



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Solid Waste Management
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 14th Floor
Nashville, Tennessee 37243

June 16, 2022

John Pipkin
Denali Water Solutions
3308 Bernice Avenue
Russellville, AR 72801

CERTIFIED MAIL
#7020 1810 0001 8307 2718
RETURN RECEIPT REQUESTED

RE: Permit-By-Rule for a Solid Waste Land Application Facility and Beneficial Use Proposal Determination-Denali Water Solutions-Gillespie Road (LND380000098)

Dear Mr. Pipkin:

The Tennessee Department of Environment and Conservation (TDEC), Division of Solid Waste Management (DSWM), has reviewed your Permit-By-Rule and Beneficial Use request received May 25, 2022. The application requested multiple waste streams for land application and beneficial use, including (1) food residuals, (2) dissolved air flotation (DAF) residuals, and (3) grease trap waste.

This letter will serve as official notice that DSWM has approved your Permit-By-Rule notification for the referenced 385 acres (identified as CG-1 and CG-2 field sites/Claiborne Gillespie Farm, located in Haywood County, four miles north of Brownsville, adjacent to Gillespie Road (latitude 35.6433, longitude -89.2725), for land application of food processing residuals. This facility shall be deemed to have a Permit-By-Rule for food processing residuals, provided the criteria of Rule 0400-11-01-.02(2)(b)6 of Tennessee's Solid Waste Processing and Disposal Regulations are met, including the permit conditions as submitted with your application. The registration number for this facility is LND380000098.

Rule 0400-11-01-.01(2) prohibits DAF residuals from being part of a Land Application Permit-By-Rule approval; however, this letter will serve as official notice that DSWM has determined that per Rule 0400-11-01-.02(1)(b)3(xxi), the proposed use of the DAF residuals in your proposal constitutes a beneficial use of solid waste when used in the manner proposed, and per the conditions specified in Attachment A.

At this time, DSWM cannot approve the land application of the grease trap waste under either of the above regulatory citations.

As of July 1, 2022, there is an annual maintenance fee required, pursuant to Tennessee Rule 0400-11-01-.07(3), for this land application site. The annual fee is \$100.00. You will receive an annual maintenance fee invoice in August 2022 from TDEC Division of Fiscal Services that will indicate Denali Water Solutions owes \$100.00.

If you have any questions concerning this letter or decision, please contact Michael David by email at Michael.David@tn.gov or phone 731-333-5457.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa A. Hughey".

Lisa A. Hughey, CHMM
Director

cc: Clifton Jeter, DSWM, Jackson Environmental Field Office
Michael David, DSWM, Jackson Environmental Field Office
Ashley Frederick, Division of Fiscal Services, Consolidated Fee Section
Records.SWM@tn.gov

Attachment A

DAF Residuals

Dissolved Air Flotation (DAF) processing residuals are specifically excluded as food residuals. Rule 0400-11-01-.01 (2) Definitions - “Food processing residuals” means organic materials generated as a by-product of the industrial food processing sector that are non-toxic, non-hazardous, and contain no sanitary wastewater. The term does not include fats, oil, grease, and Dissolved Air Flotation (DAF) skimmings. As all of the materials presented (excluding grease trap wastes) do not contain sanitary wastewater, the materials are not defined as wastewater or biosolids, and are thus a solid waste that is not a food processing residual.

Rule 0400-11-01-.13(1)(b) [Scope/Applicability of Requirements for Land Application Facilities] states that land application requests for all solid wastes that are not food processing facilities will be subject to Rule 0400-11-01-.02(1)(b)3(xxi); which states that the beneficial use of waste, which does not constitute disposal, and that the generator demonstrates, to the satisfaction of the Commissioner, is not detrimental to public health, safety, or the environment; may be exempt from permit-by-rule requirements. Therefore, no DSWM permit is required for the use of DAF residuals in the manner proposed.

Analytical results of DAF residuals from multiple source facilities were provided, broadly categorized as fruit/vegetable processing DAF residuals or animal processing residuals. Denali provided additional documentation demonstrating that the DAF residuals of typical animal processing residuals at other facilities demonstrate suitably low levels of pathogens to present minimal risk to public health, safety, and the environment. The animal residuals are deemed to have limited pathogenic potential, and the animal/vegetable residuals unlikely.

After review of your application, the use of these DAF materials as a soil amendment in a controlled manner does not constitute disposal and is in agreement with DSWM PN028 “Beneficial Use of a Solid Waste Policy.”

Those materials that have the potential for vector attraction/pathogenic shall be restricted to incorporation or injection, within appropriate time frames, as indicated in the application. At least annually, for up to 290 metric tons of material, seven samples of material with pathogenic potential shall be collected over a representative period-of-time, and the geometric mean fecal coliform density of these samples be less than 2 million CFU or MPN per gram of material (dry weight basis). This approach uses fecal coliform density as an indicator of the average density of bacterial and viral pathogens. Spray application of materials, as proposed, without pathogenic potential will be deemed appropriate when conducted with restrictions presented in the application. The site restrictions, including limited access, no application in precipitation, or saturated conditions, as proposed, is suitable to be protective of public health and shall not be modified without prior written approval from the DSWM.

This exemption from permitting does not exempt your facility from any other TDEC permitting regulations. This exemption also does not exempt your operations from enforcement actions related to any unauthorized placement of waste or abandonment of material that amounts to disposal or results in environmental harm due to surface water discharges. If at any time facility operations change, the permitting status of the facility may also be reexamined.

In addition to the farm location provided, and in order to maintain this permit exemption, you must continue to supply the TDEC Jackson Environmental Field Office with locations of placement sites as they are utilized. Send this information to Michael David at Michael.David@tn.gov as it becomes available.

This notification is submitted pursuant to Solid Waste Processing and Disposal Rule 1200-1-7-.02(1)(c)1(vi) and was developed in accordance with the provisions of Rule 1200-1-7-.13 and the associated Guidance Document.

I. Applicant:

Denali Water Solutions (Physical Address)
P.O. Box 399 15797 East State Hwy 155
Dardanelle, AR 72834 Dardanelle, AR 72834
Contact: John Pipkin
Ph. 479-264-5383, email: John.Pipkin@denaliwater.com

II. Land Application Site Information:

The site is a crop land located in central Haywood County approximately 4 miles north of Brownsville, TN (CG-1_CG-2) adjacent to Gillespie Road. The farm site will be producing corn, soybeans, wheat and other seasonal crops.

CG-1_2 384.7 acres
Gillespie Rd, Brownsville, TN
31 deg 30' 54" N 89 deg 29' 21" W (west part)
31 deg 30' 42" N 89 deg 29' 24" W (east part)

The new farm site has a land application area of 384.7 acres, and is currently farmed to produce row crops such as corn, soybeans and wheat. A land site table and Solid Waste Permit By Rule Notification form are presented in **Attachment A**. The land site table contains the latitude, longitude, spreadable acreage after subtraction of buffer setback area and nearest stream for the proposed land site.

Road map showing field location, topographic site map, and satellite image map showing buffer setbacks are presented in **Attachment B**. Soil Survey map, soil descriptions and soil testing results are presented in **Attachment C**. Analytical testing from the food processing residuals, a calculation page of projected volume to be land applied, and heavy metals site life calculations are presented in **Attachment D**.

Groundwater well survey information is presented in **Attachment E**.

III. Waste Characterization:

The material to be land applied consists of pretreatment residuals generated during the screening and treatment of wastewater at food processing facilities known as Dissolved-Air-Flotation (DAF) residuals, restaurant solids collected in the grease trap interceptor, and food processing material discarded during the manufacture of food for human consumption. The food processing facilities produce dairy products, juice drinks, swine, and poultry products for direct human consumption. The wastewater residuals consist of food processing solids and water only with no sanitary waste component. The wastewater at the food processing facilities will use mechanical screening and dissolved-air-flotation (DAF) treatment to remove most of the solids from the waste stream. The poultry and meat processing facilities produce waste activated solids to store in lagoon storage basins at the facility that will further digest to become DLR which can be surface applied to farm sites with no incorporation due to the low volatile solids and minimal odor of the material, such that no vector attraction is a concern with the surface application method of the DLR material. The DAF residuals from the food processing facility will contain a high amount of volatile organic solids that create an odor during land application and need to be incorporated into soil at the time of land application. Both the DLR and DAF material contain plant nutrients and can be used as an organic fertilizer material to benefit the farm site. The restaurant wastewater residuals are solids and rinse water collected in the grease trap interceptor from commercial food preparation kitchens. These food wastewater solids will be removed directly from the interceptor at the restaurant and taken to land application sites for blending with other wastewater residuals prior to land application at the approved farm sites. All these materials described contain plant available nutrients that can be broken down in the soil to provide beneficial crop benefits by promoting plant growth.

A representative sample of the food processing wastewater residuals has been collected and analyzed. The analytical results and corresponding loading rate tabulations are presented in **Attachment F**. The field logs used to track daily loads land applied at the farm site will log the gallons and plant available nitrogen (PAN) for each load applied to the field, and the total PAN applied is tracked to ensure the appropriate nitrogen rate is applied to the field. The application rate will be reduced for crops needing less nitrogen, such as wheat or soybeans. The desired agronomic rate suggested by the TDEC guidance document and the local UT extension agent will ensure the agronomic need for the crop is not exceeded.

IV. Management Practices

The food processing material is to be land applied for beneficial use as fertilizer. The land application site is utilized for producing seasonal crops that are typically used as animal feeds. At the proposed application rates described in Item III, neither the crop nutrient uptake rates for the crop nor the hydraulic loading rates will be exceeded during land application of the field site. The total metals applied are forecasted based on the proposed application rate for the life of the land application site. The heavy metals site life calculations and projected application rate calculations are presented in **Attachment D**.

Land application will not take place within 24 hours of a rainfall event exceeding $\frac{1}{4}$ inch, or when the probability of rainfall exceeds 50% within the next 24 hours of a rain chance exceeding 50%. The food processing residuals are land applied with the subsoil injection method or residuals can be applied to the field and incorporated into the soil. Land application will not take place if the soil is saturated or frozen. During such periods of inclement weather, the material will remain at the generating facility.

Land application will not take place:

- a. Within 500 feet of a dwelling or private well;
- b. Within 100 feet of surface water; (this limit is 500 feet from outer boundary for spray irrigation);
- c. Within 50 feet of a road; (this limit is 200 feet from outer boundary for spray irrigation);
- d. Within 1,000 feet of a public water supply well;
- e. On a slope exceeding 8 percent; (except for slopes where *incorporation* is practiced, in which case the maximum acceptable slope for land application is 12 percent)
- f. In an area having a minimum depth of less than 3 feet to the seasonal high water table, or
- g. In areas with karst features such as caves and open sinkholes, land application shall not be permitted within 200 feet of a cave or sinkhole. Further, a minimum of a 100 foot vegetative buffer must also be maintained around karst features.

V. Threatened or Endangered Species

The site included in this permit application is agricultural land used for crop production for many years. There is no evidence of any threatened or endangered species near the field site. A request has been sent to the TN Dept of Natural Heritage and to the U. S. Fish and Wildlife to determine if any evidence of endangered species or if any historical areas are adjacent to the farm site. Responses to these requests will be forwarded upon receipt.

The land application of residuals proposed to the farm site will be conducted as a normal agricultural practice, and buffer setbacks will be put in place around the borders of the fields and around any sensitive areas. As such, there should be no threat to endangered or threatened species or to critical habitats.

VI. Public Access

The site included in this permit application is private property and is not accessible to the public.

VII. Storage and Financial Assurance

There is to be no permanent storage at the proposed land application site and no financial assurance is needed.

VIII. Flood plain information

A flood plain map is presented in **Attachment G**. There is a small area of field site along the eastern edge that is in the 100 year flood plain. The 100 feet setback for surface water features will be the main protection for flood prone areas of the field near a creek or stream. The organic residuals with high volatile solids that are being sub-soil injected provide an additional control that minimize the chance for the residuals affecting a flood prone area of the field. During times of wet weather when there could be the possibility of flooding, the land application activity is not conducted. Digested lagoon residuals from food processing facilities will contain lower levels of volatile solids with a very low odor level and are surface applied to the field site with no incorporation.

