES OF SURFACES (VEGETATED, STONE , PAVED, ETC)	BEST MANAGEMENT PRACTICES EMPLOYED; INCLUDE STRUCTURAL BMPS AND TREATMENT DESIGN FLOW FOR BMPS DESCRIBE HOW FLOW IS MEASURED
N/A		SW Permit: MOR130154	

4.2 STORMWATER FLOWS
Provide the date of sampling with the flows, and how the flows were estimated.
N/A

SIGNATORY REQUIREMENTS

5.0 CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME AND OFFICIAL TITLE (TYPE OR PRINT)	TELEPHONE NUMBER WITH AREA CODE
Dana Lowe, Vice President, Manufacturing Operations	417-829-2638
SIGNATURE (SEE INSTRUCTIONS)	**DATE SIGNED**
Dana Lowe	6-8-2021

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION BRANCH
(SEE MAP FOR APPROPRIATE REGIONAL OFFICE)

FORM R – PERMIT APPLICATION FOR LAND APPLICATION OF INDUSTRIAL WASTEWATER BIOSOLIDS AND RESIDUALS

FOR AGENCY USE ONLY
PERMIT NUMBER MO -
DATE RECEIVED

INSTRUCTIONS: FORMS A and C or F (CAFOs) (and D where applicable) must also be submitted for land application of industrial wastewater sludge biosolids or residuals. **Submit FORMS E and G** for land disturbance permit if construction areas total five acres or more.

Attach **FORM I,** if wastewater will be land applied or irrigated.

1.00 FACILITY INFORMATION

1.1 FACILITY NAME

Dairy Farmers of America, Cabool, MO

1.2 Application for:
- ☐ Construction Permit (attach Engineering report, Plans and Specifications per 10 CSR 20-8.020)
- ☐ Operating Permit (if no construction permit, attach engineering documents)
  Date Land Application System Began Operation: _____
- ☑ Operating Permit Renewal

1.3 Months when the business or enterprise will operate or generate sludge or residuals:
☑ 12 months per year ☐ Part of year (list Months): _____

1.4 List the Facility outfalls which will be applicable to the land application system from outfalls listed on Form A, C, D and F.
Outfall Nos. ___ __ __ __ __ __ __ **See Attached Supplement**

2.00 STORAGE BASINS

2.1 Number of storage basins: 2 Type of basin: ☑ Steel ☐ Concrete ☐ Fiberglass ☐ Earthen ☐ Earthen with membrane liner

2.2 Storage basin dimensions at inside top of berm (feet): Report freeboard as feet from top of berm to emergency spillway or overflow pipe.

(Complete Attachment A: Profile Sketch)

Basin #1:	Length N/A	Width 26'	Depth 21'	Freeboard 8"	Berm Width N/A	% Slope N/A
Basin #2:	Length N/A	Width 29.5'	Depth 26'	Freeboard 8"	Berm Width N/A	% Slope N/A

2.2.1 Storage basin volumes (gallons): Permanent volume means two foot water depth for seal protection, and any required treatment volume capacity.

Basin #1: Gallons: 0 Permanent Volume + 83K Storage = 83K Total volume (gallons)
Basin #2: Gallons: 0 Permanent Volume + 132K Storage = 132K Total volume (gallons)

2.3 Storage Basin operating levels (report as feet below emergency overflow level) **See Attached Supplement**

Basin #1: Maximum water level _____ ft. Minimum operating water level _____ ft.
Basin #2: Maximum water level ___ ft. Minimum operating water level _____ ft.

2.4 Storage Basin design storage capacity: (storage between minimum and maximum operating levels for 1-in-10 year stormwater flows.) **See Attached Supplement**

Basin #1: N/A days Basin #2: N/A days Basin #3: ____ days

2.5 Attach Water Balance Test results to verify earthen basin seal in accordance with 10 CSR 20-8.020(13) and (16), when required by the department.

2.6 Attach a sludge management plan for materials that are not land applied.

2.7 Attach a closure plan for lagoons, storage basins and treatment units.

3.00 LAND APPLICATION SYSTEM

3.1 Number of application sites __ Total Available Acres __ Minimum & Maximum % field slopes ___

Location: ___ ¼ __ ¼ __ ¼ __ Sec. __ T __ R ___ County __ Acres
Location: __ ¼ __ ¼ __ ¼ __ Sec. __ T __ R ___ County __ Acres

Attach extra sheets as necessary. **See Attached Land Application Manual**

3.1.1 Type of vegetation: ☐ Grass hay ☑ Pasture ☐ Timber ☐ Row crops ☐ Other (describe) _____
Specific Crops and Yields/acre: N/A Goal: N/A Actual for last five years: N/A

3.2 Annual sludge production (gallons per year): _____ Actual _____ Design
(dry tons per year): 147 Actual _____ Design **See Attached Supplement**
Human Population Equivalent: ___ Actual ___ Design

3.2.1 Land Application rate per acre:
Design: _____ dry ton/year ____ dry ton/application ____ No. applications/year **See Attached Supplement**
Actual: 0.49 dry ton/year 2.0 dry ton/application 71 No. applications/year
Total amount land applied each year (total all sites) Design ___ dry ton/year Actual ___ dry ton/year
Actual months used for land application: ☑ Jan ☑ Feb ☑ Mar ☑ Apr ☑ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec

3.2.2 Land Application Rate is based on:
☐ Nutrient Management Plan (N&P) ☑ PAN ☐ Conservative
☐ Hydraulic Loading ☐ Limiting Pollutant (Specify) _____
☐ Other (describe) ___

3.3 Equipment type: ☐ Tank wagon ☑ Tank truck ☐ Subsurface injection ☐ Slinger spreader ☐ Dry spreader
☐ Other (describe) ___ **See Attached Supplement**
Equipment Capacity: ___ Gallons (cubic feet) per hour 596 Total hours of operation per year

3.4 Public Use/Access Sites: If public use or access to land application site, describe pathogen treatment and site access restrictions. If human, animal, or organic wastes, refer to 40 CFR 503.32 for pathogen treatment methods. Attach extra sheets as necessary.
_____ **See Attached Supplement**

3.5 Separation distance (in feet) from the outside edge of the biosolids application area to down gradient features:
300 Permanent flowing stream 300 Losing Stream 50 Intermittent (wet weather) stream 300 Lake or pond
50 Property boundary 150 Dwellings 300 Water supply well 150 Other (describe) Wetland

3.6 Soils Information: Use information from the County Soil Survey, NRCS, or professional soil scientist.
Note: On-site soils classification by a professional soil scientist may be required by the department where appropriate.
Soil Series Name _____ Depth of bedrock ____ Feet Depth to water table ____ Feet **See Description of Soil Types**
Soil Infiltration rate in inches/hour (in/hr) for most restrictive layer within the following soil depth ranges:
___ In/hr for 0-12 inch soil depth ___ In/hr for 12-24 inch soil depth _____ In/hr for 24-60 inch soil depth

3.7 Attach Nutrient Management Plan (NMP) including calculations for plant available nitrogen (PAN) and other nutrients, crop requirements, crop yields and other management factors. Include USDA/NRCS phosphorus recommendations. **See Land App Manual**

3.8 Geologic Investigation: _____ Date of most recent geologic report by the department's Missouri Geological Survey.

3.8.1 Groundwater Monitoring Wells: (Attach Groundwater Monitoring Plan when required by department)
☑ None ☐ Existing ☐ Planned Number: ____ Monitoring Wells ___ Lysimeters

3.9 Attach a current copy of the Operation and Maintenance (O&M) Plan for the land application system. Date of O&M Plan: **See Land App Manual**

3.9.1 Attach a site map showing topography, storage basins, land application sites, property boundary, streams, wells, roads, dwellings and other pertinent features.

3.9.2 Attach a facility sketch showing treatment units, storage basins, pipelines, application sites and other features.

4.00 INDUSTRIAL PROCESS INFORMATION

4.1 Brief description of treatment processes prior to land application and note any changes made in last five years. (Attach extra sheets as necessary.)

Wastewater passes through a trickling filter, clarifier, oxidation ditch, final clarifier and then to the City of Cabool wastewater treatment facility. Sludge can be lime stabilized.

4.2 Detailed description of industrial production processes. Also indicate any changes made in last five years. (Attach extra sheets as necessary.)

Dry and wet ingredients are blended, canned, sterilized, packaged and shipped from the facility. Also a milk condensing operation taking raw milk and pasteurizing, separating and condensing it for product ingredients.

4.3 List of raw materials, chemicals, additives, products and by-products (Attach extra sheets as necessary.)

Whole milk, flavorings, liquid sucrose, blended fats and oils, dry proteins, carbohydrates, and minerals. Caustic, acid and sanitizers are used throughout the facility for cleaning and sanitation. Boiler and cooling tower chemical additives are used for process water treatment.

4.3.1 Attach the following forms for wastewater to be land applied.

FORM C or F is required for all applicants. Use Form F for CAFOs.

FORM D is required for those industries listed in the Form D instructions or when required by the department.

Use actual testing results within last 12 months. For new operations use testing results from other similar operations or from published literature.

4.3.2 Are there any listed hazardous wastes in the material to be land applied: ☐ YES ☑ NO (If YES, attach testing results)

4.4 A. Are any Pollutants listed in 40 CFR 268.40 believed to be present in detectable concentrations: ☐ YES ☑ NO

B. Are any Pollutants listed in 10 CSR 20-7.031 believed to be present in detectable concentrations: ☐ YES ☑ NO

C. Are any Pollutants listed in EPA Process Design Manual for Land Treatment of Municipal Wastewater publication EPA-625/1-81-013, Table 4-5 and Table 4-16 believed present in detectable concentrations: ☑ YES ☐ NO

(Attach a copy of testing results for any pollutants that may be present in detectable concentrations.)

4.5 Environmental Assessment. Do any of the pollutants detected exceed the criteria for pollutant concentrations of limitations contained in the publications referenced in Section 4.40 of this form?: ☐ YES ☑ NO

If YES, attach a copy of the Environmental Assessment as required in 10 CSR 20-8.020(3)(D).

5.00 SOIL TESTING RESULTS: Complete information for each pollutant listed and each land application site. Attach results of any other soil testing performed in the last 12 months. Soil sampling and testing should conform to University publication G9110, Sampling Your Soil for Testing; Soil Test Procedures for North Central Region (North Dakota Agricultural Experiment Bulleting 499-Revised); Methods of Soil Analysis, American Society of Agronomy, Inc.; Soil Testing and Plant Analysis, Soil Science Society of America; EPA Methods; or other methods approved by the department. Attach extra sheets as necessary.

Total area sampled is 870 acres. Each composite sample covers ____ acres. Each composite consists of ____ subsamples.

Sample depth: ☑ 0-6 inches ☐ 0-12 inches ☐ Other (describe) ___ **See Attached Soil Testing Results**

Pollutant	Concentration (mg/kg or ppm)			Pounds/ Acre	No. Composite Samples	Sample Period
	Minimum	Maximum	Average			
Organic Nitrogen as N	See Attached					
Ammonia Nitrogen as N						
Nitrate Nitrogen as N						
Phosphorus as P (Bray 1P)						
Exchangeable Sodium %						
Organic Matter (percent)						
Cation Exchange Capacity						
pH (standard units)						
Other pollutants present in the material to be land applied: (Attach extra sheets as necessary)						

6.00 LAND LIMITING CONSTITUENTS FOR LAND APPLICATION

6.1 Metals of Concern for Land Application. Complete information for each pollutant listed.

Analysis results must be for "Total Metals". (Do **not** use TCLP, dissolved, total recoverable or other extraction methods.

Include all test results for the last five years and a minimum of four separate samples.

Pollutant (total metals)	Concentration (mg/kg dry weight)			Design LBS/ Acre/Year	Type of Samples	Number Samples	Sample Location	Sample Period
	Minimum	Maximum	Average					
Aluminum								
Arsenic	0.26	4.29	1.37		comp	6	truck	2017-21
Beryllium								
Cadium	0.05	0.450	0.232		comp	6	truck	2017-21
Chromium								
Copper	68	4,080	764		comp	6	truck	2017-21
Fluoride								
Lead	0.27	5.42	1.26		comp	6	truck	2017-21
Manganese								
Mercury	0.050	10.74	2.365		comp	6	truck	2017-21
Molybdenum	0.110	4.650	1.533		comp	6	truck	2017-21
Nickel	0.16	15.0	3.828		comp	6	truck	2017-21
Selenium	0.30	1.75	0.813		comp	6	truck	2017-21
Silver								
in								
Zinc	168	275	221		comp	6	truck	2017-21

6.2 Major Pollutants of Concern for Land Application. Complete information for each pollutant listed. Include any other pollutants that are most limiting for determining land application rates. Attach extra sheets as necessary.

Organic Nitrogen as N	64,100	136,000	83,192		comp	13	truck	2016-21
Ammonia Nitrogen as N	221	39,200	7,586		comp	13	truck	2016-21
Nitrate Nitrogen as N	38	276	107		comp	13	truck	2016-21
Total Nitrogen as N	8,560	138,000	82,189		comp	13	truck	2016-21
Plant Available Nitrogen (PAN)	8,720	28,800	19,325	40	comp	13	truck	2016-21
Total Phosphorus as P	7,940	22,800	16,804		comp	10	truck	2016-21
Boron								
Chlorides	8,900	22,000	15,519		comp	7	truck	2016-21
Sodium	10,500	12,900	11,767		comp	3	truck	2016-17
COD								
TPH								
*Total Suspended Solids	0.9%	3.25%	1.69%	*reported % solids	grab	18	truck	2016-21
Oil and Grease								
Sodium Absorption Ration SAR)								
pH (standard units)	6.67	7.1	6.94		grab	7	truck	2018-21

6.3 Other Limiting Pollutants for Land Application Rates. Specify any other pollutants that are most limiting for determining land application rates. Include any additional significant pollutants from Section 4 that is not already listed in Section 6.00. Attach extra sheets as necessary.

Pollutant	Concentration (mg/kg dry weight)			Design LBS/ Acre/Year	Type of Samples	Number Samples	Sample Location	Sample Period
	Minimum	Maximum	Average					
NONE								

6.4 Requirements for Public Use Sites. Complete this if land application onto public use or public access sites or if material will be distributed for general public use. Fecal Coliform, Salmonella and Entric Virus must be tested if the biosolids include waste material from humans, animals, vegetables or organic matter. **See Attached Supplement**

Pollutant		Concentration (mg/kg dry weight)			Type of Samples	Number Samples	Sample Location	Sample Period
		Minimum	Maximum	Average				
Total Dioxin TEQ*	N/A							
Fecal Coliform								
Salmonella								
Enteric Virus								
Other (specify)								

* Required Only for public access sites. TEQ = Toxicity Equivalents for CDD and CDF isomers per EPA Publication EPA/625/3-89/016 and EPA method 1613. Detection limits must be less than 1.0 ppt.