IX. Karst

A map detailing karst areas of Tennessee is attached for review, no extensive karst features exist in the field where land application is proposed. The Karst Hazard Map is presented in **Attachment H**.

X. Record Keeping and Reporting

Prior to application, the appropriate volume to be applied to each field area will be determined based upon the nutrient content of the material, the nutrient requirements of the crop to be grown following application, and the acreage to which material is to be applied. At the land application site, daily field logs will be maintained which document the application dates, time, driver's name, volume, crop to be grown, and field number. Annually, a report will be generated which includes the information from the daily field logs, the total volume applied in gallons per acre, the total nutrients and metals applied in pounds per acre and the crop to be grown on each field. This information will be submitted to TDEC, the generating facility, and to the landowner.

Rule 0400-11-01-.13(2)(a)1: the facility must be constructed, operated, maintained, and closed in such a manner as to minimize:

- (i) The propagation, harborage, or attraction of flies, rodents, or other disease vectors
Food processing based residuals being land applied as a beneficial soil amendment material are evenly spread across the farm site and these liquid based residuals quickly dry and soak into the soil to release the beneficial organic based nutrients. The land application at the agronomic rate for the cover crop being grown at the farm site will effectively recover the food based residuals as a nutrient to feed soil microbes and allow for the breakdown of organic matter in the residuals and provide crop available nutrients that can be taken up by the roots of the crop.
- (ii) The potential for releases of solid wastes or solid waste constituents to the environment except in a manner authorized by state and local air pollution control, water pollution control and/or waste management agencies
The land application at the agronomic rate using a sub-soil injection method or immediate incorporation of the residuals being land applied will prevent an potential for the residual material to be released from the field site. The buffer setbacks for the field discussed in this application will also work as a prevention to not allow any release of the residual material from the field site.
- (iii) The potential for harm to the public through unauthorized or uncontrolled access.
The land application at the field site is conducted on private property. The general public are not allowed at the field site, and the landowner will post no trespassing signs on the farm site to prevent public access.

Attachment A

Land Application Site Table

Permit By Rule Notification Form

Denali Water Solutions

Gillespie Field - Haywood County

<u>Field ID</u>	<u>Owner</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Acreage</u>	<u>Nearest Stream</u>	<u>Distance to Stream</u>
CG-1	Claborne Gillespie	31°30'54"N	89°29'21"W	315.4	Little Creek	100'
CG-2	Claborne Gillespie	31°30'42"N	89°29'24"W	69.3	Little Creek	100'



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SOLID WASTE MANAGEMENT
WILLIAM R. SNODGRASS TENNESSEE TOWER
312 ROSA L. PARKS AVENUE, 14TH FLOOR
NASHVILLE, TN 37243

RESET

PRINT

SOLID WASTE PERMIT BY RULE NOTIFICATION

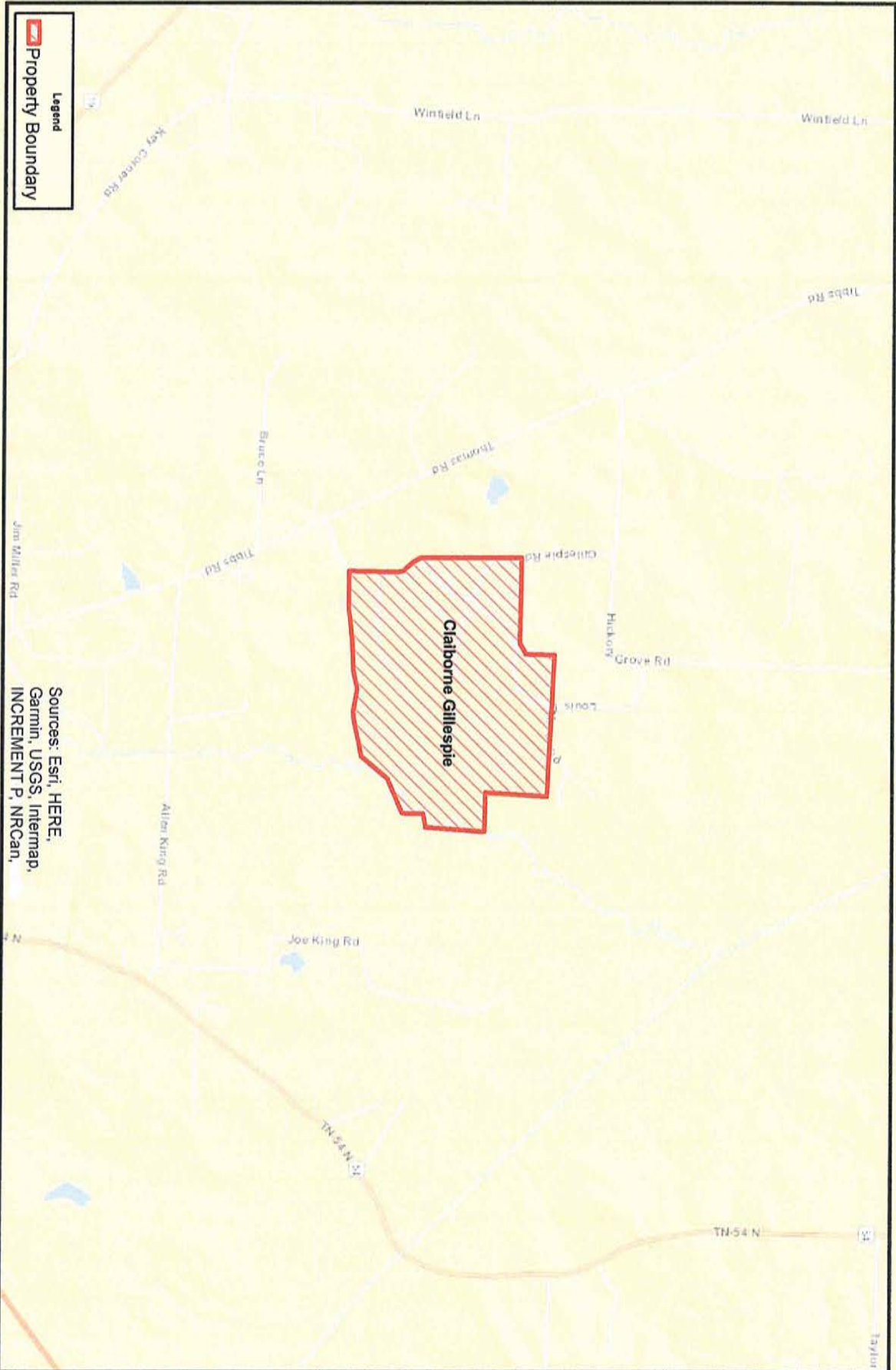
1. TYPE OF PERMIT- BY- RULE REQUESTED			ID# TDEC USE ONLY	
<input type="checkbox"/> COMPOST FACILITY	<input checked="" type="checkbox"/> LAND APPLICATION	<input type="checkbox"/> TIRE STORAGE FACILITY		
<input type="checkbox"/> CONVENIENCE CENTER	<input type="checkbox"/> PROCESSING FACILITY	<input type="checkbox"/> TRANSFER STATION		
2. FACILITY INFORMATION			FACILITY LOCATION COUNTY	
FULL LEGAL NAME OF FACILITY Denali Water Solutions			Haywood	
PHYSICAL LOCATION OR ADDRESS OF FACILITY Gillespie Road			LATITUDE (DECIMAL DEGREES) 35.6433	
CITY Brownsville			LONGITUDE (DECIMAL DEGREES) -89.2725	
STATE TN				
ZIP 38012				
FACILITY MAILING ADDRESS P.O. Box 399			FACILITY EMAIL john.pipkin@denaliwater.com	
CITY Dardanelle			STATE AR	
ZIP 72834				
FACILITY MANAGER OR SITE OPERATOR Fentress Bryan			AFFILIATION OF SITE OPERATOR (IF DIFFERENT FROM PERMITTEE) Regional Operations Manager	
PHONE (WITH AREA CODE) (479) 699-0032				
3. APPLICANT (PERMITTEE)				
APPLICANT NAME Denali Water Solutions			EMAIL vanya.colburn@denaliwater.com	
PHONE (WITH AREA CODE) (479) 239-0288				
RESPONSIBLE OFFICIAL / TITLE John Pipkin			EMAIL john.pipkin@denaliwater.com	
PHONE (WITH AREA CODE) (479) 264-5383				
RESPONSIBLE OFFICIAL MAILING ADDRESS 3308 Bernice Avenue			CITY Russellville	
			STATE AR	
			ZIP 72801	
LANDOWNER NAME Mary Louise Gillespie			LANDOWNER MAILING ADDRESS 122 Williamsburg Lane	
			CITY Brownsville	
			STATE TN	
			ZIP 38012	
LANDOWNER SIGNATURE 			DATE 4-28-22	
4. WASTE HANDLING				
DESCRIPTION OF ACTIVITIES AND WASTES HANDLED OR PROCESSED Land application of food processing residuals to farm sites as a beneficial fertilizer.			AMOUNT OF WASTE HANDLED, PROCESSED OR STORED 500.00	
			WEIGHT TONS / DAY	
			VOLUME YARDS / DAY	
			STORAGE MAX CU YARDS	
5. CERTIFICATION REQUIRED				
I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information 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. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.				
SIGNATURE OF RESPONSIBLE OFFICIAL 			PRINTED NAME John Pipkin	
TITLE Land & Environmental Mgr.			DATE 4-28-22	
SIGNATURE OF NOTARY 			DATE COMMISSION EXPIRES 2-13-24	
TITLE Sandi D. Alston-Bryant				
COMMISSION EXPIRES 02-13-24				