7.00 CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

CONSULTING ENGINEER – Name, Official Title and Engineering Firm (TYPE OR PRINT)	TELEPHONE NUMBER WITH AREA CODE
N/A	
SIGNATURE	DATE SIGNED
OWNER OR AUTHORIZED REPRESENTATIVE – Name and Official Title (TYPE OR PRINT)	TELEPHONE NUMBER WITH AREA CODE
Dana Lowe, Vice President, Manufacturing Operations	417-829-2638
SIGNATURE	DATE SIGNED
Dana Lowe	6-8-2021

Attachments

Dairy Farmers of America – Cabool, MO

NPDES Permit Renewal 2021

Permit No. MOD00002828

Supplement for Form A and Form R

Site Map

Water Balance

Wastewater Treatment Plant Schematic

Description of Soil Types

Soil Testing Results – Data Table (2017 – 2021)

Soil Test Laboratory Results (2021)

Land Application Manual

Form A Supplemental Information

8.1 Legal Description of Outfalls. There are no wastewater outfalls. Land Application sites are identified in Form R.

9. ADDITIONAL FORMS AND MAPS NECESSARY TO COMPLETE THIS APPLICATION

E. Have you received or applied for any permit or construction approval under the CWA or any other environmental regulatory authority? YES

If yes, please include a list of all permits or approvals for this facility.

Air Emission Construction Permits: 072017-011 and 112018-003
Missouri Stormwater Permit: MOR130154
City of Cabool: Industrial Wastewater Pre-Treatment Agreement

Form R Supplemental Information

1.4 List the Facility outfalls which will be applicable to the land application system from outfalls listed on Form A, C, D and F.

None - Permitted Feature 005 Only

2.2.1 Storage basin volumes (gallons): Permanent volume means two-foot water depth for seal protection, and any required treatment volume capacity.

Basin #1	Gallons: NA	Permanent Volume + 83,000	Storage = 83,000 Total volume (gallons)
Basin #2	Gallons: NA	Permanent Volume + 132,000	Storage = 132,000 Total volume (gallons)

2.30 Storage Basin operating levels (report as feet below emergency overflow level)

N/A - Steel Tanks overflow back to WWTP.

2.4 Storage Basin design storage capacity: (storage between minimum and maximum operating levels for 1-in-10-year stormwater flows.)

N/A - There is no stormwater flow to the storage tanks.

2.5 Attach Water Balance Test results to verify earthen basin seal in accordance with 10 CSR 20-8.020(13) and (16), when required by the department.

N/A - No earthen basins in use

2.6 Attach a sludge management plan for materials that are not land applied

N/A - All sludge generated is land applied.

2.7 Attach a closure plan for lagoons, storage basins and treatment units

N/A - No earthen basins in use.

3.1 Number of application sites 15 Total Available Acres 870

Minimum & Maximum % field slopes See attached Land Application Manual

3.2 Annual sludge production (gallons per year): 2,087,300 Actual 2020
(dry tons per year): 147 Actual 2020
Human Population Equivalent: N/A

3.2.1 Land Application rate per acre: (data based on 2020)
Actual: 0.49 dry ton/year 1.98 dry ton/application (days applied) 71 No. applications/year
Total amount land applied each year (total all sites) Actual 147 dry ton/year
Actual months used for land application: January through December (none in January 2020)

3.3 Equipment type: Tank Truck
Equipment Capacity: 3,500 Gallons per hour 596 Total hours of operation per year

3.4 Public Use/Access Sites: N/A - No application sites are public use or access.

3.6 Soils Information: See Attached

3.7 Attach Nutrient Management Plan (NMP) including calculations for plant available nitrogen (PAN) and other nutrients, crop requirements, crop yields and other management factors. Include USDA/NRCS phosphorus recommendations.

Form R Supplemental Information

See Attached Land Application Manual – Revised March 2021

3.9 Attach a current copy of the Operation and Maintenance (O&M) Plan for the land application system. Date of O&M Plan:

See Attached Land Application Manual – Revised March 2021

3.9.1 Attach a site map showing topography, storage basins, land application sites, property boundary, streams, wells, roads, dwellings and other pertinent features.

Facility Site Map is attached, application sites are included in the attached Land Application Manual

3.9.2 Attach a facility sketch showing treatment units, storage basins, pipelines, application sites and other features.

See attached WWTP Schematic

4.3.1 Attach the following forms for wastewater to be land applied.

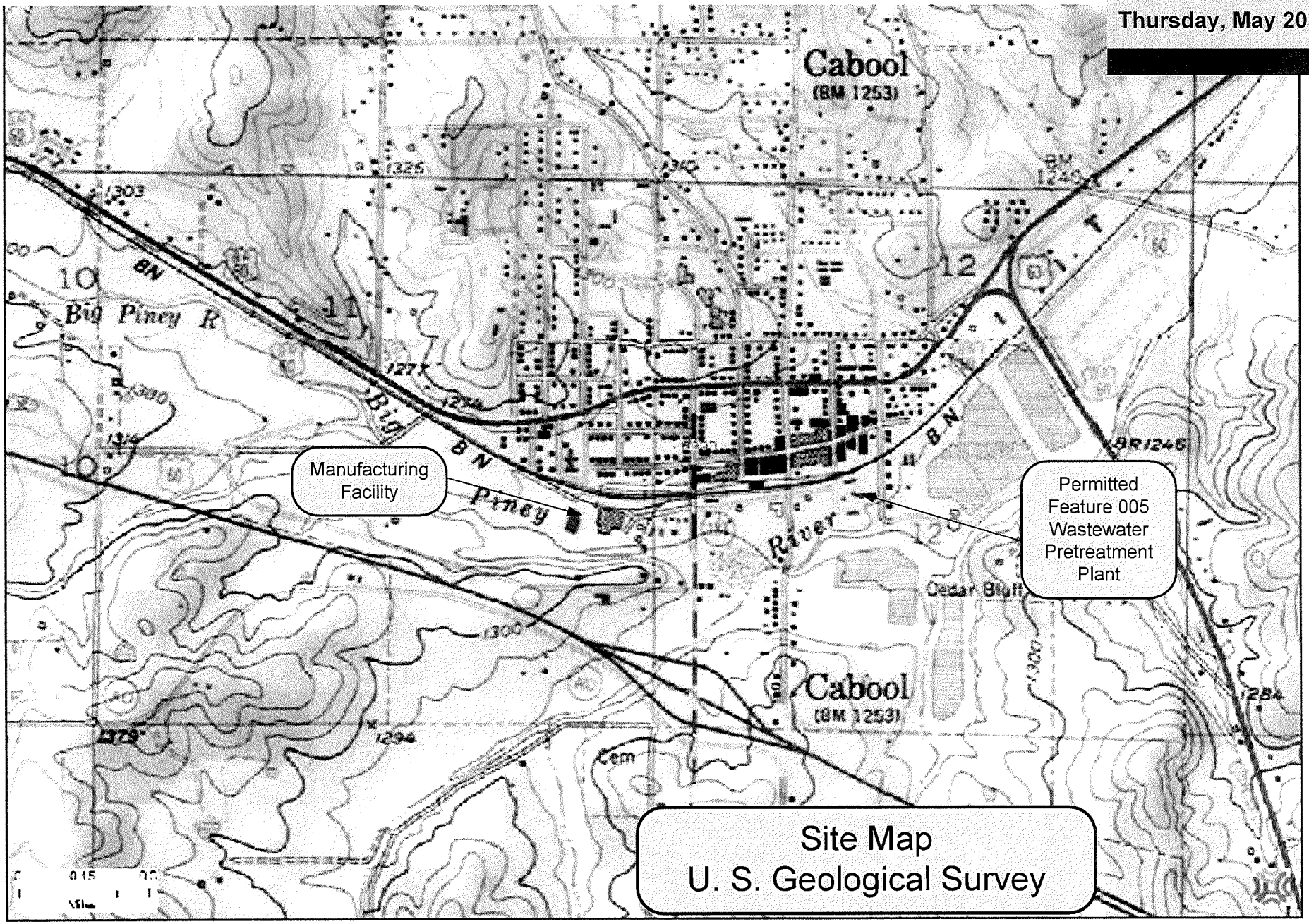
N/A - No wastewater is land applied.

5.00 SOIL TESTING RESULTS: See Attached

6.4 Requirements for Public Use Sites. N/A There are no public use sites.

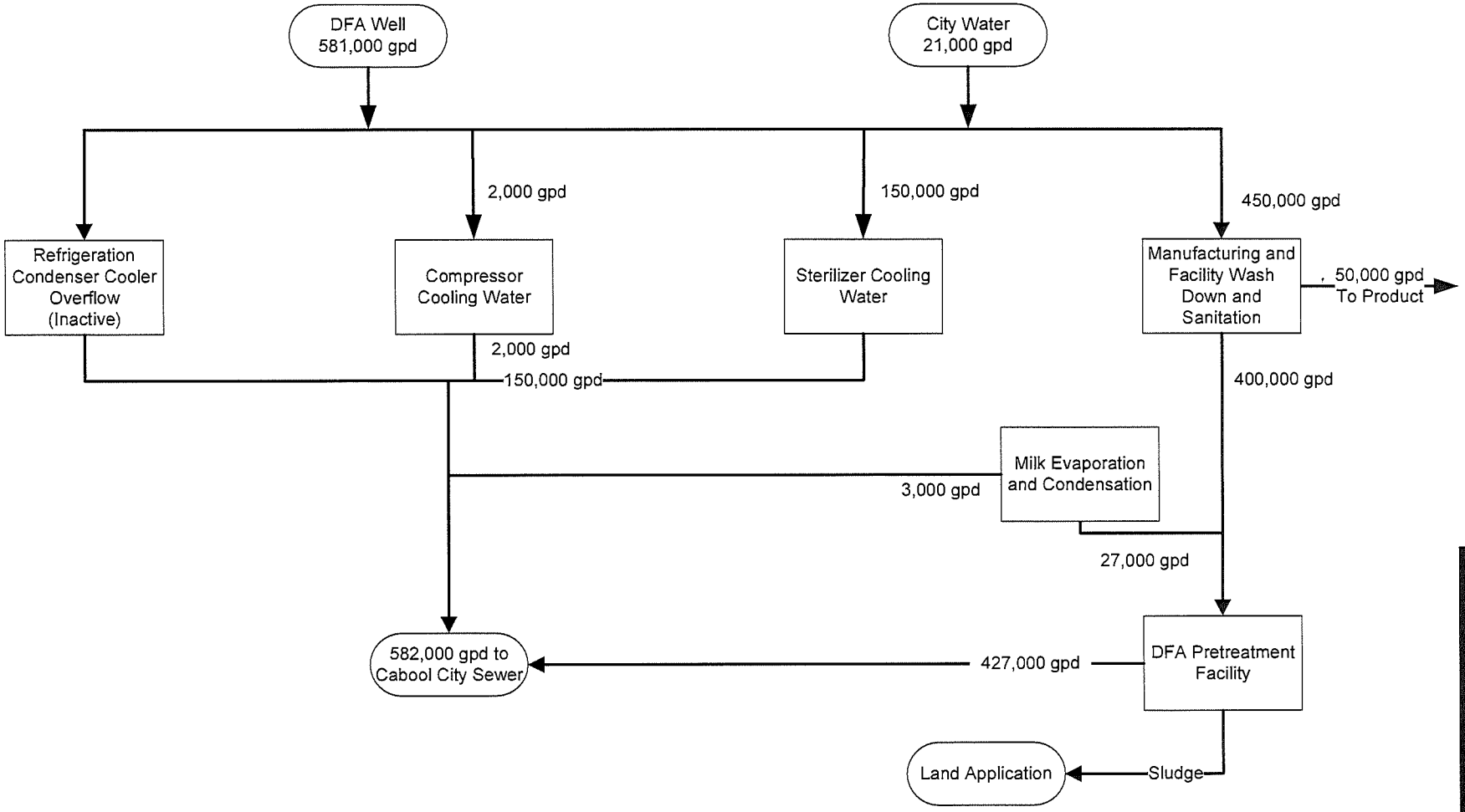
Dairy Farmers of America, Cabool Facility

Thursday, May 20, 2021



Dairy Farmers of America, Cabool Facility

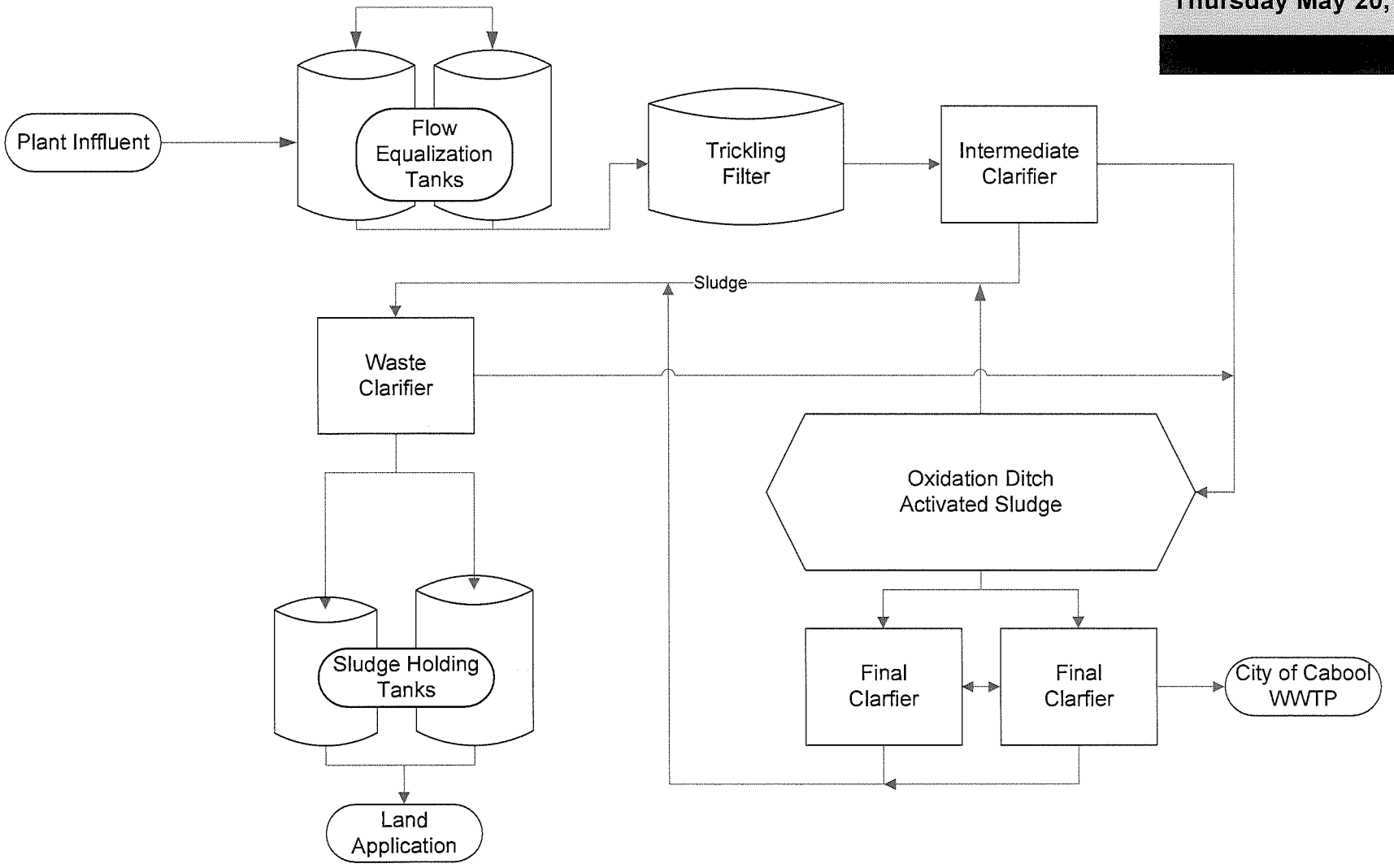
Thursday May 20, 2021



Water Balance Flow Diagram
Form C Part 2.0

Dairy Farmers of America, Cabool Facility

Thursday May 20, 2021



Wastewater Treatment Plant Schematic
Form R Part 3.92

Form R
Part 3.60
Soils Information:

010 - JBB, 012 – JWB, 014 – JWE, 016 – KFA, 017 – TEA

70022—Tonti silt loam, 3 to 8 percent slopes

Map Unit Setting

- *National map unit symbol:* 2qpbr
- *Elevation:* 600 to 1,500 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Farmland of statewide importance

Description of Tonti

Setting

- *Landform:* Ridges
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Concave
- *Across-slope shape:* Convex
- *Parent material:* Loess over pedisediment over residuum weathered from limestone

Typical profile

- *Ap - 0 to 8 inches:* silt loam
- *Bt1 - 8 to 20 inches:* gravelly silty clay loam
- *2Btx - 20 to 34 inches:* very gravelly silt loam
- *3Bt2 - 34 to 79 inches:* very gravelly clay

Properties and qualities

- *Slope:* 3 to 8 percent
- *Depth to restrictive feature:* 13 to 25 inches to fragipan
- *Drainage class:* Moderately well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
- *Depth to water table:* About 12 to 24 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 capacity:* Low (about 3.5 inches)

016 – KFA, 022 - GEA

70026—Tonti silt loam, 1 to 3 percent slopes

Map Unit Setting

Form R
Part 3.60
Soils Information:

- *National map unit symbol:* 2qpbw
- *Elevation:* 900 to 1,400 feet
- *Mean annual precipitation:* 41 to 45 inches
- *Mean annual air temperature:* 55 to 57 degrees F
- *Frost-free period:* 194 to 221 days
- *Farmland classification:* All areas are prime farmland

Map Unit Composition

- *Tonti and similar soils:* 80 percent
- *Minor components:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Tonti

Setting

- *Landform:* Interfluves
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Linear
- *Parent material:* Loess over pedisediment over residuum weathered from limestone

Typical profile

- *Ap - 0 to 8 inches:* silt loam
- *Bt1 - 8 to 20 inches:* gravelly silty clay loam
- *2Btx - 20 to 34 inches:* very gravelly silt loam
- *3Bt2 - 34 to 79 inches:* very gravelly clay

Properties and qualities

- *Slope:* 1 to 3 percent
- *Depth to restrictive feature:* 13 to 25 inches to fragipan
- *Drainage class:* Moderately well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
- *Depth to water table:* About 12 to 20 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 capacity:* Low (about 3.5 inches)

007 – BWB, 008 – BWC, 009 – JBA, 012 – JWB, 014 – JWE, 018 – JRA, 019 - JGA

73000—Pomme silt loam, 3 to 8 percent slopes

Map Unit Setting

Form R
Part 3.60
Soils Information:

- *National map unit symbol:* 2qpf3
- *Elevation:* 500 to 1,200 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* All areas are prime farmland

Map Unit Composition

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

Description of Pomme

Setting

- *Landform:* Strath terraces
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Convex
- *Across-slope shape:* Linear
- *Parent material:* Colluvium

Typical profile

- *Ap - 0 to 7 inches:* silt loam
- *Bt1 - 7 to 20 inches:* silty clay loam
- *2Bt2 - 20 to 57 inches:* very gravelly silty clay loam
- *2Bt3 - 57 to 79 inches:* very gravelly clay

Properties and qualities

- *Slope:* 3 to 8 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 high (0.57 to 1.98 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 capacity:* Moderate (about 7.3 inches)

012 – JWB, 016 - KFA

73017—Bendavis-Poynor complex, 15 to 50 percent slopes, rocky, very stony

Map Unit Setting

- *National map unit symbol:* 2qpff
- *Elevation:* 700 to 1,500 feet

Form R
Part 3.60
Soils Information:

- *Mean annual precipitation:* 39 to 51 inches
- *Mean annual air temperature:* 47 to 70 degrees F
- *Frost-free period:* 172 to 239 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Bendavis and similar soils:* 70 percent
- *Poynor and similar soils:* 20 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Bendavis

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Slope alluvium over chert

Typical profile

- *A - 0 to 3 inches:* very gravelly silt loam
- *E - 3 to 14 inches:* very gravelly silt loam
- *Bt - 14 to 34 inches:* very gravelly silt loam
- *2R - 34 to 79 inches:* bedrock

Properties and qualities

- *Slope:* 15 to 50 percent
- *Surface area covered with cobbles, stones or boulders:* 1.5 percent
- *Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
- *Drainage class:* Moderately well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
- *Depth to water table:* About 2 to 18 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 capacity:* Low (about 3.9 inches)

007 – BWB, 008 – BWC, 010 – JBB, 011 – JWA, 017 – TEA, 020 – STA, 021 – STB, 022 - EGA

73019—Poynor very gravelly silt loam, 1 to 8 percent slopes

Map Unit Setting

- *National map unit symbol:* 2qpfh

Form R
Part 3.60
Soils Information:

- *Elevation:* 500 to 1,500 feet
- *Mean annual precipitation:* 39 to 51 inches
- *Mean annual air temperature:* 54 to 60 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

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

Description of Poynor

Setting

- *Landform:* Interfluves
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Slope alluvium over residuum weathered from dolomite

Typical profile

- *A - 0 to 4 inches:* very gravelly silt loam
- *E - 4 to 10 inches:* very gravelly silt loam
- *Bt1 - 10 to 28 inches:* very gravelly silty clay loam
- *2Bt2 - 28 to 79 inches:* clay

Properties and qualities

- *Slope:* 1 to 8 percent
- *Depth to restrictive feature:* 10 to 39 inches to strongly contrasting textural stratification
- *Drainage class:* Well drained
- *Runoff class:* Medium
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 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 capacity:* Very low (about 2.8 inches)

<u>008 – BWC, 010 – JBB, 014 - JWE</u>

73021—Poynor extremely gravelly silt loam, 15 to 35 percent slopes, stony

Map Unit Setting

- *National map unit symbol:* 2qpfj

Form R
Part 3.60
Soils Information:

- *Elevation:* 800 to 1,300 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

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

Description of Poynor

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Slope alluvium over residuum weathered from dolomite

Typical profile

- *A - 0 to 4 inches:* extremely gravelly silt loam
- *E - 4 to 10 inches:* very gravelly silt loam
- *Bt1 - 10 to 28 inches:* very gravelly silty clay loam
- *2Bt2 - 28 to 79 inches:* clay

Properties and qualities

- *Slope:* 15 to 35 percent
- *Surface area covered with cobbles, stones or boulders:* 0.1 percent
- *Depth to restrictive feature:* 10 to 39 inches to strongly contrasting textural stratification
- *Drainage class:* Well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 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 capacity:* Very low (about 2.8 inches)

<u>008 – BWC, 009 – JBA, 012 – JWB, 016 – KFA, 023 - GEB</u>

73023—Mano-Ocie complex, 1 to 8 percent slopes

Map Unit Setting

Form R
Part 3.60
Soils Information:

- *National map unit symbol:* 2qpfl
- *Elevation:* 800 to 1,500 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Mano and similar soils:* 65 percent
- *Ocie and similar soils:* 25 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Mano

Setting

- *Landform:* Interfluves
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Slope alluvium over residuum weathered from dolomite

Typical profile

- *A - 0 to 3 inches:* gravelly silt loam
- *E - 3 to 13 inches:* gravelly silt loam
- *Bt1 - 13 to 33 inches:* very gravelly silt loam
- *2Bt2 - 33 to 79 inches:* clay

Properties and qualities

- *Slope:* 1 to 8 percent
- *Depth to restrictive feature:* 16 to 40 inches to strongly contrasting textural stratification
- *Drainage class:* Moderately well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
- *Depth to water table:* About 24 to 36 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 capacity:* Low (about 4.2 inches)

008 – BWC, 012 - JWB

73057—Jerktail silt loam, 1 to 3 percent slopes

Form R
Part 3.60
Soils Information:

Map Unit Setting

- *National map unit symbol:* 2qpgc
- *Elevation:* 500 to 1,200 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Jerktail and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Jerktail

Setting

- *Landform:* Interfluves
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Loess over slope alluvium over residuum weathered from dolomite over dolomite

Typical profile

- *Ap - 0 to 5 inches:* silt loam
- *Bt1 - 5 to 17 inches:* silt loam
- *2Bt2 - 17 to 63 inches:* clay
- *2R - 63 to 79 inches:* bedrock

Properties and qualities

- *Slope:* 1 to 3 percent
- *Depth to restrictive feature:* 60 to 79 inches to lithic bedrock
- *Drainage class:* Somewhat poorly drained
- *Runoff class:* Very high
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to low (0.00 to 0.01 in/hr)
- *Depth to water table:* About 11 to 24 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 capacity:* Moderate (about 6.9 inches)

011 – JWA, 012 – JWB, 019 - JGA

73058—Gunlock silt loam, 1 to 8 percent slopes

Map Unit Setting

Form R
Part 3.60
Soils Information:

- *National map unit symbol:* 2qpgd
- *Elevation:* 600 to 1,400 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* All areas are prime farmland

Map Unit Composition

- *Gunlock and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Gunlock

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Footslope
- *Landform position (three-dimensional):* Base slope
- *Down-slope shape:* Concave
- *Across-slope shape:* Concave
- *Parent material:* Loess over colluvium over residuum weathered from dolomite

Typical profile

- *Ap - 0 to 5 inches:* silt loam
- *Bt - 5 to 25 inches:* silty clay loam
- *2Btx - 25 to 43 inches:* gravelly silty clay loam
- *3Bt - 43 to 79 inches:* gravelly clay

Properties and qualities

- *Slope:* 1 to 8 percent
- *Depth to restrictive feature:* 20 to 39 inches to undefined
- *Drainage class:* Moderately well drained
- *Runoff class:* Very high
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
- *Depth to water table:* About 4 to 9 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 capacity:* Low (about 4.3 inches)

016 - KFA

73063—Bendavis-Poynor complex, 1 to 8 percent slopes

Map Unit Setting

- *National map unit symbol:* 2qpgg

- *Elevation:* 800 to 1,500 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* All areas are prime farmland

Map Unit Composition

- *Bendavis and similar soils:* 60 percent
- *Poynor and similar soils:* 30 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Bendavis

Setting

- *Landform:* Interfluves
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Slope alluvium over chert

Typical profile

- *Ap - 0 to 8 inches:* gravelly silt loam
- *E - 8 to 10 inches:* gravelly silt loam
- *Bt - 10 to 31 inches:* very gravelly silt loam
- *2R - 31 to 79 inches:* bedrock

Properties and qualities

- *Slope:* 1 to 8 percent
- *Surface area covered with cobbles, stones or boulders:* 0.0 percent
- *Depth to restrictive feature:* 23 to 39 inches to lithic bedrock
- *Drainage class:* Moderately well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
- *Depth to water table:* About 21 to 36 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 capacity:* Low (about 4.3 inches)

014 – JWE, 017 - TEA

73073—Scholten-Poynor complex, 8 to 15 percent slopes

Map Unit Setting

- *National map unit symbol:* 2vxwp

- *Elevation:* 800 to 1,200 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Scholten and similar soils:* 50 percent
- *Poynor and similar soils:* 35 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Scholten

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Shoulder
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Slope alluvium over pedisediment over residuum weathered from dolomite

Typical profile

- *Ap - 0 to 7 inches:* very gravelly silt loam
- *Bt1 - 7 to 21 inches:* very gravelly silt loam
- *2Btx - 21 to 34 inches:* very gravelly silt loam
- *3Bt2 - 34 to 79 inches:* gravelly clay

Properties and qualities

- *Slope:* 8 to 15 percent
- *Depth to restrictive feature:* 18 to 28 inches to fragipan
- *Drainage class:* Moderately well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
- *Depth to water table:* About 16 to 26 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 capacity:* Very low (about 2.4 inches)

007 – BWB, 008 – BWC, 009 – JBA, 011 – JWA, 012 – JWB, 016 – KFA, 018 – JRA, 020 – STA, 021 – STB, 022 – GEA, 023 - GEB

73076—Mano-Ocie complex, 15 to 35 percent slopes, stony

Map Unit Setting

Form R
Part 3.60
Soils Information:

- *National map unit symbol:* 2qpgs
- *Elevation:* 550 to 1,500 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Farmland of statewide importance

Map Unit Composition

- *Mano and similar soils:* 50 percent
- *Ocie and similar soils:* 35 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Mano

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Slope alluvium over residuum weathered from dolomite

Typical profile

- *A - 0 to 3 inches:* very gravelly silt loam
- *E - 3 to 13 inches:* very gravelly silt loam
- *Bt1 - 13 to 33 inches:* very gravelly silt loam
- *2Bt2 - 33 to 79 inches:* clay

Properties and qualities

- *Slope:* 15 to 35 percent
- *Surface area covered with cobbles, stones or boulders:* 0.1 percent
- *Depth to restrictive feature:* 16 to 40 inches to strongly contrasting textural stratification
- *Drainage class:* Moderately well drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
- *Depth to water table:* About 24 to 36 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 capacity:* Low (about 3.9 inches)

012 - JWB

Form R
Part 3.60
Soils Information:

73077—Eudy silt loam, 1 to 8 percent slopes

Map Unit Setting

- *National map unit symbol:* 2qpgt
- *Elevation:* 500 to 1,400 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Prime farmland if drained

Map Unit Composition

- *Eudy and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Eudy

Setting

- *Landform:* Interfluves
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Loess over residuum weathered from dolomite over dolomite

Typical profile

- *Ap - 0 to 6 inches:* silt loam
- *Bt1 - 6 to 14 inches:* silt loam
- *2Bt2 - 14 to 36 inches:* gravelly clay
- *2R - 36 to 79 inches:* bedrock

Properties and qualities

- *Slope:* 1 to 8 percent
- *Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
- *Drainage class:* Somewhat poorly drained
- *Runoff class:* High
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* About 11 to 20 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 capacity:* Low (about 5.2 inches)

008 – BWC, 010 – JBB, 012 - JWB

73197—Viburnum silt loam, 3 to 8 percent slopes

Form R
Part 3.60
Soils Information:

Map Unit Setting

- *National map unit symbol:* 2vxwr
- *Elevation:* 1,100 to 1,390 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Farmland of statewide importance

Map Unit Composition

- *Viburnum and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Viburnum

Setting

- *Landform:* Ridges
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Loess over slope alluvium over residuum weathered from dolomite

Typical profile

- *Ap - 0 to 6 inches:* silt loam
- *2Bt1 - 6 to 18 inches:* gravelly silty clay loam
- *2Bt2 - 18 to 35 inches:* gravelly silty clay
- *3Bt3 - 35 to 79 inches:* very gravelly clay

Properties and qualities

- *Slope:* 3 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Moderately well drained
- *Runoff class:* Medium
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
- *Depth to water table:* About 15 to 20 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 capacity:* Moderate (about 6.3 inches)

008 – BWC, 011 – JWA, 012 – JWB, 014 – JWE, 017 - TEA

73198—Gressy-Viraton complex, 3 to 8 percent slopes

Map Unit Setting

Form R
Part 3.60
Soils Information:

- *National map unit symbol:* 2qpjy
- *Elevation:* 700 to 1,200 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* All areas are prime farmland

Map Unit Composition

- *Gressy and similar soils:* 50 percent
- *Viraton and similar soils:* 40 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Gressy

Setting

- *Landform:* Ridges
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Loess over slope alluvium over residuum weathered from dolomite

Typical profile

- *Ap - 0 to 7 inches:* silt loam
- *Bt1 - 7 to 31 inches:* silt loam
- *2Bt2 - 31 to 49 inches:* gravelly clay loam
- *3Bt3 - 49 to 79 inches:* gravelly clay

Properties and qualities

- *Slope:* 3 to 8 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 (0.06 to 0.20 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 capacity:* Moderate (about 8.3 inches)

008 – BWC, 009 – JBA, 010 – JBB, 014 – JWE, 016 – KFA, 017 - TEA

73220—Poynor extremely gravelly silt loam, 8 to 15 percent slopes

Map Unit Setting

- *National map unit symbol:* 2qpk3
- *Elevation:* 700 to 1,300 feet
- *Mean annual precipitation:* 36 to 51 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* All areas are prime farmland

Map Unit Composition

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

Description of Poynor

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Slope alluvium over residuum weathered from dolomite

Typical profile

- *Ap - 0 to 4 inches:* extremely gravelly silt loam
- *E - 4 to 10 inches:* very gravelly silt loam
- *Bt1 - 10 to 28 inches:* very gravelly silty clay loam
- *2Bt2 - 28 to 79 inches:* clay

Properties and qualities

- *Slope:* 8 to 15 percent
- *Depth to restrictive feature:* 10 to 39 inches to strongly contrasting textural stratification
- *Drainage class:* Well drained
- *Runoff class:* Medium
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 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 capacity:* Very low (about 2.8 inches)

018 - JRA

73221—Poynor very gravelly silt loam, karst, 3 to 35 percent slopes, stony

Map Unit Setting

Form R
Part 3.60
Soils Information:

- *National map unit symbol:* 2qpk4
- *Elevation:* 800 to 1,500 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Farmland of statewide importance

Map Unit Composition

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

Description of Poynor

Setting

- *Landform:* Hillslopes, sinkholes
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear, concave
- *Across-slope shape:* Linear, concave
- *Parent material:* Slope alluvium over residuum weathered from dolomite

Typical profile

- *Ap - 0 to 4 inches:* very gravelly silt loam
- *E - 4 to 10 inches:* very gravelly silt loam
- *Bt1 - 10 to 28 inches:* very gravelly silt loam
- *2Bt2 - 28 to 79 inches:* clay

Properties and qualities

- *Slope:* 3 to 35 percent
- *Surface area covered with cobbles, stones or boulders:* 0.1 percent
- *Depth to restrictive feature:* 10 to 39 inches to strongly contrasting textural stratification
- *Drainage class:* Well drained
- *Runoff class:* Medium
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 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 capacity:* Very low (about 2.4 inches)

009 – JBA, 012 – JWB, 014 – JWE, 016 – KFA, 022 - GEA

Form R
Part 3.60
Soils Information:

73228—Gatewood-Moko complex, 3 to 15 percent slopes, very rocky, very flaggy

Map Unit Setting

- *National map unit symbol:* 2qpkb
- *Elevation:* 500 to 1,500 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* All areas are prime farmland

Map Unit Composition

- *Gatewood and similar soils:* 55 percent
- *Moko and similar soils:* 25 percent
- *Minor components:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Gatewood

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Slope alluvium over residuum weathered from dolomite over dolomite

Typical profile

- *A - 0 to 2 inches:* very gravelly silt loam
- *E - 2 to 5 inches:* very gravelly silt loam
- *2Bt - 5 to 36 inches:* gravelly clay
- *2R - 36 to 79 inches:* bedrock

Properties and qualities

- *Slope:* 3 to 15 percent
- *Surface area covered with cobbles, stones or boulders:* 2.0 percent
- *Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
- *Drainage class:* Moderately well drained
- *Runoff class:* Very high
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* About 18 to 36 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 capacity:* Low (about 4.0 inches)

Form R
Part 3.60
Soils Information:

022 – GEA, 023 – GEB

73229—Gatewood-Moko complex, 15 to 35 percent slopes, very rocky, very flaggy

Map Unit Setting

- *National map unit symbol:* 2qpkc
- *Elevation:* 500 to 1,500 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Farmland of statewide importance

Map Unit Composition

- *Gatewood and similar soils:* 50 percent
- *Moko and similar soils:* 30 percent
- *Minor components:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Gatewood

Setting

- *Landform:* Hillslopes
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Slope alluvium over residuum weathered from dolomite over dolomite

Typical profile

- *A - 0 to 2 inches:* gravelly silt loam
- *E - 2 to 5 inches:* very gravelly silt loam
- *2Bt - 5 to 36 inches:* cobbly clay
- *2R - 36 to 79 inches:* bedrock

Properties and qualities

- *Slope:* 15 to 35 percent
- *Surface area covered with cobbles, stones or boulders:* 2.0 percent
- *Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
- *Drainage class:* Moderately well drained
- *Runoff class:* Very high
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
- *Depth to water table:* About 18 to 36 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 capacity:* Low (about 4.1 inches)

008 – BWC, 011 – JWA, 012 – JWB, 016 - KFA

75392—Stultz very cobbly loam, 1 to 3 percent slopes, frequently flooded

Map Unit Setting

- *National map unit symbol:* 2qq0h
- *Elevation:* 500 to 950 feet
- *Mean annual precipitation:* 39 to 49 inches
- *Mean annual air temperature:* 54 to 59 degrees F
- *Frost-free period:* 172 to 232 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Stultz and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Stultz

Setting

- *Landform:* Drainageways
- *Landform position (three-dimensional):* Talf
- *Down-slope shape:* Linear
- *Across-slope shape:* Concave
- *Parent material:* Alluvium over dolomite

Typical profile

- *Ap - 0 to 8 inches:* very cobbly loam
- *AC - 8 to 20 inches:* gravelly clay loam
- *Cg - 20 to 51 inches:* extremely gravelly clay
- *2R - 51 to 79 inches:* bedrock

Properties and qualities

- *Slope:* 1 to 3 percent
- *Depth to restrictive feature:* 40 to 59 inches to lithic bedrock
- *Drainage class:* Somewhat poorly drained
- *Runoff class:* Low
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* About 4 to 13 inches
- *Frequency of flooding:* Frequent, Occasional, Rare
- *Frequency of ponding:* None
- *Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- *Available water capacity:* Low (about 4.3 inches)

FIELD ID		Nitrate Nitrogen as N (Mg/Kg)	Phosphorus as P (Bray 1P) (lbs./acre)	Sodium, Total (Mg/Kg)	Sodium, Exchangeble (percent)	Organic Matter (percent)	Cation Exchange Capacity	pH (standard units)	Potassium (lbs./acre)	Calcium (lbs./acre)	Magnesium (lbs./acre)
BWB 007	avg	13.9	246			3.3	9.6	7.1	85	3301	291
	min	2.1	105			2.3	8.3	6.9	84	2810	157
	max	25.7	362	77.4	0.0028	4.2	12	7.2	86	4076	471
BWC 008	avg	13.7	134			2.7	8.1	6.9	111	2826	168
	min	1.9	46			2.3	6.9	6.7	82	2395	124
	max	25.5	212	18	0.0027	3	10.1	7.1	165	3554	233
JBA 009	avg	7.4	50			2.7	7.6	6.4	101	2181	247
	min	3.2	34			1.7	6.4	6.2	54	1757	185
	max	15.9	66	65.9	0.0019	3.6	8.7	6.5	176	2454	359
JBB 010	avg	6.2	158			2.5	9.5	6.1	83	2200	246
	min	1	109			2.2	8.1	5.8	45	1334	129
	max	11.4	237	47.5	0.0013	2.8	10.9	6.3	132	2931	359
JWA - 011		12.6	41	40.8	0.0008	1.9	4.3	6	34	1148	90
JWB - 012		13.8	106	52.6	0.0012	2.6	5.9	5.9	64	1338	115
JWE - 014		7.67	14	53.4	0.001	2.4	5.2	6.4	76	1605	151
KFA - 016		6.58	16	42.9	0.0009	2.3	4.9	6.1	84	880	249
TEA - 017		8.54	27	49.3	0.001	1.6	6.7	6	108	1544	168
JRA - 018		10.6	16	56.6	0.0022	2.8	5.6	5.5	105	880	152
JGA - 019		7.75	11	44.3	0.0009	1.8	5.7	6.7	59	1682	347
STA - 020		10.4	19	43.5	0.0009	3.6	8.2	6.6	128	2201	490
STB - 021		6.74	4	55.4	0.0015	1.9	5.3	6.4	47	1401	286
GEA - 022		4.47	58	51	0.0009	2.4	7.6	4.8	90	411	110
GEB - 023		4.55	88	45.6	0.001	2.3	6	5.6	63	1002	230

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-1	Lab no. C2109339
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID BWB	Sample no 1	
Acres 160	Last Limed >5 yrs	Irrigated No
Last crop 13 BLUEGRASS PASTURE		FSA Copy N

This report is for:
DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)	6.9		**********					
Phosphorus (P)	362	lbs/A	**********	**********	**********	**********	**********	**********
Potassium (K)	85	lbs/A	**********					
Calcium (Ca)	3016	lbs/A	**********	**********	**********	**********		
Magnesium (Mg)	157	lbs/A	**********					
Sulfur (SO_4-S)		ppm						
Zinc (Zn)		ppm						
Manganese (Mn)		ppm						
Iron (Fe)		ppm						
Copper (Cu)		ppm						

Organic matter	3.5 %	Neutralizable acidity	0.0 meq/100g	Cation Exch. Capacity	8.3 meq/100g
PH in water		Electrical Conductivity	Mmho/cm	Sodium (Na)	lbs/A
Nitrate (NO_3-N) Topsoil	ppm	Subsoil ppm	Sampling Depth Top	Inches	Subsoil Inches

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	0	60		
13 BLUEGRASS PASTURE	200 CD/A	120	0	75		
19 COOL SEASON GR PAST	100 CD/A	60	0	65		
19 COOL SEASON GR PAST	200 CD/A	120	0	80		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	***

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 7.4 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---If no P2O5 or no K2O is recommended retest annually to determine when maintenance fertilizer should be applied.

***Limestone is not currently recommended. For a future limestone application, suggest using dolomitic limestone if readily available, but yield response to magnesium is not likely.

A CD/A is a pasture yield goal that means "cow day per acre." This is enough forage dry matter for a 1,000-pound cow with a calf less than 4 months old for one day. In Missouri this is considered to be 30 pounds of forage dry matter per day. For example, a yield goal of 200 CD/A is roughly equivalent to 3 tons of forage dry matter per acre.

onal Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*
Signature

White-Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Columbia

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-2	**Lab no. C2109340**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID BWC	Sample no 2	
Acres 160	Last Limed >5 yrs	Irrigated No
Last crop 13 BLUEGRASS PASTURE		FSA Copy N

This report is for:
DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)		6.9	**********					
Phosphorus	(P)	212 lbs/A	**********	**********	**********	**********	**********	**********
Potassium	(K)	82 lbs/A	**********					
Calcium	(Ca)	2529 lbs/A	**********	**********	**********	**********	**********	**********
Magnesium	(Mg)	124 lbs/A	**********	**********				
Sulfur	(SO_4-S)	ppm						
Zinc	(Zn)	ppm						
Manganese	(Mn)	ppm						
Iron	(Fe)	ppm						
Copper	(Cu)	ppm						

Organic matter 2.8 %	Neutralizable acidity 0.0 meq/100g	Cation Exch. Capacity 6.9 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	0	60		
13 BLUEGRASS PASTURE	200 CD/A	120	0	75		
19 COOL SEASON GR PAST	100 CD/A	60	0	65		
19 COOL SEASON GR PAST	200 CD/A	120	0	80		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	***

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 7.4 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---If no P2O5 or no K2O is recommended retest annually to determine when maintenance fertilizer should be applied.