Attachment B

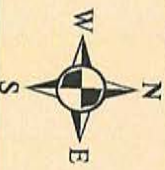
Road Map to denote general location

Topographic Map to note location to roads and streams

Closer View Satellite Maps to show buffer setbacks

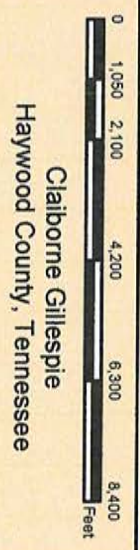


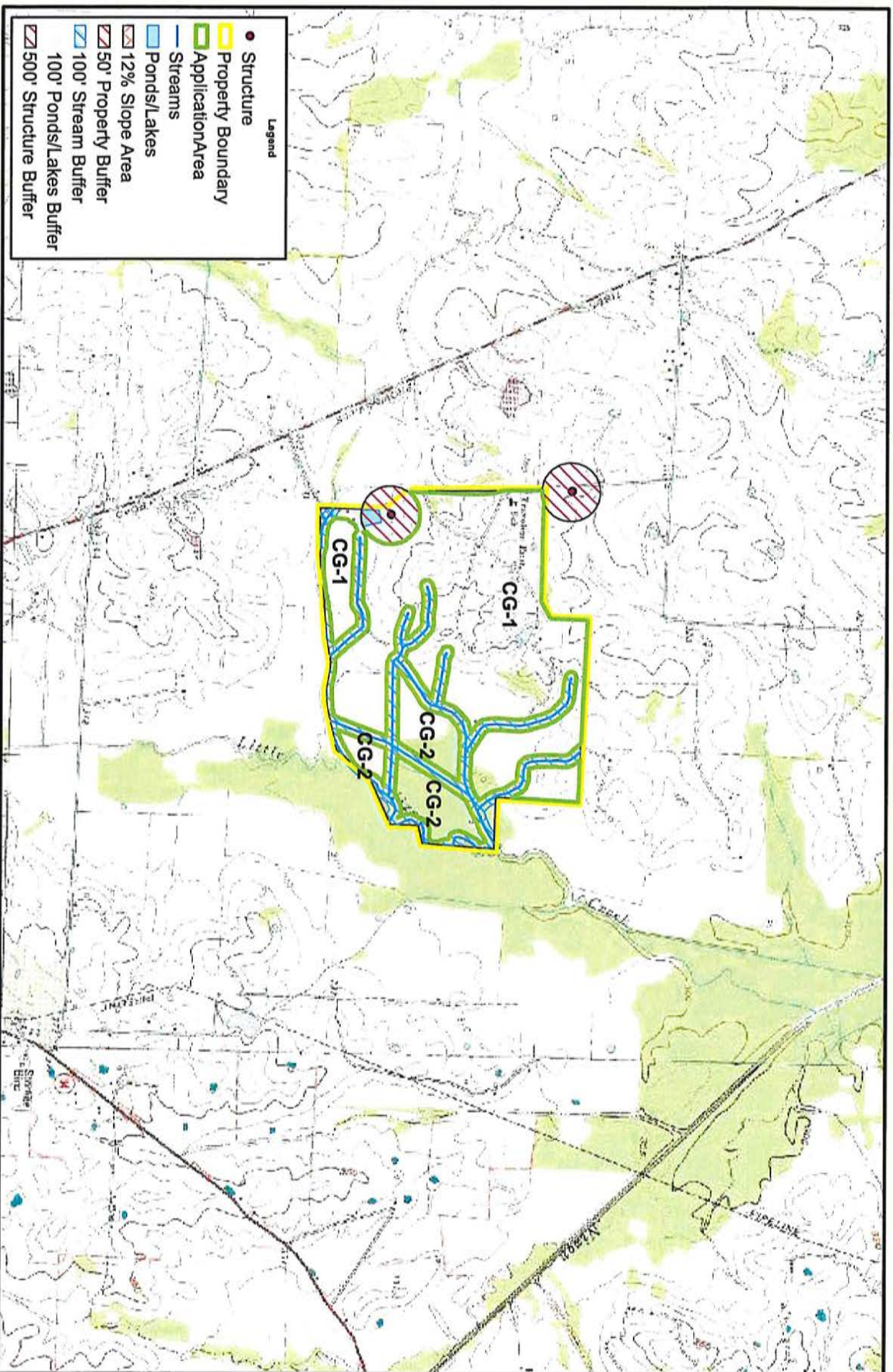
Sources: Esri, HERE,
Garmin, USGS, Intermap,
INCREMENT P, NRCAN,



CG-1 and CG-2

384.7 Acres



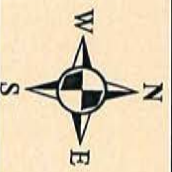


CG-1 and CG-2

384.7 Acres



Claiborne Gillespie
Haywood County, Tennessee





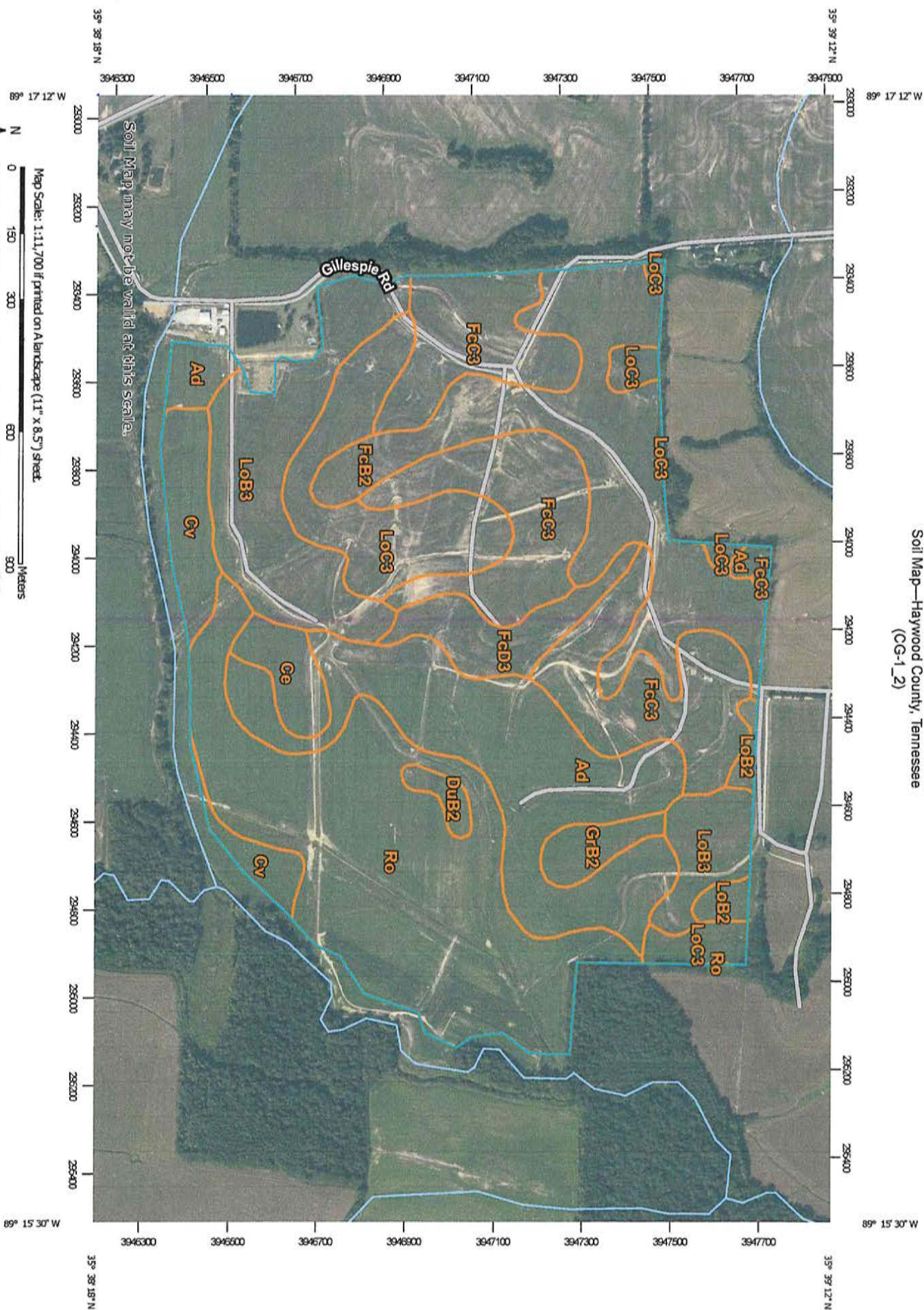
Attachment C

Soil Survey Map

Soil Survey Description

Soil Testing Results

Soil Map—Haywood County, Tennessee (CG-1_2)



MAP LEGEND

	Area of Interest (AOI)		Spot Area
	Area of Interest (AOI)		Stony Spot
	Soils		Very Stony Spot
	Soil Map Unit Polygons		Wet Spot
	Soil Map Unit Lines		Other
	Soil Map Unit Points		Special Line Features
	Special Point Features		Water Features
	Blowout		Streams and Canals
	Borrow Pit		Transportation
	Clay Spot		+++
	Closed Depression		Rails
	Gravel Pit		Interstate Highways
	Gravelly Spot		US Routes
	Landfill		Major Roads
	Lava Flow		Local Roads
	Marsh or swamp		Background
	Mine or Quarry		Aerial Photography
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Haywood County, Tennessee
Survey Area Data: Version 21, Sep 14, 2021

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

Date(s) aerial images were photographed: Sep 9, 2019—Sep 15, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ad	Adler silt loam, 0 to 2 percent slopes, frequently flooded	71.3	15.4%
Ce	Center silt loam, 0 to 2 percent slopes	8.5	1.8%
Cv	Convent silt loam, frequently flooded	17.5	3.8%
DuB2	Dubbs silt loam, 1 to 5 percent slopes, eroded	2.9	0.6%
FcB2	Felician silt loam, 2 to 5 percent slopes, moderately eroded, northern phase	65.1	14.0%
FcC3	Felician silt loam, 5 to 8 percent slopes, severely eroded, northern phase	83.3	18.0%
FcD3	Felician silt loam, 8 to 12 percent slopes, severely eroded, northern phase	14.1	3.0%
GrB2	Grenada silt loam, 1 to 5 percent slopes, eroded	6.3	1.4%
LoB2	Loring silt loam, 1 to 5 percent slopes, eroded	4.4	0.9%
LoB3	Loring silt loam, 1 to 5 percent slopes, severely eroded	53.2	11.5%
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	39.9	8.6%
Ro	Routon silt loam	97.3	21.0%
Totals for Area of Interest		463.8	100.0%

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

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

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Haywood County, Tennessee

Map Unit: Ad—Adler silt loam, 0 to 2 percent slopes, frequently flooded

Component: Adler, frequently flooded (89%)

The Adler, frequently flooded component makes up 89 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains, hills. The parent material consists of silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 23 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. This component is in the F134XY014AL Northern Non-Acid Floodplain - PROVISIONAL ecological site. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Morganfield, frequently flooded (7%)

Generated brief soil descriptions are created for major soil components. The Morganfield, frequently flooded soil is a minor component.

Component: Convent, frequently flooded (4%)

Generated brief soil descriptions are created for major soil components. The Convent, frequently flooded soil is a minor component.

Map Unit: Ce—Center silt loam, 0 to 2 percent slopes

Component: Center (92%)

The Center component makes up 92 percent of the map unit. Slopes are 0 to 2 percent. This component is on stream terraces on river valleys. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Component: Routon (8%)

Generated brief soil descriptions are created for major soil components. The Routon soil is a minor component.

Map Unit: Cv—Convent silt loam, frequently flooded

Component: Convent (100%)

The Convent component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. The parent material consists of silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 33 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 5w. This soil does not meet hydric criteria.

Map Unit: DuB2—Dubbs silt loam, 1 to 5 percent slopes, eroded

Component: Dubbs (100%)

The Dubbs component makes up 100 percent of the map unit. Slopes are 1 to 5 percent. This component is on stream terraces on plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map Unit: FcB2—Feliciana silt loam, 2 to 5 percent slopes, moderately eroded, northern phase

Component: Feliciana, northern phase (94%)

The Feliciana, northern phase component makes up 94 percent of the map unit. Slopes are 2 to 5 percent. This component is on divides, hills. The parent material consists of fine-silty noncalcareous loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the F134XY006AL Northern Loess Sideslope - PROVISIONAL ecological site. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Loring, northern phase (6%)

Generated brief soil descriptions are created for major soil components. The Loring, northern phase soil is a minor component.

Map Unit: FcC3—Feliciana silt loam, 5 to 8 percent slopes, severely eroded, northern phase

Component: Feliciana, northern phase (95%)

The Feliciana, northern phase component makes up 95 percent of the map unit. Slopes are 5 to 8 percent. This component is on divides, hills. The parent material consists of fine-silty noncalcareous loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the F134XY003AL Northern Loess Interfluvium - PROVISIONAL ecological site. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Loring (5%)

Generated brief soil descriptions are created for major soil components. The Loring soil is a minor component.

Map Unit: FcD3—Feliciana silt loam, 8 to 12 percent slopes, severely eroded, northern phase

Component: Feliciana, northern phase (95%)

The Feliciana, northern phase component makes up 95 percent of the map unit. Slopes are 8 to 12 percent. This component is on divides, hills. The parent material consists of fine-silty noncalcareous loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the F134XY003AL Northern Loess Interfluvium - PROVISIONAL ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

Component: Loring, northern phase (5%)

Generated brief soil descriptions are created for major soil components. The Loring, northern phase soil is a minor component.