***Limestone is not currently recommended. For a future limestone application, suggest using dolomitic limestone if readily available, but yield response to magnesium is not likely.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*
White-Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Signature

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-3	**Lab no. C2109341**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION			
Field ID JBA		Sample no 3	
Acres 27	Last Limed >5 yrs	Irrigated No	
Last crop 13 BLUEGRASS PASTURE		FSA Copy N	

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION				RATING					
				Very Low	Low	Medium	High	Very High	Excess
pH_S	(salt pH)	6.4		**********					
Phosphorus	(P)	66	lbs/A			**********			
Potassium	(K)	176	lbs/A		**********				
Calcium	(Ca)	1757	lbs/A				**********		
Magnesium	(Mg)	197	lbs/A			**********			
Sulfur	(SO_4-S)		ppm						
Zinc	(Zn)		ppm						
Manganese	(Mn)		ppm						
Iron	(Fe)		ppm						
Copper	(Cu)		ppm						

Organic matter 2.8	%	Neutralizable acidity 1.0	meq/100g	Cation Exch. Capacity 6.4	meq/100g
PH in water		Electrical Conductivity	Mmho/cm	Sodium (Na)	lbs/A

Nitrate (NO_3-N) Topsoil	ppm	Subsoil ppm	Sampling Depth	Top Inches	Subsoil Inches

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	0	20		
13 BLUEGRASS PASTURE	200 CD/A	120	0	35		
19 COOL SEASON GR PAST	100 CD/A	60	0	25		
19 COOL SEASON GR PAST	200 CD/A	120	0	40		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.9 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---If no P2O5 or no K2O is recommended retest annually to determine when maintenance fertilizer should be applied.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

White-Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Signature

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-4	**Lab no. C2109342**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID JBB	Sample no 4	
Acres 160	Last Limed >5 yrs	Irrigated No
Last crop 13 BLUEGRASS PASTURE		FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)		5.8	**********					
Phosphorus	(P)	109 lbs/A	**********	**********	**********	**********	**********	**********
Potassium	(K)	45 lbs/A	*******					
Calcium	(Ca)	1334 lbs/A	**********	**********	**********	**********		
Magnesium	(Mg)	129 lbs/A	**********	**********				
Sulfur	(SO_4-S)	ppm						
Zinc	(Zn)	ppm						
Manganese	(Mn)	ppm						
Iron	(Fe)	ppm						
Copper	(Cu)	ppm						

Organic matter 2.3 %	Neutralizable acidity 1.5 meq/100g	Cation Exch. Capacity 5.4 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	0	80		
13 BLUEGRASS PASTURE	200 CD/A	120	0	95		
19 COOL SEASON GR PAST	100 CD/A	60	0	85		
19 COOL SEASON GR PAST	200 CD/A	120	0	100		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	***

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.3 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---If no P2O5 or no K2O is recommended retest annually to determine when maintenance fertilizer should be applied.

***Limestone is not currently recommended. For a future limestone application, suggest using dolomitic limestone if readily available, but yield response to magnesium is not likely.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

White-Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Signature

Columbia

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-5	**Lab no. C2109343**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION			
Field ID JWA		Sample no 5	
Acres 40	Last Limed >5 yrs	Irrigated No	
Last crop 13 BLUEGRASS PASTURE			FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION				RATING					
				Very Low	Low	Medium	High	Very High	Excess
pH_S	(salt pH)	6.0		**********					
Phosphorus	(P)	41	lbs/A	**********	**********	**********			
Potassium	(K)	34	lbs/A	******					
Calcium	(Ca)	1148	lbs/A	**********	**********	**********	**********	**********	
Magnesium	(Mg)	90	lbs/A	**********	**********				
Sulfur	(SO_4-S)		ppm						
Zinc	(Zn)		ppm						
Manganese	(Mn)		ppm						
Iron	(Fe)		ppm						
Copper	(Cu)		ppm						

Organic matter 1.9 %	Neutralizable acidity 1.0 meq/100g	Cation Exch. Capacity 4.3 meq/100g
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	20	85		
13 BLUEGRASS PASTURE	200 CD/A	120	20	100		
19 COOL SEASON GR PAST	100 CD/A	60	20	90		
19 COOL SEASON GR PAST	200 CD/A	120	20	105		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	***

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.5 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

***Limestone is not currently recommended. For a future limestone application, suggest using dolomitic limestone if readily available, but yield response to magnesium is not likely.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*
Signature

White-Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Columbia
University of Missouri, Lincoln University, U.S. Department of Agriculture & Local University Extension Councils Cooperating
Equal opportunity institutions

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-6	**Lab no. C2109344**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID JWB	Sample no 6	
Acres 40	Last Limed >5 yrs	Irrigated No
Last crop 13 BLUEGRASS PASTURE		FSA Copy N

This report is for:
DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)		5.8	**********					
Phosphorus (P)		106 lbs/A				**********		
Potassium (K)		64 lbs/A	**********					
Calcium (Ca)		1338 lbs/A					**********	
Magnesium (Mg)		118 lbs/A				**********		
Sulfur (SO_4-S)		ppm						
Zinc (Zn)		ppm						
Manganese (Mn)		ppm						
Iron (Fe)		ppm						
Copper (Cu)		ppm						

Organic matter 2.6 %	Neutralizable acidity 2.0 meq/100g	Cation Exch. Capacity 5.9 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	0	70		
13 BLUEGRASS PASTURE	200 CD/A	120	0	85		
19 COOL SEASON GR PAST	100 CD/A	60	0	70		
19 COOL SEASON GR PAST	200 CD/A	120	0	90		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	***

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.3 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---If no P2O5 or no K2O is recommended retest annually to determine when maintenance fertilizer should be applied.

***Limestone is not currently recommended. For a future limestone application, suggest using dolomitic limestone if readily available, but yield response to magnesium is not likely.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*
Signature

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-7	**Lab no. C2109345**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION			
Field ID JWE	Sample no 7		
Acres 60	Last Limed >5 yrs	Irrigated No	
Last crop 13 BLUEGRASS PASTURE		FSA Copy N	

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)		6.4	**********					
Phosphorus	(P)	14 lbs/A	**********					
Potassium	(K)	76 lbs/A	**********					
Calcium	(Ca)	1605 lbs/A	**********					
Magnesium	(Mg)	151 lbs/A	**********					
Sulfur	(SO_4-S)	ppm						
Zinc	(Zn)	ppm						
Manganese	(Mn)	ppm						
Iron	(Fe)	ppm						
Copper	(Cu)	ppm						

Organic matter 2.4 %	Neutralizable acidity 0.5 meq/100g	Cation Exch. Capacity 5.2 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	40	60		
13 BLUEGRASS PASTURE	200 CD/A	120	45	75		
19 COOL SEASON GR PAST	100 CD/A	60	40	65		
19 COOL SEASON GR PAST	200 CD/A	120	45	80		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.9 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

White-Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Signature

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26464-8	**Lab no. C2109346**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION			
Field ID STA		Sample no 8	
Acres 125	Last Limed >5 yrs	Irrigated No	
Last crop 13 BLUEGRASS PASTURE			FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION				RATING					
				Very Low	Low	Medium	High	Very High	Excess
pH_s	(salt pH)	6.6		**********					
Phosphorus	(P)	19	lbs/A	**********					
Potassium	(K)	128	lbs/A	**********					
Calcium	(Ca)	2201	lbs/A	**********					
Magnesium	(Mg)	490	lbs/A	**********					
Sulfur	(SO_4-S)		ppm						
Zinc	(Zn)		ppm						
Manganese	(Mn)		ppm						
Iron	(Fe)		ppm						
Copper	(Cu)		ppm						

Organic matter 3.6	%	Neutralizable acidity 0.5	meq/100g	Cation Exch. Capacity 8.2	meq/100g
PH in water		Electrical Conductivity	Mmho/cm	Sodium (Na)	lbs/A

Nitrate (NO_3-N) Topsoil	ppm	Subsoil ppm	Sampling Depth	Top Inches	Subsoil Inches

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	30	40		
13 BLUEGRASS PASTURE	200 CD/A	120	35	55		
19 COOL SEASON GR PAST	100 CD/A	60	30	45		
19 COOL SEASON GR PAST	200 CD/A	120	35	60		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 7.1 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

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Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26463-1	**Lab no. C2109347**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID STB	Sample no 1	
Acres 100	Last Limed unknown	Irrigated No
Last crop		FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)	6.4		**********					
Phosphorus (P)	4	lbs/A	****					
Potassium (K)	47	lbs/A	********					
Calcium (Ca)	1401	lbs/A	**********					
Magnesium (Mg)	286	lbs/A	**********					
Sulfur (SO_4-S)		ppm						
Zinc (Zn)		ppm						
Manganese (Mn)		ppm						
Iron (Fe)		ppm						
Copper (Cu)		ppm						

Organic matter 1.9 %	Neutralizable acidity 0.5 meq/100g	Cation Exch. Capacity 5.3 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	65	80		
13 BLUEGRASS PASTURE	200 CD/A	120	70	95		
19 COOL SEASON GR PAST	100 CD/A	60	65	80		
19 COOL SEASON GR PAST	200 CD/A	120	70	100		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.9 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

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Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26463-2	**Lab no. C2109348**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID JRA	Sample no 2	
Acres 30	Last Limed unknown	Irrigated No
Last crop		FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)		5.5	**********					
Phosphorus (P)		16 lbs/A	**********					
Potassium (K)		106 lbs/A	**********					
Calcium (Ca)		880 lbs/A	**********					
Magnesium (Mg)		182 lbs/A	**********					
Sulfur	(SO_4-S)	ppm						
Zinc	(Zn)	ppm						
Manganese	(Mn)	ppm						
Iron	(Fe)	ppm						
Copper	(Cu)	ppm						

Organic matter 2.0 %	Neutralizable acidity 2.5 meq/100g	Cation Exch. Capacity 5.6 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	35	45		
13 BLUEGRASS PASTURE	200 CD/A	120	40	60		
19 COOL SEASON GR PAST	100 CD/A	60	35	50		
19 COOL SEASON GR PAST	200 CD/A	120	40	65		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	405
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.0 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---To determine limestone needed in tons/acre, divide your ENM requirement by the guarantee of your limestone dealer.

The most limiting factor is the low pH. It will take some time for this lime recommendation to adjust the pH to the desired level.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

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Soil Test Report

Soil Testing Laboratory
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Phone: (573) 882-0623

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Serial no. T26463-3	**Lab no. C2109349**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID KFA	Sample no 3	
Acres 45	Last Limed unknown	Irrigated No
Last crop		FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION				RATING					
				Very Low	Low	Medium	High	Very High	Excess
pH_s	(salt pH)	6.1		**********					
Phosphorus	(P)	16	lbs/A	**********					
Potassium	(K)	84	lbs/A	**********					
Calcium	(Ca)	898	lbs/A	**********					
Magnesium	(Mg)	249	lbs/A	**********					
Sulfur	(SO_4-S)		ppm						
Zinc	(Zn)		ppm						
Manganese	(Mn)		ppm						
Iron	(Fe)		ppm						
Copper	(Cu)		ppm						

Organic matter	2.3 %	Neutralizable acidity	1.5 meq/100g	Cation Exch. Capacity	4.9 meq/100g		
PH in water		Electrical Conductivity	Mmho/cm	Sodium (Na)	lbs/A		
Nitrate (NO_3-N) Topsoil	ppm	Subsoil ppm	Sampling Depth	Top	Inches	Subsoil	Inches

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	35	55		
13 BLUEGRASS PASTURE	200 CD/A	120	40	70		
19 COOL SEASON GR PAST	100 CD/A	60	35	60		
19 COOL SEASON GR PAST	200 CD/A	120	40	75		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.6 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

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Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26463-4	**Lab no. C2109350**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID JGA	Sample no 4	
Acres 12	Last Limed unknown	Irrigated No
Last crop		FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION				RATING					
				Very Low	Low	Medium	High	Very High	Excess
pH_s	(salt pH)	6.7		**********					
Phosphorus	(P)	11	lbs/A	********					
Potassium	(K)	59	lbs/A	**********					
Calcium	(Ca)	1682	lbs/A	**********					
Magnesium	(Mg)	347	lbs/A	**********					
Sulfur	(SO_4-S)		ppm						
Zinc	(Zn)		ppm						
Manganese	(Mn)		ppm						
Iron	(Fe)		ppm						
Copper	(Cu)		ppm						

Organic matter 1.8 %	Neutralizable acidity 0.0 meq/100g	Cation Exch. Capacity 5.7 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	45	70		
13 BLUEGRASS PASTURE	200 CD/A	120	50	85		
19 COOL SEASON GR PAST	100 CD/A	60	45	75		
19 COOL SEASON GR PAST	200 CD/A	120	50	90		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 7.2 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

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Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26463-5	**Lab no. C2109351**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID TEA	Sample no 5	
Acres 55	Last Limed unknown	Irrigated No
Last crop		FSA Copy N

This report is for:

DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s	(salt pH)	6.0	**********					
Phosphorus	(P)	27 lbs/A		**********				
Potassium	(K)	108 lbs/A			**********			
Calcium	(Ca)	1544 lbs/A				**********		
Magnesium	(Mg)	168 lbs/A				**********		
Sulfur	(SO_4-S)	ppm						
Zinc	(Zn)	ppm						
Manganese	(Mn)	ppm						
Iron	(Fe)	ppm						
Copper	(Cu)	ppm						

Organic matter 1.6 %	Neutralizable acidity 2.0 meq/100g	Cation Exch. Capacity 6.7 meq/100g			
PH in water	Electrical Conductivity Mmho/cm	Sodium (Na) lbs/A			
Nitrate (NO_3-N) Topsoil ppm	Subsoil ppm	Sampling Depth Top Inches	Subsoil Inches		

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	20	50		
13 BLUEGRASS PASTURE	200 CD/A	120	25	65		
19 COOL SEASON GR PAST	100 CD/A	60	20	50		
19 COOL SEASON GR PAST	200 CD/A	120	25	65		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.5 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*

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Columbia

Extension
University of Missouri

Soil Test Report

Soil Testing Laboratory
23 Mumford Hall, MU
Columbia, MO 65211
Phone: (573) 882-0623

https://soilplantlab.missouri.edu/

Serial no. T26463-6	**Lab no. C2109352**
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID GEA	Sample no 6	
Acres 60	Last Limed unknown	Irrigated No
Last crop		FSA Copy N

This report is for:
DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION			RATING					
			Very Low	Low	Medium	High	Very High	Excess
pH_s (salt pH)		4.8	**********					
Phosphorus (P)		58 lbs/A	**********	**********	**********	**********	**********	**********
Potassium (K)		90 lbs/A	**********	**********				
Calcium (Ca)		411 lbs/A	**********	**********	**********	**********	**********	
Magnesium (Mg)		110 lbs/A	**********	**********	**********			
Sulfur (SO_4-S)		ppm						
Zinc (Zn)		ppm						
Manganese (Mn)		ppm						
Iron (Fe)		ppm						
Copper (Cu)		ppm						

Organic matter	2.4 %	Neutralizable acidity	6.0 meq/100g	Cation Exch. Capacity	7.6 meq/100g
PH in water		Electrical Conductivity	Mmho/cm	Sodium (Na)	lbs/A
Nitrate (NO_3-N) Topsoil	ppm	Subsoil ppm	Sampling Depth	Top Inches	Subsoil Inches

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
13 BLUEGRASS PASTURE	100 CD/A	60	20	60		
13 BLUEGRASS PASTURE	200 CD/A	120	20	75		
19 COOL SEASON GR PAST	100 CD/A	60	20	60		
19 COOL SEASON GR PAST	200 CD/A	120	20	75		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	1575
Effective magnesium (EMg)	***

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 5.3 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---To determine limestone needed in tons/acre, divide your ENM requirement by the guarantee of your limestone dealer.

***Suggest using dolomitic limestone if readily available, but yield response to magnesium is not likely.

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*
Signature

White-Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Columbia

Extension
University of Missouri

Soil Test Report

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Serial no. T26463-7	Lab no. C2109353
County Texas	Region 7
Submitted 4/15/2021	Processed 4/21/2021

Soil sample submitted by: Firm Number: Outlet:

FIELD INFORMATION		
Field ID GEB	Sample no 7	
Acres 30	Last Limed unknown	Irrigated No
Last crop		FSA Copy N

This report is for:
DAIRY FARMERS OF AMERICA
958 SHELTON DRIVE
CABOOL MO 65689

SOIL TEST INFORMATION				RATING					
				Very Low	Low	Medium	High	Very High	Excess
pH_s	(salt pH)	5.6		**********					
Phosphorus	(P)	88	lbs/A	**********	**********	**********	**********	**********	
Potassium	(K)	63	lbs/A	**********					
Calcium	(Ca)	1002	lbs/A	**********	**********	**********			
Magnesium	(Mg)	230	lbs/A	**********	**********	**********			
Sulfur	(SO_4-S)		ppm						
Zinc	(Zn)		ppm						
Manganese	(Mn)		ppm						
Iron	(Fe)		ppm						
Copper	(Cu)		ppm						

Organic matter	2.3	%	Neutralizable acidity	2.5	meq/100g	Cation Exch. Capacity	6.0 meq/100g
PH in water			Electrical Conductivity		Mmho/cm	Sodium (Na)	lbs/A

Nitrate (NO_3-N) Topsoil	ppm	Subsoil	ppm	Sampling Depth	Top	Inches	Subsoil	Inches

NUTRIENT REQUIREMENTS

Cropping options	Yield goal	Pounds per acre N	P_2O_5	K_2O	Zn	S
10 BLUEGRASS PASTURE	100 CD/A	60	0	70		
13 BLUEGRASS PASTURE	200 CD/A	120	0	85		
19 COOL SEASON GR PAST	100 CD/A	60	0	70		
19 COOL SEASON GR PAST	200 CD/A	120	0	90		

LIMESTONE SUGGESTIONS

Effective Neutralizing Material (ENM)	0
Effective magnesium (EMg)	0

Comments

---For cool season grass pasture and bluegrass pasture split nitrogen applications between late Spring after first grazing and mid August, applying 60% before the season of greatest need.

---Some herbicide labels list restrictions based on soil pH in water. This sample has an estimated pH in water of 6.1 . Use this estimated pH in water as a guide. If you wish to have soil pH in water analyzed, contact your dealer or Extension specialist listed below.

---If no P2O5 or no K2O is recommended retest annually to determine when maintenance fertilizer should be applied.

The current soil pH is adequate for grass production; however, at this pH some of the soil nutrients are unavailable to the plant. Adjusting the pH to 6.0 will make available 100% of N, P, K, and other nutrients. For most soils in the region this is an additional ½ to 1 tons of limestone per acre. If you would like me to change your soil reports to reflect a higher pH please call. – SK

Regional Agronomy Specialist Sarah Kenyon Phone 417-256-2391 *Sarah Kenyon*
Signature

Farmer, Yellow-FSA, Blue-Firm, Pink-Extension MP 189 Revised 1/96 Columbia
University of Missouri, Lincoln University, U.S. Department of Agriculture & Local University Extension Councils Cooperating
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MU Soil Testing and Plant Diagnostic Service Laboratories
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Columbia, MO. 65211
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UNIVERSITY OF MISSOURI
MU Extension

April 29, 2021

Dairy Farmers of America
958 Shelton Drive
Cabool, MO 65689

Special test Lab No	Original Lab No	NO_3-N mg/kg	Total Na mg/kg	Exchangeble Na %		
S210930	C2109339	25.7	77.4	0.0028		
S210931	C2109340	25.5	65.9	0.0027		
S210932	C2109341	15.9	50.6	0.0019		
S210933	C2109342	11.4	47.5	0.0013		
S210934	C2109343	12.6	40.8	0.0008		
S210935	C2109344	13.8	52.6	0.0012		
S210936	C2109345	7.67	53.4	0.0010		
S210937	C2109346	10.4	43.5	0.0009		
S210938	C2109347	6.74	55.4	0.0015		
S210939	C2109348	10.6	56.6	0.0022		
S210940	C2109349	6.58	42.9	0.0009		
S210941	C2109350	7.75	44.3	0.0009		
S210942	C2109351	8.54	49.3	0.0010		
S210943	C2109352	4.47	51.0	0.0009		
S210944	C2109353	4.55	45.6	0.0010		

THIS MARK MATTERS. DFA Dairy Farmers of America

Land Application Manual
For
Cabool, Missouri
Dairy Farmers of America
Land Application of Biosolids

Revised
March 2021

Index

I. Introduction

The guidelines and procedures set forth in this Land Application Manual concern the utilization of biosolids produced as a by-product from the pretreatment of dairy processing wastes at the Cabool DFA Facility.

The purpose of this manual is to provide the operators of the Cabool DFA pretreatment Facility guidelines for the land application of biosolids. This manual addresses the methods necessary to ensure safe loading rates to the soil as well as ensuring that no negative impacts are made to the environment.

II. Guidelines for the Land Application of Biosolids

A. Application Rates (PAN & Dry Tons)

To comply with permit regulations and to ease record keeping restrictions, DFA limits the Nutrient Loading Rate of Plant Available Nitrogen (PAN) to less than 40 lbs./acre/year on all fields. Further, DFA limits the Total Dry Ton loading rate to less than 2 dry tons/acre/year on permitted sites with slopes greater than 12%. No reporting of crop yields is necessary as long as these limits are maintained. The calculation on PAN loading rates is further discussed in the Nutrient Management Plan found in this Section II.F of this manual.

B. Separation Distances and Slope Limitations

Separation distances from property lines, streams, wells, and other features are necessary to ensure that biosolids do not enter into any waters of the state. Below is a list of separation distances and the procedure to maintain these distances.

Procedure for Establishing Distances:

- Identify all features to maintain a distance from
- Measure distance from each feature that will be near the application area
- Make a first pass around the area observing the distances with no discharge from the truck
- Make a second pass inside the first and keep all subsequent passes working away from the features requiring a distance separation

Distance Limitations:

300 ft when any of the following are down gradient from the application area:

- Permanent Flowing Stream
- Losing Steam
- Lake or Pond
- Water Supply Well

150 ft from the following:

- Dwellings
- Wetlands

50 ft from the following:

- Intermittent (wet weather) Flowing Streams
- Property Boundary

Slope Limitations:

0-6 % Slopes:

No restrictions apply other than those to maintain loading rates found in the Nutrient Management Plan.

7-12 % Slopes:

Application may occur where such slopes exist if conservation practices are in place such as terracing or dikes to prevent soil erosion. Application may only occur on land maintained in grass vegetation.

>12% Slopes

Application may occur only when grass is vegetated and maintained with at least 80 percent ground cover at a rate of two dry tons per acre per year or less

C. Wet or Frozen Ground Limitations

Biosolids will not be applied during rainfall events, saturated soil conditions or when the ground is frozen. However, if application is deemed necessary due to long periods of inclement weather, the following guidelines will be followed.

- A maximum slope of 6 % and a minimum 300 feet grass buffer between the application site and waters of the state must be maintained.

D. Wet Weather Forecast Limitations

In the event there is a forecast of significant rainfall within 24 hours, no land application is to occur. Should the forecast be changed or if there is reasonable reason to believe the forecast is for other parts of the viewing or listening area,

land application may occur (if necessary) following the Wet or Frozen Ground Limitations established above. Operators should refrain from land application if at all possible when rain is forecasted.

E. Number of Suitable Days for Application

The Cabool DFA Facility typically land applies between 90-120 days per calendar year. The number of suitable days per calendar year is believed to be around 250-300 days.

F. Nutrient Management Plan

To comply with DNR guidelines and to ease the burden of record keeping, the DFA plant will follow the Nutrient Management Plan below until it becomes necessary to increase loading rates above the current plan limits. In such case, the guidelines found in the Water Quality Guides published by the University of Missouri and available on DNR's website will be followed and this Plan revised accordingly. Until such time, the following will be maintained:

- PAN will be calculated based on lab tests conducted by an outside lab and a loading rate not to exceed 40 lbs/acre/year will be maintained on each land application site
- The total dry tons of biosolids are to be applied at a rate not to exceed 2 dry tons/acre/year on permitted sites with slopes greater than 12%.
- Land application will not occur on any land found to have more than 800 lbs available phosphorus/acre. (See WQ 426)

PAN Calculations:

To calculate dry tons of sludge applied:

Dry Tons = Volume of Sludge Applied (gal) x Percent Solids x 0.0000417

For Percent Solids use the whole number, example 2.3% use 2.3

Water Quality Guide 426 gives the following formula for converting Nitrogen forms to PAN mg/kg dry wt.

(Nitrate + nitrite nitrogen) + (organic nitrogen x 0.2) + (ammonia nitrogen x volatilization factor)

Use the volatilization factor of 0.7 for Cabool's application

The volatilization factors are 0.7 for surface application and 1.0 for subsurface injection.

To convert PAN mg/kg dry wt. to pounds per dry ton use the following formula:

PAN mg/kg dry wt x 0.002 = lbs PAN per dry ton

To calculate the lbs of PAN per acre use the following formula:

Dry tons applied per acre x pounds PAN/dry ton = lbs of PAN per acre

III.Land Application Management and Record Keeping

A. Site Maps

Site maps for each land application site can be found in Appendix. A. The site maps show the topography and locations of features requiring separation distances.

B. Sample Collection, Preservation and Testing

Biosolids Sampling:

- Biosolids samples will be collected at the truck when loading. A series of at least 7 samples will be collected and composited for testing. Samples collected for testing off-site will be transferred into prepared sample bottles with the proper preservative provided by the contract lab. Testing conducted at the Cabool plant will occur immediately after the last sample is collected and no preservation will be needed.
- Samples will be mixed thoroughly before being transferred to another container.
- Testing on-site will include pH and Total Solids on the composite sample for everyday land application takes place.
- All other testing will be conducted by an outside lab. (Currently CASI, Springfield, MO)

Soil Sampling:

- Samples are collected, at minimum, once every five (5) years and delivered to the Texas County University of Missouri Extension Office for Testing.
- Follow soil sampling procedures found in the University of Missouri guide located in Appendix B.
- Soil sampling is to occur between the months of March and September.

C. Spill Reporting Procedure

In the event a spill of biosolids, notify the Cabool Pretreatment Plant Manager immediately. Take any precautions necessary to keep the biosolids from entering any waters of the state. Should any biosolids reach waters of the State, the Southeast Regional Office of the Department of Natural Resources will be notified as soon as possible by phone and if requested, a follow up letter sent within five (5) days of the spill. Spills can be cleaned-up by vacuum truck and land applied on a permitted land application site covered within this plan.

The phone number to report spills during regular business hours is:

573-840-9750

Outside of normal business hours call the spill hotline:

573-634-2436

The address to mail a report to is:

2155 N. Westwood Blvd., Poplar Bluff, MO 63901

D. Operator Training

All land application operators will be trained in the operation of applicable equipment before being released to perform land application of biosolids. Furthermore, operators will be trained on the content of this program with an emphasis placed on gaining an understanding of the proper procedures and restrictions related to the actual land application of biosolids.

E. Land Application Equipment

Land application equipment used at the Cabool DFA Facility consists of 3,000 to 4,000-gallon vacuum trucks. Trucks are operated by third party contractors overseen by DFA personnel. Contact information for the contractors is noted below:

Randy Jarrett Hauling
102 Oak Forest Lane
Cabool, MO 65689
417-254-0337

Hillhouse Pumping Co. LLC
21009 Lawrence 1160
Verona, MO 65769
417-498-6548

F. Record Keeping

The operator performing the land application of biosolids is required to keep a log of the number of loads hauled. At the end of the day, the total is to be entered into the daily log sheet along with any other pertinent information required on the log sheet.

A record of land application totals as well as a record of PAN/acre and total solids dry ton/acre is kept on the plant computer in an Excel or equivalent file. These files will be updated on a regular basis to ensure the proper loading rates are observed.

A copy of the daily log and any other record keeping forms can be found in Appendix C.

Appendix A

Soil Maps of Application Areas

Land Application Areas

	ID	Owner	Legal Description & UTM Coordinates					
007	BWB	James Woods		NE 1/4	Sec. 14	T 28N	R 11W	Texas County
			Easting	579025		Northing	4107504	
008	BWC	James Woods		N 1/2	Sec. 23	T 28N	R 11W	Texas County
			Easting	578499		Northing	4105673	
009	JBA	John Beller		SW 1/4	Sec. 26	T 28N	R 11W	Texas County
			Easting	578285		Northing	4103478	
010	JBB	John Beller	SW 1/4	SW 1/4	Sec. 25	T 28N	R 11W	Texas County
			Easting	579762		Northing	4103366	
011	JWA	Joe Whetstine	N 1/2	NW 1/4	Sec. 20	T 29N	R 10W	Texas County
			Easting	582954		Northing	4115851	
012	JWB	Joe Whetstine	E 1/2	SE 1/4	Sec. 17	T 29N	R 10W	Texas County
			Easting	583959		Northing	4116537	
014	JWE	Joe Whetstine	W 1/2	SW 1/4	Sec. 9	T 29N	R 10W	Texas County
			Easting	584267		Northing	4118083	
New Permitted Features Proposed for Addition to Permit								
016	KFA	Kenny Foresythe	N 1/2	NW 1/4	Sec. 29	T 28N	R 12W	Wright County
			Easting			Northing		
017	TEA	Tony Estep		SW 1/4	Sec 9	T 29N	R 10W	Texas County
			Easting			Northing		
018	JRA	Jeffrey Roth		W 1/2	Sec 29	T 28N	R 12W	Wright County
			Easting			Northing		
019	JGA	James Grey		NE 1/4	Sec 13	T 28N	R 11W	Texas County
			Easting			Northing		
020	STA	Scott Tucker		E 1/2	Sec.14	T 28N	R 11W	Texas County
			Easting			Northing		
021	STB	Scott Tucker		SE 1/4	Sec. 18	T 29N	R 9W	Texas County
			Easting			Northing		
022	GEA	Gordon Evans		E 1/2	Sec 10	T 29N	R 11W	Texas County
			Easting			Northing		
023	GEB	Gordon Evans		S 1/2	Sec 3	T 29N	R 11W	Texas County
			Easting			Northing		

Permitted Feature: 007 Field Name: BWB Legal Description: NE¼, Sec. 14, T28N, R11W, Texas County

Permitted Feature: 007 Field Name: BWB Legal Description: NE¼, Sec. 14, T28N, R11W, Texas County