Map Unit: GrB2—Grenada silt loam, 1 to 5 percent slopes, eroded

Component: Grenada (100%)

The Grenada component makes up 100 percent of the map unit. Slopes are 1 to 5 percent. This component is on loess hills on plains. The parent material consists of loess. Depth to a root restrictive layer, fragipan, is 18 to 36 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map Unit: LoB2—Loring silt loam, 1 to 5 percent slopes, eroded

Component: Loring (100%)

The Loring component makes up 100 percent of the map unit. Slopes are 1 to 5 percent. The parent material consists of loess. Depth to a root restrictive layer, fragipan, is 14 to 35 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 20 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map Unit: LoB3—Loring silt loam, 1 to 5 percent slopes, severely eroded

Component: Loring (100%)

The Loring component makes up 100 percent of the map unit. Slopes are 1 to 5 percent. The parent material consists of loess. Depth to a root restrictive layer, fragipan, is 14 to 35 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 11 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Map Unit: LoC3—Loring silt loam, 5 to 8 percent slopes, severely eroded

Component: Loring (100%)

The Loring component makes up 100 percent of the map unit. Slopes are 5 to 8 percent. This component is on loess hills, uplands. The parent material consists of loess. Depth to a root restrictive layer, fragipan, is 14 to 30 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 11 inches during January, February, March, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Map Unit: Ro—Routon silt loam

Component: Routon (100%)

The Routon component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on stream terraces on plains. The parent material consists of loess over silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.

Data Source Information

Soil Survey Area: Haywood County, Tennessee

Survey Area Data: Version 21, Sep 14, 2021

SOIL ANALYSIS

Client : Denali Water Solutions Mr. Billy Staton P.O. Box 399 Dardanelle AR 72834	Grower : TB3-Gillespie Haywood Co.	Report No: 21-043-0854 Cust No: 20513 Date Printed: 02/13/2021 Date Received : 02/12/2021 PO: Page : 1 of 2
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Lab No: 13105

Field:

Sample ID: CG-1

Test	Method	Results	SOIL TEST RATINGS					Calculated Cation Exchange Capacity
			Very Low	Low	Medium	Optimum	Very High	
Soil pH	1:1	5.2						9.4 meq/100g
Buffer pH	SMP	6.61						%Saturation
Phosphorus (P)	M3	38 mg/kg						%sat meq
Potassium (K)	M3	77 mg/kg						K 2.1 0.2
Calcium (Ca)	M3	967 mg/kg						Ca 51.4 4.8
Magnesium (Mg)	M3	136 mg/kg						Mg 12.1 1.1
Sulfur (S)								H 34.0 3.2
Boron (B)								
Copper (Cu)								
Iron (Fe)								
Manganese (Mn)								
Zinc (Zn)								
Sodium (Na)								
Soluble Salts								
Organic Matter	LOI	1.4mc ENR 72						K/Mg Ratio: 0.17
Nitrate Nitrogen								Ca/Mg Ratio: 4.25

SOIL FERTILITY GUIDELINES

Crop : Corn

Yield Goal : 150 bu/acre

Rec Units: LB/ACRE

(lbs)	LIME	(tons)	N	P ₂ O ₅	K ₂ O	Mg	S	B	Cu	Mn	Zn	Fe
4000		2	183	61	114	0						
Crop :												Rec Units:

Comments :

Corn

Limestone application is targeted to bring soil pH to 6.0.

• Greater N efficiency for corn may be achieved by splitting the N application. Apply 1/4 to 1/3 of the N prior to or at planting and the remainder as sidedress when corn is 8-24 inches high.

• For early planted corn or no till corn, apply a starter fertilizer at least 2 inches from the seed at a rate of 10-20 lbs N/Acre and 30-60 lbs P₂O₅/Acre.

SOIL ANALYSIS

Client : Denali Water Solutions Mr. Billy Staton P.O. Box 399 Dardanelle AR 72834	Grower : TB3-Gillespie Haywood Co.	Report No: 21-043-0854 Cust No: 20513 Date Printed: 02/13/2021 Date Received : 02/12/2021 PO: Page : 2 of 2
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Lab No: 13106

Field:

Sample ID: CG-2

Test	Method	Results	SOIL TEST RATINGS					Calculated Cation Exchange Capacity
			Very Low	Low	Medium	Optimum	Very High	
Soil pH	1:1	4.9						12.3 meq/100g
Buffer pH	SMP	6.39						%Saturation
Phosphorus (P)	M3	61 mg/kg						%sat meq
Potassium (K)	M3	98 mg/kg						K 2.0 0.3
Calcium (Ca)	M3	1122 mg/kg						Ca 45.6 5.6
Magnesium (Mg)	M3	124 mg/kg						Mg 8.4 1.0
Sulfur (S)								H 43.9 5.4
Boron (B)								
Copper (Cu)								
Iron (Fe)								K/Mg Ratio: 0.24
Manganese (Mn)								Ca/Mg Ratio: 5.43
Zinc (Zn)								
Sodium (Na)								
Soluble Salts								
Organic Matter	LOI	2.6mc ENR 96						
Nitrate Nitrogen								

SOIL FERTILITY GUIDELINES

Crop : Corn

Yield Goal : 150 bu/acre

Rec Units:

LB/ACRE

(lbs)	LIME	(tons)	N	P ₂ O ₅	K ₂ O	Mg	S	B	Cu	Mn	Zn	Fe
5500		2.8	183	30	118	0						
Crop :												
Rec Units:												

Comments :

Corn

Limestone application is targeted to bring soil pH to 6.0.

- Greater N efficiency for corn may be achieved by splitting the N application. Apply 1/4 to 1/3 of the N prior to or at planting and the remainder as sidedress when corn is 8-24 inches high.
- For early planted corn or no till corn, apply a starter fertilizer at least 2 inches from the seed at a rate of 10-20 lbs N/Acre and 30-60 lbs P₂O₅/Acre.

Attachment D

Heavy Metal Site Life Calculation

Projected Volume of Residuals to be Land Applied

Residuals Loading Rate Tabulations

HEAVY METALS CALCULATIONS

CG-1.2 - Haywood County Permit Application

	Tyson Number	4.04%	Cov (Vogut	40.40%	Cov (DAF)	20.20%	ConAgta	2.02%	CSC Sugar	2.02%	Bongards	2.02%	Da-Mem	4.04%	TyHumb	20.20%	TyUnion Cty	5.05%	Weighted Average mg/kg (dry weight)
Pb	4.55	0.16392	6.39	2.57/52	8.82	1.76164	3.57	0.072114	3	0.0606	7.69	0.155338	0.35	0.01414	3.32	0.67064	0.675	0.0340875	5.4
Zn	339	13.6956	26.6	10.7464	149	30.098	90.8	1.83416	22	0.4444	32.1	0.64842	1.5	0.0606	165	37.37	21.9	1.10966	82.3
Cu	57.1	2.30884	10.6	4.2624	16.4	3.3128	12.4	0.25048	27	0.5454	12.8	0.25856	0.29	0.011716	43.2	8.7264	11.3	0.57066	18.0
Ne	6.35	0.25654	5.32	2.14928	7.35	1.4647	8.89	0.199778	2.5	0.0505	6.41	0.129462	0.29	0.011716	9.19	1.65339	1.65	0.083325	6.0
Cd	1.52	0.061408	2.13	0.86052	2.84	0.59388	1.19	0.024038	1	0.0202	2.56	0.051712	0.12	0.004948	1.08	0.21616	0.225	0.0113625	1.8
PAN	16147	652.3398	4385	1771.54	12097	2443.594	1480	29.492	1054	21.2908	5014	101.2828	117600	4751.04	30071	6074.342	1985	100.2425	15292.8
% solids	6.55	0.28866	4.74	1.91496	3.38	0.68276	9.45	0.19089	8.97	0.201394	3.91	0.078962	0.12	0.004648	9.75	1.9695	44.4	2.2422	7.3

Note: The weighted average values are from representative samples from each material reported in mg/kg dry weight.
Note: The percentages used to calculate weighted average analysis are based upon historical volumes generated.

Maximum allowable accumulations of sludge in dry tons/acre:

Lead	(445 lbs Pb/acre)/(5.4ppm Pb x 0.002) =	41,203.7 dry tons sludge/acre
Zinc	(223 lbs Zn/acre)/(82.3 ppm Zn x 0.002) =	1354.8 dry tons sludge/acre
Copper	(111 lbs Cu/acre)/(18.0 ppm Cu x 0.002) =	3083.3 dry tons sludge/acre
Nickel	(45 lbs Ni/acre)/(6.0 ppm Ni x 0.002) =	3750 dry tons sludge/acre
Cadmium	(4.5 lbs Cd/acre)/(1.8 ppm Cd x 0.002) =	1250 dry tons sludge/acre

Maximum annual application rate for Cadmium at 0.45 pounds/acre/year:

$$(0.45 \text{ lbs Cd/acre}) / (1.8 \text{ ppm Cd} \times 0.002) = 125 \text{ dry tons/acre/year}$$

Maximum annual application rate for Plant-Available Nitrogen at 180 lbs PAN/acre/year

$$(180 \text{ lbs PAN/acre}) / (15292.8 \text{ ppm PAN} \times 0.002) = 5.88 \text{ dry tons/acre/year}$$

If sludge were applied at maximum allowable PAN rate of 5.9 dry tons per acre per year, the most restrictive metals limit (Cadmium in low CEC soils) would be reached in 212.5 years.

Calculation Page

CG-1_2 - Haywood County Permit Application

Weighted Average
mg/kg dry weight

Note: The weighted average values are from representative samples from each material reported in mg/kg dry weight.
Note: The percentages used to calculate weighted average analysis are based upon historical volumes generated.

Maximum allowable accumulations of sludge in dry tons/acre:

Pb	5.4
Zn	82.3
Cu	18.0
Ni	6.0
Cd	1.8
PAN	15292.8
% solids	7.3

Lead $(445 \text{ lbs Pb/acre}) / (5.4 \text{ ppm Pb} \times 0.002) = 41,203.7 \text{ dry tons sludge/acre}$

Zinc $(223 \text{ lbs Zn/acre}) / (82.3 \text{ ppm Zn} \times 0.002) = 1354.8 \text{ dry tons sludge/acre}$

Copper $(111 \text{ lbs Cu/acre}) / (18.0 \text{ ppm Cu} \times 0.002) = 3083.3 \text{ dry tons sludge/acre}$

Nickel $(45 \text{ lbs Ni/acre}) / (6.0 \text{ ppm Ni} \times 0.002) = 3750 \text{ dry tons sludge/acre}$

Cadmium $(4.5 \text{ lbs Cd/acre}) / (1.8 \text{ ppm Cd} \times 0.002) = 1250 \text{ dry tons sludge/acre}$

Maximum annual application rate for Cadmium at 0.45 pounds/acre/year:

$$(0.45 \text{ lbs Cd/acre}) / (1.8 \text{ ppm Cd} \times 0.002) = 125 \text{ dry tons/acre/year}$$

Maximum annual application rate for Plant-Available Nitrogen at 180 lbs PAN/acre/year

$$(180 \text{ lbs PAN/acre}) / (15292.8 \text{ ppm PAN} \times 0.002) = 5.88 \text{ dry tons/acre/year}$$

If sludge were applied at maximum allowable PAN rate of 5.9 dry tons per acre per year, the most restrictive metals limit (Cadmium in low CEC soils) would be reached in 212.5 years.

	lbs/ac	ppm	factor	dry ton/ac	
Pb	445	5.4	0.002	41203.7	
Zn	223	82.3	0.002	1354.8	
Cu	111	18.0	0.002	3083.333	
Ni	45	6.0	0.002	3750	
Cd	4.5	1.8	0.002	1250	
PAN	180	15292.8	0.002	5.885122	
annual limit	Cd	0.45	1.8	0.002	125

1250 dry ton/ac	5.9	1250	212.585
Cd limit			

(Com)	Highest Application Rate Factor
PAN/ac	Avg PAN factor dry tons/ac/yr
180	15292.8 0.002 5.885122

Total Weekly Volume of Material Projected for CG-1_2 Field and Weighted Average Application Rate