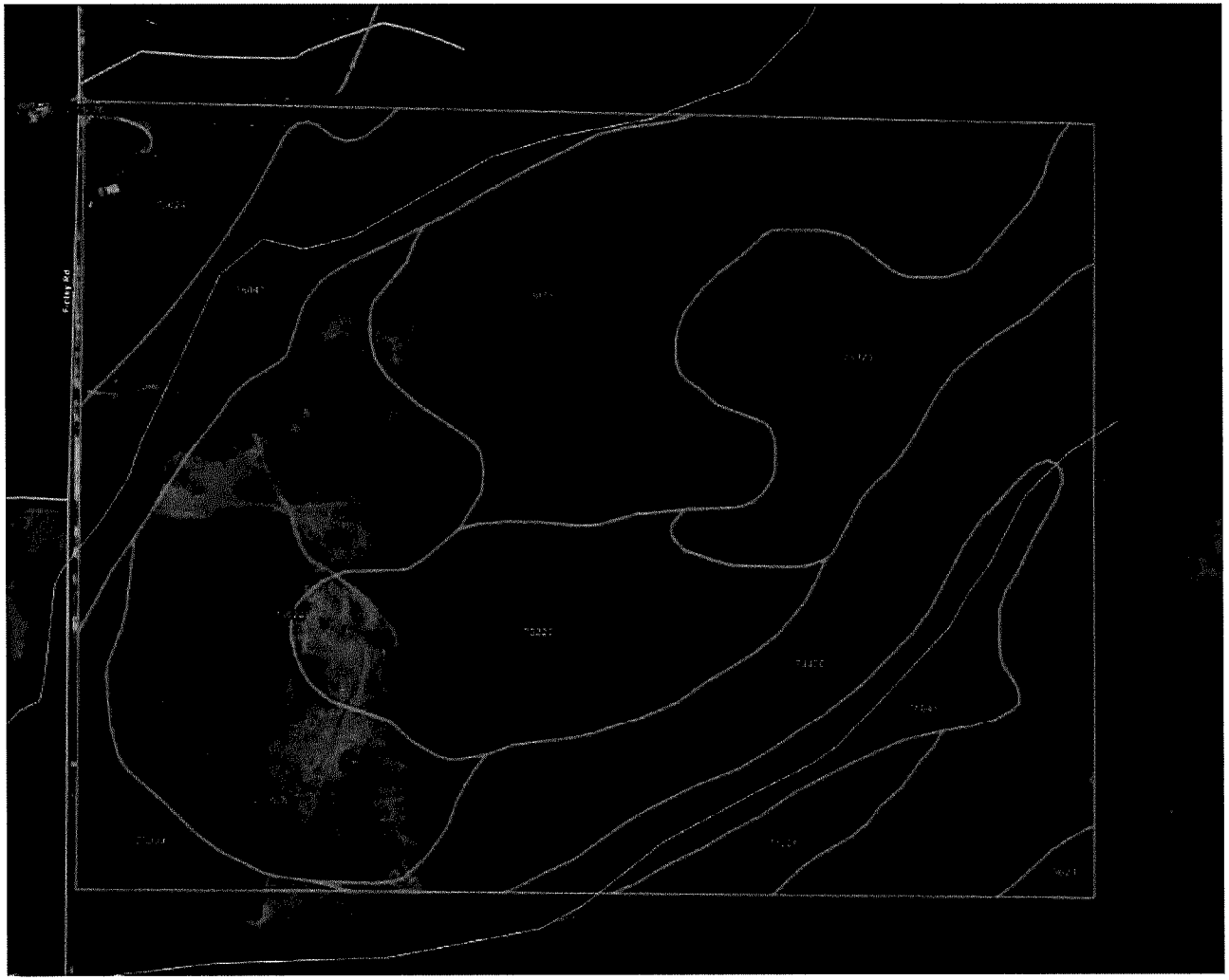
Map unit symbol	Map unit name	Rating
73000	Pomme silt loam, 3 to 8 percent slopes	All areas are prime farmland
73019	Poynor very gravelly silt loam, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
76047	Secesh-Tilk complex, 1 to 3 percent slopes, occasionally flooded	All areas are prime farmland

Permitted Feature: 008 Field Name: BWC Legal Description: N ½, Sec. 23, T28N, R11W, Texas County

Permitted Feature: 008 Field Name: BWC Legal Description: N ½, Sec. 23, T28N, R11W, Texas County

Map unit symbol	Map unit name	Rating
73000	Pomme silt loam, 3 to 8 percent slopes	All areas are prime farmland
73019	Poynor very gravelly silt loam, 1 to 8 percent slopes	Not prime farmland
73021	Poynor extremely gravelly silt loam, 15 to 35 percent slopes, stony	Not prime farmland
73023	Mano-Ocie complex, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73057	Jerktail silt loam, 1 to 3 percent slopes	Not prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73197	Viburnum silt loam, 3 to 8 percent slopes	Farmland of statewide importance
73198	Gressy-Viraton complex, 3 to 8 percent slopes	All areas are prime farmland
73220	Poynor extremely gravelly silt loam, 8 to 15 percent slopes	All areas are prime farmland
75392	Stultz very cobbly loam, 1 to 3 percent slopes, frequently flooded	Not prime farmland
76047	Secesh-Tilk complex, 1 to 3 percent slopes, occasionally flooded	All areas are prime farmland

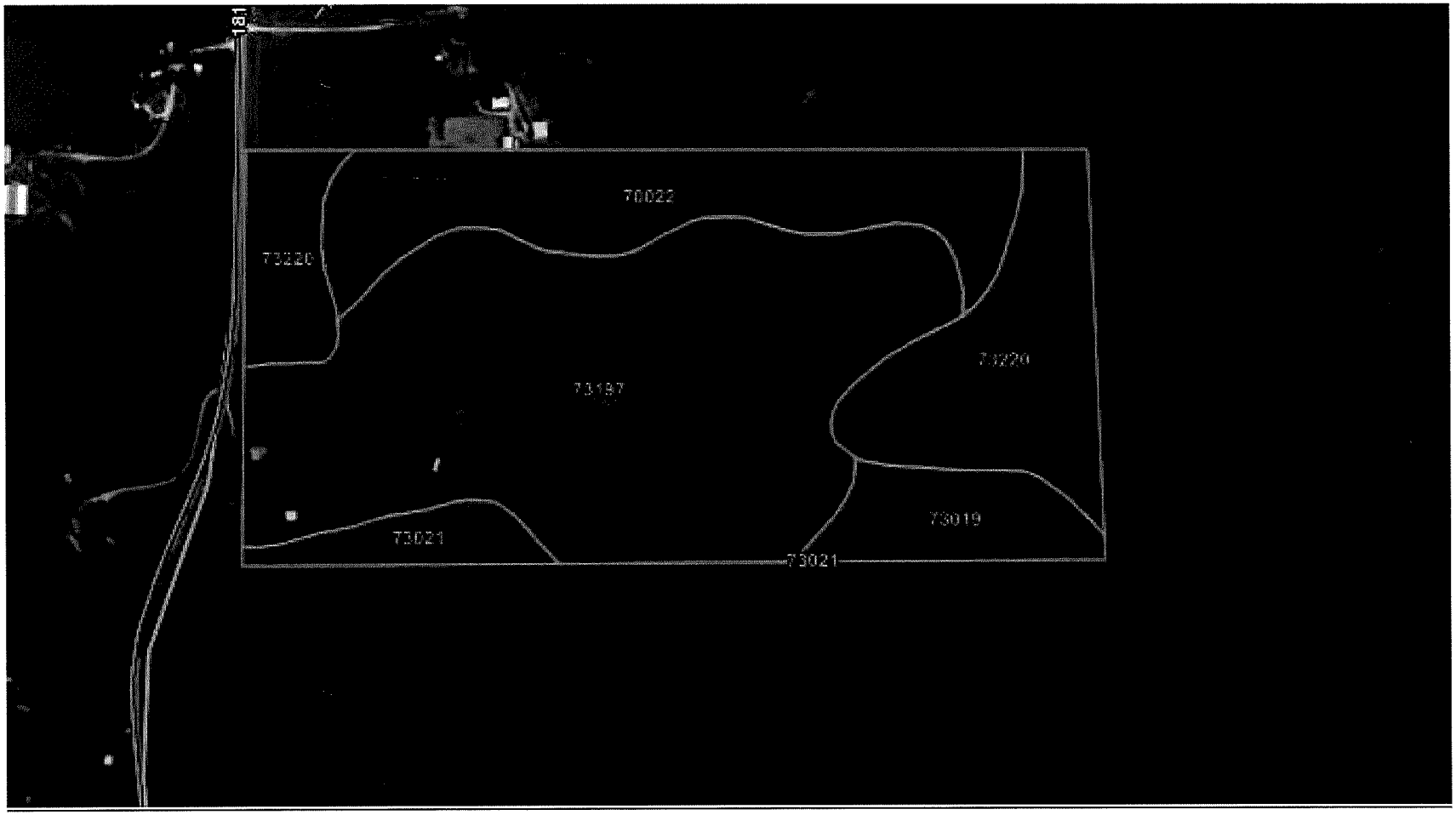
Permitted Feature: 009 Field Name: JBA Legal Description: SW¼, Sec. 26, T28N, R11 W, Texas County



Permitted Feature: 009 Field Name: JBA Legal Description: SW¼, Sec. 26, T28N, R11 W, Texas County

Map unit symbol	Map unit name	Rating
73000	Pomme silt loam, 3 to 8 percent slopes	All areas are prime farmland
73023	Mano-Ocie complex, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73220	Poynor extremely gravelly silt loam, 8 to 15 percent slopes	All areas are prime farmland
73228	Gatewood-Moko complex, 3 to 15 percent slopes, very rocky, very flaggy	All areas are prime farmland
76047	Secesh-Tilk complex, 1 to 3 percent slopes, occasionally flooded	All areas are prime farmland

Permitted Feature: 010 Field Name: JBB Legal Description: SW ¼, SW ¼, Sec. 25, T28N, R11 W, Texas County



Permitted Feature: 010 Field Name: JBB Legal Description: SW ¼, SW ¼, Sec. 25, T28N, R11 W, Texas County

Map unit Symbol	Map unit name	Rating
70022	Tonti silt loam, 3 to 8 percent slopes	Farmland of statewide importance
73019	Poynor very gravelly silt loam, 1 to 8 percent slopes	Not prime farmland
73021	Poynor extremely gravelly silt loam, 15 to 35 percent slopes, stony	Not prime farmland
73197	Viburnum silt loam, 3 to 8 percent slopes	Farmland of statewide importance
73220	Poynor extremely gravelly silt loam, 8 to 15 percent slopes	All areas are prime farmland

Permitted Feature: 011 Field Name: JWA Legal Description: NW 1/2, NW ¼, Sec. 29, T29N, R10 W, Texas County

Permitted Feature: 011 Field Name: JWA Legal Description: NW 1/2, NW ¼, Sec. 29, T29N, R10 W, Texas County

Map unit symbol	Map unit name	Rating
73019	Poynor very gravelly silt loam, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73058	Gunlock silt loam, 1 to 8 percent slopes	All areas are prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73198	Gressy-Viraton complex, 3 to 8 percent slopes	All areas are prime farmland
74626	Tanglenook silt loam, 1 to 3 percent slopes, rarely flooded	Prime farmland if drained
75392	Stultz very cobbly loam, 1 to 3 percent slopes, frequently flooded	Not prime farmland

Permitted Feature: 012 Field Name: JWB Legal Description: SW 1/4 SW 1/4 Sec. 17 T 29N R 10W

Permitted Feature – 012 Field Name – JWB Legal Description: SW 1/4 SW 1/4 Sec. 17 T 29N R

Map unit symbol	Map unit name	Rating
70022	Tonti silt loam, 3 to 8 percent slopes	Farmland of statewide importance
73000	Pomme silt loam, 3 to 8 percent slopes	All areas are prime farmland
73023	Mano-Ocie complex, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73057	Jerktail silt loam, 1 to 3 percent slopes	Not prime farmland
73058	Gunlock silt loam, 1 to 8 percent slopes	All areas are prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73077	Eudy silt loam, 1 to 8 percent slopes	Prime farmland if drained
73197	Viburnum silt loam, 3 to 8 percent slopes	Farmland of statewide importance
73198	Gressy-Viraton complex, 3 to 8 percent slopes	All areas are prime farmland
73228	Gatewood-Moko complex, 3 to 15 percent slopes, very rocky, very flaggy	All areas are prime farmland
74626	Tanglenook silt loam, 1 to 3 percent slopes, rarely flooded	Prime farmland if drained
75392	Stultz very cobbly loam, 1 to 3 percent slopes, frequently flooded	Not prime farmland

Permitted Feature: 014 Field Name: JWE Legal Description: W 1/2 SW 1/4 Sec. 9 T 29N R 10W

Permitted Feature: 014 Field Name: JWE Legal Description: W 1/2 SW 1/4 Sec. 9 T 29N R 10W

Map unit symbol	Map unit name	Rating
70022	Tonti silt loam, 3 to 8 percent slopes	Farmland of statewide importance
73000	Pomme silt loam, 3 to 8 percent slopes	All areas are prime farmland
73021	Poynor extremely gravelly silt loam, 15 to 35 percent slopes, stony	Not prime farmland
73073	Scholten-Poynor complex, 8 to 15 percent slopes	Not prime farmland
73176	Bendavis-Poynor complex, 8 to 15 percent slopes, stony	Not prime farmland
73198	Gressy-Viraton complex, 3 to 8 percent slopes	All areas are prime farmland
73220	Poynor extremely gravelly silt loam, 8 to 15 percent slopes	All areas are prime farmland
73228	Gatewood-Moko complex, 3 to 15 percent slopes, very rocky, very flaggy	All areas are prime farmland

Permitted Feature: 016 Field Name: KFA Legal Description: N ½ NW ¼ Sec 29 T 28N R 12W Wright County

Permitted Feature: 016 Field Name: KFA Legal Description: N ½ NW ¼ Sec 29 T 28N R 12W Wright County

Map unit symbol	Map unit name	Rating
70022	Tonti silt loam, 3 to 8 percent slopes	Farmland of statewide importance
70026	Tonti silt loam, 1 to 3 percent slopes	All areas are prime farmland
73017	Bendavis-Poynor complex, 15 to 50 percent slopes, rocky, very stony	Not prime farmland
73023	Mano-Ocie complex, 1 to 8 percent slopes	Not prime farmland
73063	Bendavis-Poynor complex, 1 to 8 percent slopes	All areas are prime farmland
73071	Hogcreek silt loam, 1 to 3 percent slopes	All areas are prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73220	Poynor extremely gravelly silt loam, 8 to 15 percent slopes	All areas are prime farmland
73228	Gatewood-Moko complex, 3 to 15 percent slopes, very rocky, very flaggy	All areas are prime farmland
75392	Stultz very cobbly loam, 1 to 3 percent slopes, frequently flooded	Not prime farmland

Permitted Feature: 017 Field Name: TEA Legal Description: W 1/2 Sec 9 T 29N R 10W Texas County

Permitted Feature: 017 Field Name: TEA Legal Description: W 1/2 Sec 9 T 29N R 10W Texas County