Material Type	Facility Name	Weighted %	Weighted								
			loads/wk	gal/wk	PAN/load	PAN/wk	P2O5/load	K2O/load	Avg PAN	Avg P2O5	Avg K2O
ice cream	EcoYog - Covington, TN	40.4040404	40	240000	9.35	374	16.95	17.58	3.777778	6.8	7.1
ice cream	EcoDAF - Covington, TN	20.2020202	20	120000	18.4	368	30.02	8.21	3.72	6.1	1.7
toppings	ConAgra - Humboldt, TN	2.02020202	2	12000	6.21	12.42	91.4	6.94	0.1	1.8	0.1
pork	Tyson Foods - Newburn, TN	4.04040404	4	24000	48.4	193.6	25.3	2.1	2.0	1.0	0.1
dairy	Bongards Creameries - Humboldt, TN	2.02020202	2	12000	8.8	17.6	54.4	3.4	0.2	1.1	0.1
sugar	CSC-Sugarite - Covington TN	2.02020202	2	12000	4.7	9.4	3.1	2	0.1	0.1	0.0
restaurant	Darpro-Memphis	4.04040404	4	24000	6.2	24.8	1.3	1.4	0.3	0.1	0.1
poultry	Tyson Foods-Humboldt, TN	20.2020202	20	120000	125.4	2508	111.7	29.9	25.3	22.6	6.0
poultry	Tyson Foods - Union City, TN	5.050505051	5	30000	39.6	198	90.1	8.2	2.0	4.6	0.4
Weighted Avg Fertilizer Value/ 6000 gal truck load:					PAN	P2O5	K2O				
					37.43253	44.1	15.6				
					lbs PAN/gal	lbs P2O5/gal	lbs K2O/gal				
					0.005167	0.003717	0.001867				
Totals:			100	99	594000	3705.8					
			loads/wk	gal/wk	PAN/wk						

Loading Rate Tabulation

Environmental



Facility: Tyson Foods Inc : Tyson Foods - Newbern TN

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0098

Internal ID: 5341

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	16,147	1076.21	
Ammonia	7,740	515.87	
TKN	49,700	3312.51	
Nitrates/Nitrites	15.20	1.0131	
Organic N	41,960	2796.63	
Arsenic	8.00	0.5052	75 mg/kg
Cadmium	2.00	0.1013	85 mg/kg
Chromium	14.00	0.9464	3000 mg/kg
Copper	57.00	3.8057	4300 mg/kg
Lead	4.55	0.3033	840 mg/kg
Mercury	0.23	0.0151	57 mg/kg
Molybdenum	3.79	0.2526	75 mg/kg
Nickel	6.00	0.4232	420 mg/kg
Phosphorus	3,680	245.27	
Potassium	594	39.59	
Selenium	8.00	0.5052	100 mg/kg
Zinc	339.00	22.5944	7500 mg/kg
Iron			
Sodium	1,230	81.9795	
Barium			
Silver			
Calcium	17,900.00	1,193.04	
Magnesium	1,320.00	87.98	
Manganese	59.80	3.99	
Chloride	544.00	36.26	
Sulfur	2,700.00	179.96	
Oil & Grease		39	
BOD			
pcb			
TCLP			
ph	5.60		
% solidsS	6.67		
% Vol Solids	92.70		
% Moisture	93.40		
lbs/gallon	7.50		
dry tons/load	1.67		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 48.4295

Phospate (P2O5): 25.2800

Potash (K2O): 2.1400

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	11,250
Corn	150	18,750
Bermuda Pasture	240	30,000
Soybeans	60	7,500
Wheat	75	9,375

Loading Rate Tabulation

Environmental



Facility: Nalco Contract Operations - Ecovation Covington

Analysis Date: 3/23/2022

Analysis Note:

Product: Yogurt

State: TN

Application Type: Subsurface

AIC Control # 22-073-0104

Internal ID: 5401

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	4,385	207.86	
Ammonia	2,130	100.96	
TKN	13,300	630.42	
Nitrates/Nitrites	21.30	1.0096	
Organic N	11,170	529.46	
Arsenic	11.00	0.5024	75 mg/kg
Cadmium	2.00	0.1010	85 mg/kg
Chromium	5.00	0.2522	3000 mg/kg
Copper	11.00	0.5024	4300 mg/kg
Lead	6.38	0.3024	840 mg/kg
Mercury	0.31	0.0146	57 mg/kg
Molybdenum	5.32	0.2522	75 mg/kg
Nickel	5.00	0.2522	420 mg/kg
Phosphorus	3,470	164.48	
Potassium	6,870	325.64	
Selenium	11.00	0.5024	100 mg/kg
Zinc	26.60	1.2608	7500 mg/kg
Iron			
Sodium	2,280	108.0720	
Barium			
Silver			
Calcium	4,000.00	189.60	
Magnesium	6,887.00	326.44	
Manganese	10.60	0.50	
Chloride	2,470.00	117.08	
Sulfur	1,450.00	68.73	
Oil & Grease		14	
BOD			
pcb			
TCLP			
ph	3.40		
% solidsS	4.74		
% Vol Solids	97.20		
% Moisture	95.30		
lbs/gallon	7.50		
dry tons/load	1.19		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 9.3538

Phospate (P2O5): 16.9500

Potash (K2O): 17.5800

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	60,000
Corn	150	100,000
Bermuda Pasture	240	160,000
Soybeans	60	40,000
Wheat	75	50,000

Loading Rate Tabulation

Environmental



Facility: Nalco Contract Operations - Ecovation Covington

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0102

Internal ID: 5346

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	12,097	408.89	
Ammonia	3,760	127.09	
TKN	45,300	1531.14	
Nitrates/Nitrites	29.40	0.9937	
Organic N	41,540	1404.05	
Arsenic	15.00	0.4969	75 mg/kg
Cadmium	3.00	0.0994	85 mg/kg
Chromium	7.00	0.2484	3000 mg/kg
Copper	16.00	0.5543	4300 mg/kg
Lead	8.82	0.2981	840 mg/kg
Mercury	0.43	0.0146	57 mg/kg
Molybdenum	7.35	0.2484	75 mg/kg
Nickel	7.00	0.2484	420 mg/kg
Phosphorus	8,620	291.36	
Potassium	4,500	152.10	
Selenium	15.00	0.4969	100 mg/kg
Zinc	149.00	5.0362	7500 mg/kg
Iron			
Sodium	6,470	218.6860	
Barium			
Silver			
Calcium	11,600.00	392.08	
Magnesium	932.00	31.50	
Manganese	17.70	0.60	
Chloride	7,350.00	248.43	
Sulfur	3,290.00	111.20	
Oil & Grease		19	
BOD			
pcb			
TCLP			
ph	4.80		
% solidsS	3.38		
% Vol Solids	89.90		
% Moisture	96.60		
lbs/gallon	7.50		
dry tons/load	0.85		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 18.4001

Phosphate (P2O5): 30.0200

Potash (K2O): 8.2100

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	30,000
Corn	150	50,000
Bermuda Pasture	240	80,000
Soybeans	60	20,000
Wheat	75	25,000

Loading Rate Tabulation

Environmental



Facility: ConAgra Foods : ConAgra Foods - Humboldt

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0101

Internal ID: 5343

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	1,460	137.96	
Ammonia	1,190	112.46	
TKN	2,480	234.36	
Nitrates/Nitrites	11.90	1.1246	
Organic N	1,290	121.91	
Arsenic	6.00	0.5623	75 mg/kg
Cadmium	1.00	0.1125	85 mg/kg
Chromium	13.00	1.2569	3000 mg/kg
Copper	12.00	1.1718	4300 mg/kg
Lead	3.57	0.3374	840 mg/kg
Mercury	0.18	0.0173	57 mg/kg
Molybdenum	2.98	0.2816	75 mg/kg
Nickel	10.00	0.9346	420 mg/kg
Phosphorus	9,390	887.36	
Potassium	1,360	128.52	
Selenium	6.00	0.5623	100 mg/kg
Zinc	90.80	8.5806	7500 mg/kg
Iron			
Sodium	2,890	273.1050	
Barium			
Silver			
Calcium	946.00	89.40	
Magnesium	208.00	19.66	
Manganese	7.38	0.70	
Chloride	727.00	68.70	
Sulfur	1,310.00	123.80	
Oil & Grease		5	
BOD			
pcb			
TCLP			
ph	4.10		
% solidsS	9.45		
% Vol Solids	85.00		
% Moisture	91.60		
lbs/gallon	7.50		
dry tons/load	2.36		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 6.2082

Phospate (P2O5): 91.4400

Potash (K2O): 6.9400

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	90,000
Corn	150	150,000
Bermuda Pasture	240	240,000
Soybeans	60	60,000
Wheat	75	75,000

Loading Rate Tabulation

Environmental



Facility: CSC Sugar - Covington TN

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0100

Internal ID: 5342

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	1,054	105.06	
Ammonia	1,060	105.68	
TKN	979	97.61	
Nitrates/Nitrites	10.00	0.9970	
Organic N	-81	-8.08	
Arsenic	5.00	0.4985	75 mg/kg
Cadmium	1.00	0.0997	85 mg/kg
Chromium	3.00	0.2493	3000 mg/kg
Copper	27.00	2.6919	4300 mg/kg
Lead	3.00	0.2991	840 mg/kg
Mercury	0.15	0.0150	57 mg/kg
Molybdenum	2.50	0.2493	75 mg/kg
Nickel	3.00	0.2493	420 mg/kg
Phosphorus	297	29.61	
Potassium	371	36.99	
Selenium	5.00	0.4985	100 mg/kg
Zinc	22.00	2.1934	7500 mg/kg
Iron			
Sodium	981	97.8057	
Barium			
Silver			
Calcium	1,430.00	142.57	
Magnesium	239.00	23.83	
Manganese	7.03	0.70	
Chloride	175.00	17.45	
Sulfur	148.00	14.76	
Oil & Grease		0	
BOD			
pcb			
TCLP			
ph	3.80		
% solidsS	9.97		
% Vol Solids	30.10		
% Moisture	90.00		
lbs/gallon	7.50		
dry tons/load	2.49		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 4.7279

Phospate (P2O5): 3.0500

Potash (K2O): 2.0000

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	108,000
Corn	150	180,000
Bermuda Pasture	240	288,000
Soybeans	60	72,000
Wheat	75	90,000

Loading Rate Tabulation

Environmental



Facility: Bongards - Humboldt

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0106

Internal ID: 5347

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	5,014	196.03	
Ammonia	2,560	100.10	
TKN	14,700	574.77	
Nitrates/Nitrites	25.60	1.0010	
Organic N	12,140	474.67	
Arsenic	13.00	0.5005	75 mg/kg
Cadmium	3.00	0.1001	85 mg/kg
Chromium	11.00	0.4223	3000 mg/kg
Copper	13.00	0.5005	4300 mg/kg
Lead	7.69	0.3007	840 mg/kg
Mercury	0.37	0.0144	57 mg/kg
Molybdenum	6.41	0.2506	75 mg/kg
Nickel	6.00	0.2506	420 mg/kg
Phosphorus	13,500	527.85	
Potassium	1,600	62.56	
Selenium	13.00	0.5005	100 mg/kg
Zinc	32.10	1.2551	7500 mg/kg
Iron			
Sodium	6,540	255.7140	
Barium			
Silver			
Calcium	2,240.00	87.58	
Magnesium	223.00	8.72	
Manganese	12.80	0.50	
Chloride	3,330.00	130.20	
Sulfur	3,050.00	119.26	
Oil & Grease		15	
BOD			
pcb			
TCLP			
ph	6.00		
% solidsS	3.91		
% Vol Solids	56.40		
% Moisture	96.10		
lbs/gallon	7.50		
dry tons/load	0.98		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 8.8214

Phospate (P2O5): 54.3900

Potash (K2O): 3.3800

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	60,000
Corn	150	100,000
Bermuda Pasture	240	160,000
Soybeans	60	40,000
Wheat	75	50,000

Loading Rate Tabulation

Environmental



Facility: DarPro-Memphis, TN

Analysis Date: 12/12/2013

Analysis Note:

Product: Sludge

State: TN

Application Type: SubSurface

AIC Control #: 173210

LRT #:

Internal ID: 22853

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

~~PAN~~

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	6,824	102.36	
Ammonia	730	10.95	
TKN	31,000	465.00	
Nitrates/Nitrites	40.00	0.6000	
Organic N	30,270	454.05	
Arsenic	5.00	0.0750	75 mg/kg
Cadmium	0.00	0.0060	85 mg/kg
Chromium	4.00	0.0630	3000 mg/kg
Copper	35.00	0.5250	4300 mg/kg
Lead	4.00	0.0600	840 mg/kg
Mercury	0.10	0.0015	57 mg/kg
Molybdenum	0.80	0.0120	75 mg/kg
Nickel	8.00	0.1140	420 mg/kg
Phosphorus	820	12.30	
Potassium	510	7.65	
Selenium	7.00	0.1050	100 mg/kg
Zinc	20.00	0.3000	7500 mg/kg
Iron	0.0000	0.0000	
Soluble P	61	0.9150	
Sodium	3,500	52.5000	
Barium	0.00	0.00	
Silver	0.00	0.00	
Calcium	0.00	0.00	
Magnesium	0.00	0.00	
Manganese	0.00	0.00	
Chloride	0.00	0.00	
Sulfur	0.00	0.00	
Oil & Grease		2	
BOD	1,200,000		
pcb			
Fecal Coliform	30000		
TCLP			
ph	4.0		
% solidsS	1.50		
% Vol Solids	1.40		
% Moisture	0.00		
lbs/gallon	7.50		
dry tons/load	0.38		

Pounds per 6000 gallon load:

Plant-available nitrogen: 5.0000

Phosphate (P2O5): 1.2700

Potash (K2O): 0.4100

SP: 0.04

Max. Allowable App Rate at:

Crop	PAN	App Rate
Bermuda Pasture	200	240,000
Corn	150	180,000
Fescue Hay	120	144,000
Soybeans	270	324,000
Wheat	140	168,000

Loading Rate Tabulation

Environmental



Facility: Tyson Foods Inc : Tyson Foods Inc - Tyson Hum

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0103

Internal ID: 5344

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	30,071	2787.56	
Ammonia	19,100	1770.57	
TKN	73,900	6850.53	
Nitrates/Nitrites	10.80	1.0012	
Organic N	54,800	5079.96	
Arsenic	5.00	0.4987	75 mg/kg
Cadmium	1.00	0.1001	85 mg/kg
Chromium	13.00	1.2051	3000 mg/kg
Copper	43.00	4.0046	4300 mg/kg
Lead	3.23	0.2994	840 mg/kg
Mercury	0.17	0.0156	57 mg/kg
Molybdenum	2.69	0.2494	75 mg/kg
Nickel	9.00	0.8519	420 mg/kg
Phosphorus	11,700	1084.59	
Potassium	5,980	554.35	
Selenium	5.00	0.4987	100 mg/kg
Zinc	185.00	17.1495	7500 mg/kg
Iron			
Sodium	1,140	105.6780	
Barium			
Silver			
Calcium	4,460.00	413.44	
Magnesium	1,560.00	144.61	
Manganese	24.90	2.31	
Chloride	537.00	49.78	
Sulfur	4,160.00	385.63	
Oil & Grease		30	
BOD			
pcb			
TCLP			
ph	6.30		
% solidsS	9.27		
% Vol Solids	93.90		
% Moisture	90.70		
lbs/gallon	7.50		
dry tons/load	2.32		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 125.4403

Phospate (P2O5): 111.7700

Potash (K2O): 29.9300

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	4,320
Corn	150	7,200
Bermuda Pasture	240	11,520
Soybeans	60	2,880
Wheat	75	3,600

Loading Rate Tabulation

Environmental



Facility: Tyson Foods Inc : Tyson Foods - Union City

Analysis Date: 4/1/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-075-0089

Internal ID: 5377

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	1,985	881.30	
Ammonia	883	392.05	
TKN	6,280	2788.32	
Nitrates/Nitrites	22.50	9.9900	
Organic N	5,397	2396.27	
Arsenic	1.00	0.5017	75 mg/kg
Cadmium	0.00	0.0999	85 mg/kg
Chromium	3.00	1.3897	3000 mg/kg
Copper	11.00	5.0172	4300 mg/kg
Lead	0.68	0.2997	840 mg/kg
Mercury	0.04	0.0157	57 mg/kg
Molybdenum	0.56	0.2500	75 mg/kg
Nickel	2.00	0.7326	420 mg/kg
Phosphorus	1,970	874.68	
Potassium	340	150.96	
Selenium	1.00	0.5017	100 mg/kg
Zinc	21.90	9.7236	7500 mg/kg
Iron			
Sodium	156	69.2640	
Barium			
Silver			
Calcium	435.00	193.14	
Magnesium	91.40	40.58	
Manganese	4.82	2.14	
Chloride	232.00	103.01	
Sulfur	1,280.00	568.32	
Oil & Grease		68	
BOD			
pcb			
TCLP			
ph	4.10		
% solidsS	44.40		
% Vol Solids	99.20		
% Moisture	55.60		
lbs/gallon	7.50		
dry tons/load	11.11		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 39.6583

Phosphate (P2O5): 90.1400

Potash (K2O): 8.1500

SP:

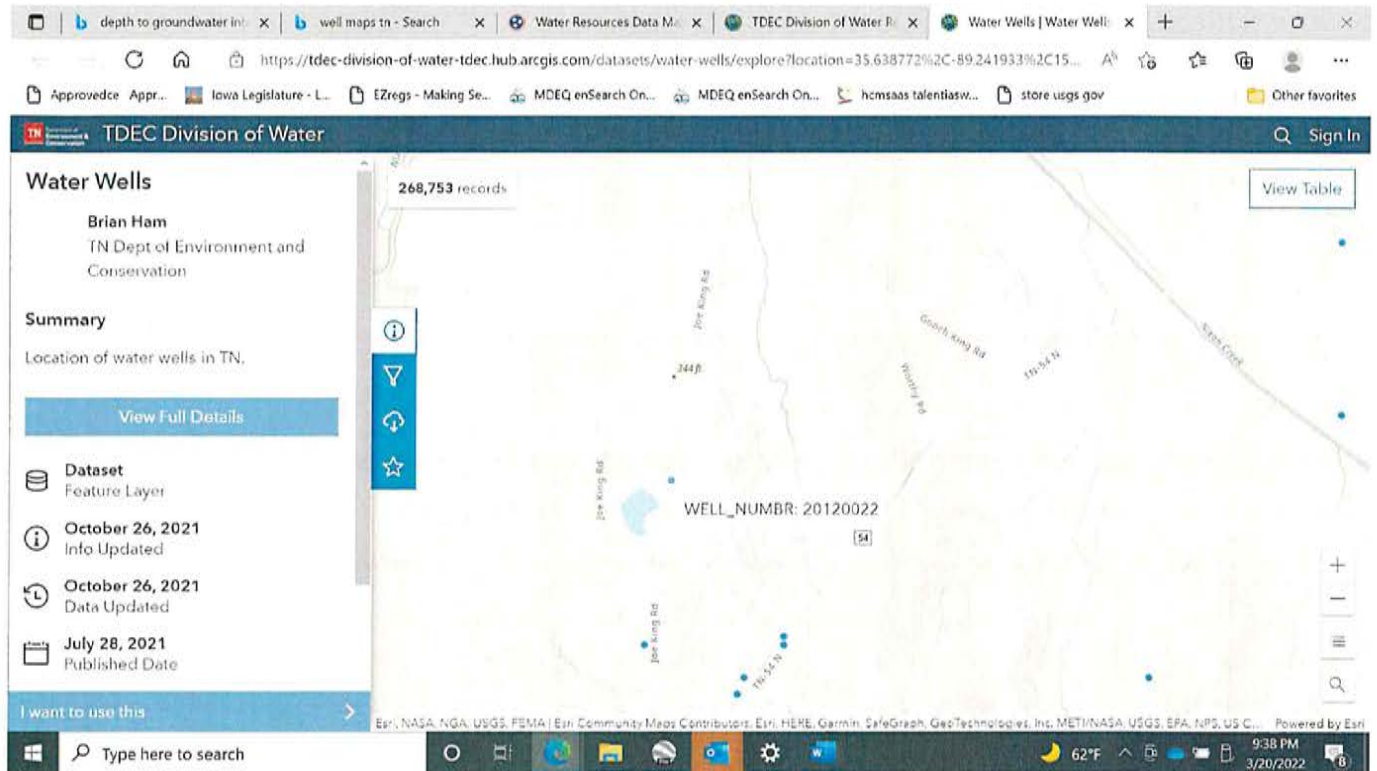
Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	13,500
Corn	150	22,500
Bermuda Pasture	240	36,000
Soybeans	60	9,000
Wheat	75	11,250

Attachment E

Groundwater Well Survey Information

(to be sent upon receipt)



WELL LOCATION

OBJECTID 168346
WELL_NUMBR 20120022
WELL_NUMBR_R4 22
DRILLER_TAG_NUMBR D0097647
INSPECTION_TAG_NUMBR 055622
CMPLTN_DATE November 11, 2011
CMPLTN_TOTAL_DEPTH 265
FINISH_TYPE Screen
FINISH_FROM_FT 225
FINISH_TO_FT 265
CMPLTN_ESTIMATED_YIELD
CMPLTN_STATIC_LEVEL 70
QUALITY Clear