Map unit symbol	Map unit name	Rating
70022	Tonti silt loam, 3 to 8 percent slopes	Farmland of statewide importance
73019	Poynor very gravelly silt loam, 1 to 8 percent slopes	Not prime farmland
73073	Scholten-Poynor complex, 8 to 15 percent slopes	Not prime farmland
73198	Gressy-Viraton complex, 3 to 8 percent slopes	All areas are prime farmland
73220	Poynor extremely gravelly silt loam, 8 to 15 percent slopes	All areas are prime farmland

Permitted Feature: 018 Field Name: JRA Legal Description: W ½ Sec 29 T 28N R 12W Wright County

Permitted Feature: 018 Field Name: JRA Legal Description: W ½ Sec 29 T 28N R 12W Wright County

Map unit symbol	Map unit name	Rating
73008	Viraton silt loam, 2 to 5 percent slopes	All areas are prime farmland
73010	Wilderness gravelly silt loam, 3 to 8 percent slopes	Not prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73221	Poynor very gravelly silt loam, karst, 3 to 35 percent slopes, stony	Farmland of statewide importance
73237	Clarksville very gravelly silt loam, 3 to 15 percent slopes	Not prime farmland

Permitted Feature: 019 Field Name: JGA Legal Description: NE 1/4 Sec. 13, T28N, R11 W, Texas County

Permitted Feature: 019 Field Name: JGA Legal Description: NE 1/4 Sec. 13, T28N, R11 W, Texas County

Map unit symbol	Map unit name	Rating
73000	Pomme silt loam, 3 to 8 percent slopes	All areas are prime farmland
73058	Gunlock silt loam, 1 to 8 percent slopes	All areas are prime farmland
76047	Secesh-Tilk complex, 1 to 3 percent slopes, occasionally flooded	All areas are prime farmland

Permitted Feature: 020 Field Name: STA Legal Description: E 1/2, Sec. 14, T28N, R11 W, Texas County

Permitted Feature: 020 Field Name: STA Legal Description: E 1/2, Sec. 14, T28N, R11 W, Texas County

Map unit symbol	Map unit name	Rating
73019	Poynor very gravelly silt loam, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73057	Jerktail silt loam, 1 to 3 percent slopes	Not prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
76047	Secesh-Tilk complex, 1 to 3 percent slopes, occasionally flooded	All areas are prime farmland

Permitted Feature: 021 Field Name: STB Legal Description: SE 1/4 Sec. 18, T29N, R9 W, Texas County

Permitted Feature: 021 Field Name: STB Legal Description: SE 1/4 Sec. 18, T29N, R9 W, Texas County

Map unit symbol	Map unit name	Rating
70022	Tonti silt loam, 3 to 8 percent slopes	Farmland of statewide importance
70026	Tonti silt loam, 1 to 3 percent slopes	All areas are prime farmland
73017	Bendavis-Poynor complex, 15 to 50 percent slopes, rocky, very stony	Not prime farmland
73023	Mano-Ocie complex, 1 to 8 percent slopes	Not prime farmland
73063	Bendavis-Poynor complex, 1 to 8 percent slopes	All areas are prime farmland
73071	Hogcreek silt loam, 1 to 3 percent slopes	All areas are prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73220	Poynor extremely gravelly silt loam, 8 to 15 percent slopes	All areas are prime farmland
73228	Gatewood-Moko complex, 3 to 15 percent slopes, very rocky, very flaggy	All areas are prime farmland
75392	Stultz very cobbly loam, 1 to 3 percent slopes, frequently flooded	Not prime farmland

Permitted Feature: 022 Field Name: GEA Legal Description: E 1/2 Sec. 10, T29N, R11 W, Texas County

Permitted Feature: 022 Field Name: GEA Legal Description: E 1/2 Sec. 10, T29N, R11 W, Texas

Map unit symbol	Map unit name	Rating
70026	Tonti silt loam, 1 to 3 percent slopes	All areas are prime farmland
73019	Poynor very gravelly silt loam, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73052	Lily loam, 3 to 8 percent slopes	All areas are prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73228	Gatewood-Moko complex, 3 to 15 percent slopes, very rocky, very flaggy	All areas are prime farmland
73229	Gatewood-Moko complex, 15 to 35 percent slopes, very rocky, very flaggy	Farmland of statewide importance

Permitted Feature: 023 Field Name: GEB Legal Description: S 1/2 Sec. 3, T29N, R11 W, Texas County

Permitted Feature: 023 Field Name: GEB Legal Description: S 1/2 Sec. 3, T29N, R11 W, Texas County

Map unit symbol	Map unit name	Rating
73023	Mano-Ocie complex, 1 to 8 percent slopes	Not prime farmland
73024	Mano-Ocie complex, 8 to 15 percent slopes, stony	Not prime farmland
73076	Mano-Ocie complex, 15 to 35 percent slopes, stony	Farmland of statewide importance
73229	Gatewood-Moko complex, 15 to 35 percent slopes, very rocky, very flaggy	Farmland of statewide

Appendix B

MU Guide – Soil Sampling Pastures

AGRICULTURAL
MU Guide
PUBLISHED BY MU EXTENSION, UNIVERSITY OF MISSOURI-COLUMBIA muextension.missouri.edu

Soil Sampling Pastures

John Lory and Steve Cromley
Division of Plant Sciences and Commercial Agriculture Program

Collecting a representative soil sample is an important step in developing a nutrient plan for your farm. The goals of your soil sampling plan should be to

- Identify manageable sized fields with similar characteristics.
- Accurately and cost-effectively determine the nutrient status of those fields.

Highly variable soil fertility levels across a field can make it difficult to collect a good soil sample. With planning, representative soil samples can be obtained from your pasture. Careful, comprehensive soil sampling pays dividends in smarter management decisions and efficient use of fertilizer nutrients.

How should I divide my pastures?

When creating a soil-sampling plan for fields and farms, the objective is to divide fields into areas that you expect to have similar characteristics or that you are likely to manage differently than other parts of the pasture. Typically sampling areas should not exceed 20 acres and can be much smaller. In management-intensive grazing systems, frequently the best strategy is to sample each paddock separately.

Pastures have many sources of variability:

- Animal activities and habits are a huge source of variation in pastures.
  - Areas around winter feeders, shade trees and water sources have higher soil test levels.
  - Manure piles and urine spots have elevated nutrients.
- Natural features such as soil type and topography are important sources in variability, particularly in low-testing and unfertilized fields.
- Human activities can overwhelm natural sources of variability in a field.
  - Nutrient hot spots are often found near old feeding areas and homesteads.
  - Differences in fertilizer patterns can create differences in soil test levels. An indicator of different fertilizer histories can be old or existing fence lines.

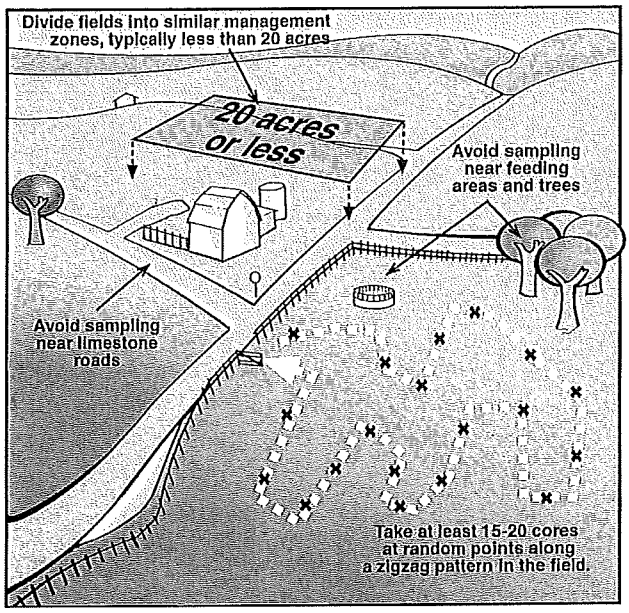


Figure 1. Obtaining a quality soil sample.

  - There is often a band of elevated pH within 150 feet of a gravel road caused by drifting dust from the crushed limestone road surface.

When sampling a paddock or field, avoid sampling in areas that are unrepresentative of the field (Figure 1). Avoid taking cores near shade trees, water sources and winter feeding areas. If you want to know soil test levels in these areas, sample them separately.

How to collect a soil sample

Your objective is to collect 15 to 20 cores from the area to be sampled (Figure 1). You need to collect more cores per field in a pasture than in a row-crop field because there typically is much more variation in a pasture from manure piles and urine spots.

The best approach is to travel across the entire area to be sampled in a zigzag pattern, randomly selecting spots to take a core (Figure 1). Sampling depth is 6 to 7 inches for most objectives in pastures (Figure 2). Do not take too shallow a sample as this will overestimate the soil fertility level in your pasture.

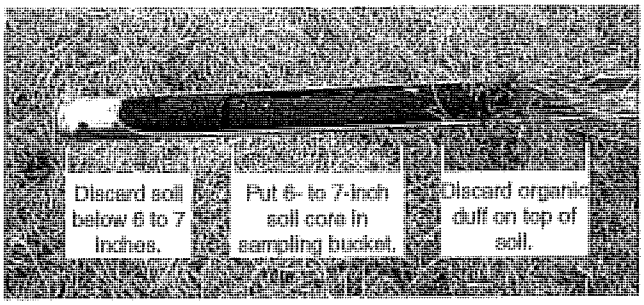


Figure 2. Obtaining a 6- to 7-inch core for soil sampling.

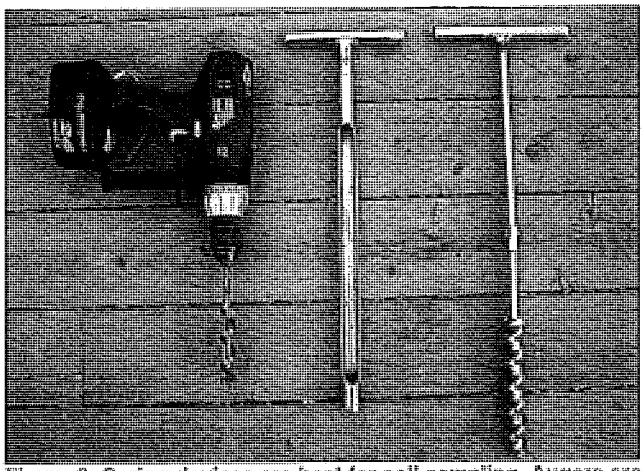


Figure 3. Coring devices are best for soil sampling. Augers are recommended on rocky soils. Hand samplers at least 3 feet long are desirable because they reduce back strain.

Needed equipment for soil sampling includes

- A soil sampler; preferably some type of coring device.
- A clean plastic bucket; e.g., plastic paint bucket.
- A small box or bag; contact your soil testing lab for boxes. Hardware store nail bags work well.
- Map of the field with sampling plan and sample labels.

The best tool for soil sampling is a coring device (Figures 3 and 4). A core sampler works best in soils with few rocks. In rocky soils, some type of auger is the preferred tool. If you are doing a lot of sampling, a power drill with an auger can be efficient. A shovel or spade can be used if a coring device is not available.

Always use clean equipment when collecting soil samples. A plastic bucket should be used for collecting and mixing samples.

It is best to wait at least three months after application of phosphorus fertilizer, lime or manure before taking a soil sample. Sample your pasture every three to five years. It is better to do a more thorough job of sampling with more cores per sample less often than to do a poor job more often. It is also best to sample fields at the same time of year each time you sample.

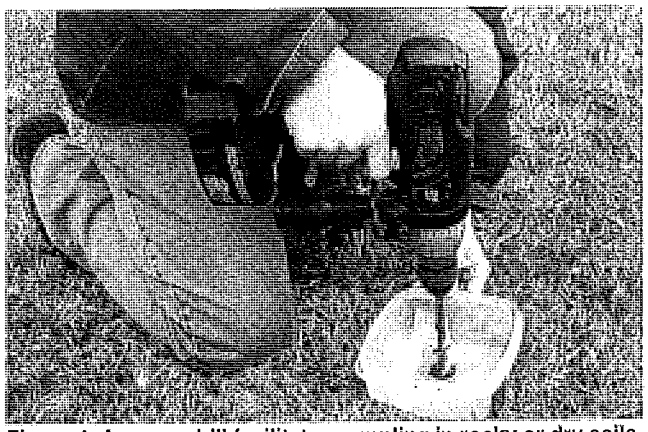


Figure 4. A power drill facilitates sampling in rocky or dry soils. Use a plastic container with a hole in the middle to collect the soil as the auger pulls it out of the ground. Empty the soil out of the plastic container into the soil sample bucket after each successful attempt to get a 6-inch core.

Avoid sampling near fresh manure piles or recent urine spots. These areas do not represent the bulk of the paddock. It is appropriate to sample in or near older manure piles and urine patches in intensively grazed pastures with a high amount of manure coverage.

Submitting your soil samples

Break up the 15–20 cores and thoroughly mix the soil. Place about 1.5 cups of the mixture into a soil sample box or plastic bag and discard the excess. If the soil is too wet to mix thoroughly, the sample can be set out on a bench and allowed to air dry before mixing.

Label the sample with field and subfield names. Soil sample boxes and soil information forms can be obtained from private soil testing labs or your local University Extension center or by contacting:

Soil and Plant Testing Services
Department of Agronomy
23 Mumford Hall
University of Missouri
Columbia, MO 65211
(573) 882-3250 or (573) 882-0623
http://soiltest.psu.missouri.edu

Soil samples can also be submitted to your local Extension center or directly to a University or private soil testing lab. Be sure to use a lab that has been accredited by Missouri Soil Testing Association (MSTA). A list of accredited labs is available on the Web at http://www.soiltest.psu.missouri.edu/MSTAlabs.htm.

Also from Extension Publications 1-800-292-0969

G 9112 *Interpreting Missouri Soil Test Reports*
G 9217 *Soil Sampling Hayfields and Row Crops*

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Appendix C

Forms

Dairy Farmers of America

DAILY LAND APPLICATION RECORDS
DAIRY FARMERS OF AMERICA
CABOOL, MO

Date	Field ID	Field Name	Loads	Gallons Applied	Acres Applied	% Solids	pH	Air Temp	Weather	Soil Conditions	Operator Initials

SLUDGE HAULING MONTHLY REPORT

MONTH: _____ YEAR: _____

DATE	TRUCK GALLONS	TOTAL GALLONS	FIELD ID	FIELD Name	HAULERS NAME	TOTAL LOADS	SLUDGE TANK L OR S	pH	% SOLIDS	AIR TEMP	Weather	Soil Conditions

NOTES

Oven Readings			Weekly ph Meter Calibration			
Month_____			4.0 BUFFER	7.0 BUFFER	10.0 BUFFER	
Day	Oven Temp	Initial				Initial
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
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NOTES: Oven temperature check completed daily, PH unit calibration to be completed weekly.