CASING_TYPE Plastic

CASING_FEET_BELOW_GROUND 225

QUAD_NAME TIBBS

QUAD_NUMBR 0422NE

QUAD_NTH 9

LATITUDE_DD 35.6375

LONGITUDE_DD -89.250278

COUNTY_NAME HAYWOOD

OWNER_NAME AGEE, STEVEN

LOCATION JOE KING RD

INSPECTION_DATE August 13, 2012

LICENSE_CODE 570

DRILLER_REPORT_ID 90

ACCURACY S

WELL_USE Irrigation

FORM_LOG Yes

LATITUDE 353815

LONGITUDE 891501

LAT_DD 35

LAT_MM 38

LAT_SS 15

LON_DD 89

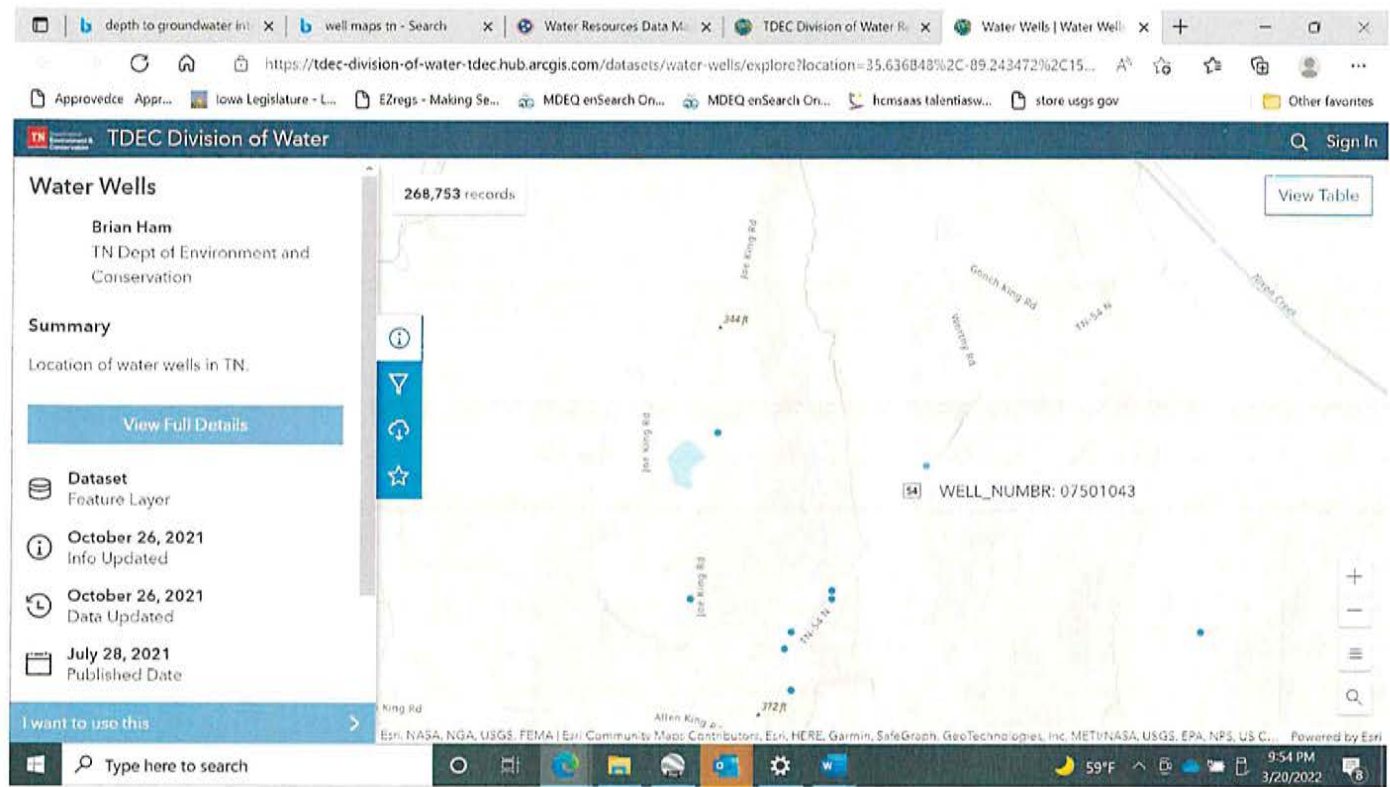
LON_MM 15

LON_SS 1

Q9TH_ORPHAN

LINK_ID 20120022|D0097647|055622|12-NOV-

11|265|Screen|225|265||70|Clear|Plastic|225|TIBBS|0422NE|9|HAYWOOD|AGEE, STEVEN |JOE
KING RD |14-AUG-12|570|90|S|Irrigation|353815|891501



WELL LOCATION

OBJECTID 173044

WELL_NUMBR 07501043

WELL_NUMBR_R4 1043

DRILLER_TAG_NUMBR

INSPECTION_TAG_NUMBR

CMPLTN_DATE April 15, 1974

CMPLTN_TOTAL_DEPTH 225

FINISH_TYPE

FINISH_FROM_FT 195

FINISH_TO_FT 225

CMPLTN_ESTIMATED_YIELD

CMPLTN_STATIC_LEVEL

QUALITY Good
CASING_TYPE Plastic
CASING_FEET_BELOW_GROUND 195
QUAD_NAME JONES
QUAD_NUMBR 0430NW
QUAD_NTH 7
LATITUDE_DD 35.636389
LONGITUDE_DD -89.241667
COUNTY_NAME HAYWOOD
OWNER_NAME CASTELAW B
LOCATION
INSPECTION_DATE
LICENSE_CODE 47
DRILLER_REPORT_ID
ACCURACY S
WELL_USE Residential
FORM_LOG No
LATITUDE 353811
LONGITUDE 891430
LAT_DD35
LAT_MM 38
LAT_SS 11
LON_DD 89
LON_MM 14
LON_SS30
Q9TH_ORPHAN
LINK_ID07501043|||16-APR-
74|225||195|225|||Good|Plastic|195|JONES|0430NW|7|HAYWOOD|CASTELAW B|
||47||S|Residential|353811|891430

Attachment F

Laboratory Analysis and Loading Rate Tabulations

11675
Denali Water Solutions
Ms. Vanya Colburn
P.O. Box 3036
Russellville, AR 72802

Project TN3
Information : Project # TYNEWBE

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0098

REPORT OF ANALYSIS

Lab No : 89721
Sample ID : TYNEWBE

Matrix: Solids
Sampled: 3/14/2022 7:30

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	63.5	%	0.10	1	03/21/22 09:42	JCG	LECO
Fecal Coliform	8180000	MPN/g - dry	27300	1	03/14/22 14:57	CMF	9221E-2011
Calcium (saturated paste)	5.22	meq/L	0.005	1	03/21/22 14:33	JCG	Saturate Paste
Magnesium (saturated paste)	6.00	meq/L	0.008	1	03/21/22 14:33	JCG	Saturate Paste
Sodium (saturated paste)	4.14	meq/L	0.004	1	03/21/22 14:33	JCG	Saturate Paste
Sodium Absorption Ratio	1.75			1	03/21/22 14:33	JCG	Saturate Paste
Soluble Salts	3.66	dS/m	0.01	1	03/21/22 09:00	JVP	Soluble Salts
Loss on Ignition	82.7	%		1	03/20/22 15:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	19.5	%	0.1	1	03/20/22 14:00	DXT	AOAC 955.01
Moisture	93.4	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	0.487	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	7740	mg/Kg - dry	1520	1	03/21/22 14:30	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	814000 d	mg/Kg - dry	303000	1	03/15/22 10:20	RDP	5210B-2016
Chloride	544	mg/Kg - dry	60.6	1	03/17/22 23:50	JCA	9056A
Nitrate (NO3-N)	<15.2	mg/Kg - dry	15.2	1	03/17/22 23:50	JCA	9056A
Nitrite (NO2-N)	<15.2	mg/Kg - dry	15.2	1	03/17/22 23:50	JCA	9056A
Nitrate+Nitrite-N	<15.2	mg/Kg - dry	15.2	1	03/17/22 23:50		9056A
HEM: Oil and Grease	385000	mg/Kg - dry	2090	1	03/17/22 10:30	MEJ	SW-9071B
pH	5.6	s.u.		1	03/21/22 16:40	DRS	9045D
Total Solids	6.65	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	92.7	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	49700	mg/Kg - dry	3580	1	03/21/22 15:03	CLP	4500NORGD-2011
Phosphorus	3680	mg/Kg - dry	75.8	1	03/18/22 00:32	JTR	6010D

Qualifiers/ Definitions	d	BOD Dilution Water	DF	Dilution Factor
	MQL	Method Quantitation Limit		



2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

11675
Denali Water Solutions
Ms. Vanya Colburn
P.O. Box 3036
Russellville, AR 72802

Project TN3
Information : Project # TYNEWBE

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0098

REPORT OF ANALYSIS

Lab No : 89721
Sample ID : TYNEWBE

Matrix: Solids
Sampled: 3/14/2022 7:30

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Arsenic	<7.58	mg/Kg - dry	7.58	1	03/18/22 00:32	JTR	6010D
Boron	<37.9	mg/Kg - dry	37.9	1	03/18/22 00:32	JTR	6010D
Cadmium	<1.52	mg/Kg - dry	1.52	1	03/18/22 00:32	JTR	6010D
Calcium	17900	mg/Kg - dry	758	1	03/18/22 00:32	JTR	6010D
Chromium	14.2	mg/Kg - dry	3.79	1	03/18/22 00:32	JTR	6010D
Copper	57.1	mg/Kg - dry	7.58	1	03/18/22 00:32	JTR	6010D
Lead	<4.55	mg/Kg - dry	4.55	1	03/18/22 00:32	JTR	6010D
Magnesium	1320	mg/Kg - dry	75.8	1	03/18/22 00:32	JTR	6010D
Manganese	59.8	mg/Kg - dry	7.58	1	03/18/22 00:32	JTR	6010D
Mercury	<0.227	mg/Kg - dry	0.227	1	03/18/22 15:23	ZMT	7471A
Molybdenum	<3.79	mg/Kg - dry	3.79	1	03/18/22 00:32	JTR	6010D
Nickel	6.35	mg/Kg - dry	3.79	1	03/18/22 00:32	JTR	6010D
Potassium	594	mg/Kg - dry	152	1	03/18/22 00:32	JTR	6010D
Selenium	<7.58	mg/Kg - dry	7.58	1	03/18/22 00:32	JTR	6010D
Sodium	1230	mg/Kg - dry	379	1	03/18/22 00:32	JTR	6010D
Zinc	339	mg/Kg - dry	18.9	1	03/18/22 00:32	JTR	6010D
Sulfur	2700	mg/Kg - dry	152	1	03/18/22 00:32	JTR	6010D

Qualifiers/ Definitions

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor

Loading Rate Tabulation

Environmental



Facility: Tyson Foods Inc : Tyson Foods - Newbern TN

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0098

Internal ID: 5341

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	16,147	1076.21	
Ammonia	7,740	515.87	
TKN	49,700	3312.51	
Nitrates/Nitrites	15.20	1.0131	
Organic N	41,960	2796.63	
Arsenic	8.00	0.5052	75 mg/kg
Cadmium	2.00	0.1013	85 mg/kg
Chromium	14.00	0.9464	3000 mg/kg
Copper	57.00	3.8057	4300 mg/kg
Lead	4.55	0.3033	840 mg/kg
Mercury	0.23	0.0151	57 mg/kg
Molybdenum	3.79	0.2526	75 mg/kg
Nickel	6.00	0.4232	420 mg/kg
Phosphorus	3,680	245.27	
Potassium	594	39.59	
Selenium	8.00	0.5052	100 mg/kg
Zinc	339.00	22.5944	7500 mg/kg
Iron			
Sodium	1,230	81.9795	
Barium			
Silver			
Calcium	17,900.00	1,193.04	
Magnesium	1,320.00	87.98	
Manganese	59.80	3.99	
Chloride	544.00	36.26	
Sulfur	2,700.00	179.96	
Oil & Grease		39	
BOD			
pcb			
TCLP			
ph	5.60		
% solidsS	6.67		
% Vol Solids	92.70		
% Moisture	93.40		
lbs/gallon	7.50		
dry tons/load	1.67		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 48.4295

Phosphate (P2O5): 25.2800

Potash (K2O): 2.1400

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	11,250
Corn	150	18,750
Bermuda Pasture	240	30,000
Soybeans	60	7,500
Wheat	75	9,375

11675

Denali Water Solutions
Ms. Vanya Colburn
P.O. Box 3036
Russellville, AR 72802

Project TN3

Information : Porject # ECOVATI-Yogurt

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0104

REPORT OF ANALYSIS

Lab No : 89729

Matrix: Solids

Sample ID : ECOVATI-Yogurt

Sampled: 3/14/2022 9:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	54.2	%	0.10	1	03/21/22 09:56	JCG	LECO
Fecal Coliform	277000	MPN/g - dry	38300	1	03/14/22 14:57	CMF	9221E-2011
Calcium (saturated paste)	4.37	meq/L	0.005	1	03/21/22 14:33	JCG	Saturate Paste
Magnesium (saturated paste)	1.22	meq/L	0.008	1	03/21/22 14:33	JCG	Saturate Paste
Sodium (saturated paste)	2.17	meq/L	0.004	1	03/21/22 14:33	JCG	Saturate Paste
Sodium Absorption Ratio	1.30			1	03/21/22 14:33	JCG	Saturate Paste
Soluble Salts	0.99	dS/m	0.01	1	03/21/22 09:00	JVP	Soluble Salts
Loss on Ignition	70.9	%		1	03/20/22 15:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	7.6	%	0.1	1	03/20/22 14:00	DXT	AOAC 955.01
Moisture	95.3	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	0.132	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	<2130	mg/Kg - dry	2130	1	03/21/22 14:30	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	1080000 d	mg/Kg - dry	426000	1	03/15/22 10:20	RDP	5210B-2016
Chloride	2470	mg/Kg - dry	85.1	1	03/18/22 16:52	JCA	9056A
Nitrate (NO3-N)	<21.3	mg/Kg - dry	21.3	1	03/18/22 16:52	JCA	9056A
Nitrite (NO2-N)	<21.3	mg/Kg - dry	21.3	1	03/18/22 16:52	JCA	9056A
Nitrate+Nitrite-N	<21.3	mg/Kg - dry	21.3	1	03/18/22 16:52		9056A
HEM: Oil and Grease	138000	mg/Kg - dry	3040	1	03/17/22 10:30	MEJ	SW-9071B
pH	3.4	s.u.		1	03/21/22 16:40	DRS	9045D
Total Solids	4.74	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	97.2	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	13300	mg/Kg - dry	4040	1	03/21/22 15:10	CLP	4500NORGD-2011
Phosphorus	3470	mg/Kg - dry	106	1	03/18/22 00:58	JTR	6010D

**Qualifiers/
Definitions**

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor

11675

Denali Water Solutions
Ms. Vanya Colburn
P.O. Box 3036
Russellville, AR 72802

Project TN3

Information : Porject # ECOVATI-Yogurt

Report Date : 03/23/2022

Received : 03/14/2022

Report Number : **22-073-0104**

REPORT OF ANALYSIS

Lab No : **89729**

Matrix: **Solids**

Sample ID : **ECOVATI-Yogurt**

Sampled: **3/14/2022 9:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Arsenic	<10.6	mg/Kg - dry	10.6	1	03/18/22 00:58	JTR	6010D
Boron	<53.2	mg/Kg - dry	53.2	1	03/18/22 00:58	JTR	6010D
Cadmium	<2.13	mg/Kg - dry	2.13	1	03/18/22 00:58	JTR	6010D
Calcium	4000	mg/Kg - dry	1060	1	03/18/22 00:58	JTR	6010D
Chromium	<5.32	mg/Kg - dry	5.32	1	03/18/22 00:58	JTR	6010D
Copper	<10.6	mg/Kg - dry	10.6	1	03/18/22 00:58	JTR	6010D
Lead	<6.38	mg/Kg - dry	6.38	1	03/18/22 00:58	JTR	6010D
Magnesium	687	mg/Kg - dry	106	1	03/18/22 00:58	JTR	6010D
Manganese	<10.6	mg/Kg - dry	10.6	1	03/18/22 00:58	JTR	6010D
Mercury	<0.309	mg/Kg - dry	0.309	1	03/18/22 15:33	ZMT	7471A
Molybdenum	<5.32	mg/Kg - dry	5.32	1	03/18/22 00:58	JTR	6010D
Nickel	<5.32	mg/Kg - dry	5.32	1	03/18/22 00:58	JTR	6010D
Potassium	6870	mg/Kg - dry	213	1	03/18/22 00:58	JTR	6010D
Selenium	<10.6	mg/Kg - dry	10.6	1	03/18/22 00:58	JTR	6010D
Sodium	2280	mg/Kg - dry	532	1	03/18/22 00:58	JTR	6010D
Zinc	<26.6	mg/Kg - dry	26.6	1	03/18/22 00:58	JTR	6010D
Sulfur	1450	mg/Kg - dry	213	1	03/18/22 00:58	JTR	6010D

**Qualifiers/
Definitions**

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor

Loading Rate Tabulation

Environmental



Facility: Nalco Contract Operations - Ecovation Covington

Analysis Date: 3/23/2022

Analysis Note:

Product: Yogurt

State: TN

Application Type: Subsurface

AIC Control # 22-073-0104

Internal ID: 5401

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	4,385	207.86	
Ammonia	2,130	100.96	
TKN	13,300	630.42	
Nitrates/Nitrites	21.30	1.0096	
Organic N	11,170	529.46	
Arsenic	11.00	0.5024	75 mg/kg
Cadmium	2.00	0.1010	85 mg/kg
Chromium	5.00	0.2522	3000 mg/kg
Copper	11.00	0.5024	4300 mg/kg
Lead	6.38	0.3024	840 mg/kg
Mercury	0.31	0.0146	57 mg/kg
Molybdenum	5.32	0.2522	75 mg/kg
Nickel	5.00	0.2522	420 mg/kg
Phosphorus	3,470	164.48	
Potassium	6,870	325.64	
Selenium	11.00	0.5024	100 mg/kg
Zinc	26.60	1.2608	7500 mg/kg
Iron			
Sodium	2,280	108.0720	
Barium			
Silver			
Calcium	4,000.00	189.60	
Magnesium	6,887.00	326.44	
Manganese	10.60	0.50	
Chloride	2,470.00	117.08	
Sulfur	1,450.00	68.73	
Oil & Grease		14	
BOD			
pcb			
TCLP			
ph	3.40		
% solidsS	4.74		
% Vol Solids	97.20		
% Moisture	95.30		
lbs/gallon	7.50		
dry tons/load	1.19		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 9.3538

Phosphate (P2O5): 16.9500

Potash (K2O): 17.5800

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	60,000
Corn	150	100,000
Bermuda Pasture	240	160,000
Soybeans	60	40,000
Wheat	75	50,000

11675
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Project Sludge/Biosolids Testing

Information :

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0102

REPORT OF ANALYSIS

Lab No : 89727

Matrix: Solids

Sample ID : ECPVATI-DAF

Sampled: 3/14/2022 9:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	56.6	%	0.10	1	03/21/22 09:50	JCG	LECO
Fecal Coliform	<52900	MPN/g - dry	52900	1	03/14/22 14:57	CMF	9221E-2011
Calcium (saturated paste)	9.72	meq/L	0.005	1	03/21/22 14:33	JCG	Saturate Paste
Magnesium (saturated paste)	1.77	meq/L	0.008	1	03/21/22 14:33	JCG	Saturate Paste
Sodium (saturated paste)	6.56	meq/L	0.004	1	03/21/22 14:33	JCG	Saturate Paste
Sodium Absorption Ratio	2.74			1	03/21/22 14:33	JCG	Saturate Paste
Soluble Salts	2.02	dS/m	0.01	1	03/21/22 09:00	JVP	Soluble Salts
Loss on Ignition	57.4	%		1	03/20/22 15:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	11.1	%	0.1	1	03/20/22 14:00	DXT	AOAC 955.01
Moisture	96.6	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	0.341	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	3760	mg/Kg - dry	2940	1	03/21/22 14:30	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	1380000 d	mg/Kg - dry	588000	1	03/15/22 10:20	RDP	5210B-2016
Chloride	7350	mg/Kg - dry	118	1	03/18/22 16:00	JCA	9056A
Nitrate (NO3-N)	<29.4	mg/Kg - dry	29.4	1	03/18/22 16:00	JCA	9056A
Nitrite (NO2-N)	<29.4	mg/Kg - dry	29.4	1	03/18/22 16:00	JCA	9056A
Nitrate+Nitrite-N	<29.4	mg/Kg - dry	29.4	1	03/18/22 16:00		9056A
HEM: Oil and Grease	194000	mg/Kg - dry	4320	1	03/17/22 10:30	MEJ	SW-9071B
pH	4.8	s.u.		1	03/21/22 16:40	DRS	9045D
Total Solids	3.38	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	89.9	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	45300	mg/Kg - dry	6880	1	03/21/22 15:08	CLP	4500NORGD-2011
Phosphorus	8620	mg/Kg - dry	147	1	03/18/22 00:47	JTR	6010D

Qualifiers/ Definitions	d MQL	BOD Dilution Water Method Quantitation Limit	DF	Dilution Factor
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11675
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Project Sludge/Biosolids Testing

Information :

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : **22-073-0102**

REPORT OF ANALYSIS

Lab No : **89727**

Matrix: **Solids**

Sample ID : **ECPVATI-DAF**

Sampled: **3/14/2022 9:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Arsenic	<14.7	mg/Kg - dry	14.7	1	03/18/22 00:47	JTR	6010D
Boron	<73.5	mg/Kg - dry	73.5	1	03/18/22 00:47	JTR	6010D
Cadmium	<2.94	mg/Kg - dry	2.94	1	03/18/22 00:47	JTR	6010D
Calcium	11600	mg/Kg - dry	1470	1	03/18/22 00:47	JTR	6010D
Chromium	<7.35	mg/Kg - dry	7.35	1	03/18/22 00:47	JTR	6010D
Copper	16.4	mg/Kg - dry	14.7	1	03/18/22 00:47	JTR	6010D
Lead	<8.82	mg/Kg - dry	8.82	1	03/18/22 00:47	JTR	6010D
Magnesium	932	mg/Kg - dry	147	1	03/18/22 00:47	JTR	6010D
Manganese	17.7	mg/Kg - dry	14.7	1	03/18/22 00:47	JTR	6010D
Mercury	<0.432	mg/Kg - dry	0.432	1	03/18/22 15:27	ZMT	7471A
Molybdenum	<7.35	mg/Kg - dry	7.35	1	03/18/22 00:47	JTR	6010D
Nickel	<7.35	mg/Kg - dry	7.35	1	03/18/22 00:47	JTR	6010D
Potassium	4500	mg/Kg - dry	294	1	03/18/22 00:47	JTR	6010D
Selenium	<14.7	mg/Kg - dry	14.7	1	03/18/22 00:47	JTR	6010D
Sodium	6470	mg/Kg - dry	735	1	03/18/22 00:47	JTR	6010D
Zinc	149	mg/Kg - dry	36.8	1	03/18/22 00:47	JTR	6010D
Sulfur	3290	mg/Kg - dry	294	1	03/18/22 00:47	JTR	6010D

**Qualifiers/
Definitions**

d
MQL

BOD Dilution Water
Method Quantitation Limit

DF

Dilution Factor

Loading Rate Tabulation

Environmental



Facility: Nalco Contract Operations - Ecovation Covington

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0102

Internal ID: 5346

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	12,097	408.89	
Ammonia	3,760	127.09	
TKN	45,300	1531.14	
Nitrates/Nitrites	29.40	0.9937	
Organic N	41,540	1404.05	
Arsenic	15.00	0.4969	75 mg/kg
Cadmium	3.00	0.0994	85 mg/kg
Chromium	7.00	0.2484	3000 mg/kg
Copper	16.00	0.5543	4300 mg/kg
Lead	8.82	0.2981	840 mg/kg
Mercury	0.43	0.0146	57 mg/kg
Molybdenum	7.35	0.2484	75 mg/kg
Nickel	7.00	0.2484	420 mg/kg
Phosphorus	8,620	291.36	
Potassium	4,500	152.10	
Selenium	15.00	0.4969	100 mg/kg
Zinc	149.00	5.0362	7500 mg/kg
Iron			
Sodium	6,470	218.6860	
Barium			
Silver			
Calcium	11,600.00	392.08	
Magnesium	932.00	31.50	
Manganese	17.70	0.60	
Chloride	7,350.00	248.43	
Sulfur	3,290.00	111.20	
Oil & Grease		19	
BOD			
pcb			
TCLP			
ph	4.80		
% solidsS	3.38		
% Vol Solids	89.90		
% Moisture	96.60		
lbs/gallon	7.50		
dry tons/load	0.85		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 18.4001

Phosphate (P2O5): 30.0200

Potash (K2O): 8.2100

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	30,000
Corn	150	50,000
Bermuda Pasture	240	80,000
Soybeans	60	20,000
Wheat	75	25,000

11675
Denali Water Solutions
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Project TN3
Information : Project # CONHUMB

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0101

REPORT OF ANALYSIS

Lab No : 89726
Sample ID : CONHUMB

Matrix: Solids
Sampled: 3/14/2022 5:30

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	50.7	%	0.10	1	03/21/22 09:47	JCG	LECO
Fecal Coliform	393000	MPN/g - dry	21400	1	03/14/22 14:57	CMF	9221E-2011
Calcium (saturated paste)	2.35	meq/L	0.005	1	03/21/22 14:33	JCG	Saturate Paste
Magnesium (saturated paste)	1.17	meq/L	0.008	1	03/21/22 14:33	JCG	Saturate Paste
Sodium (saturated paste)	6.72	meq/L	0.004	1	03/21/22 14:33	JCG	Saturate Paste
Sodium Absorption Ratio	5.07			1	03/21/22 14:33	JCG	Saturate Paste
Soluble Salts	0.96	dS/m	0.01	1	03/21/22 09:00	JVP	Soluble Salts
Loss on Ignition	83.6	%		1	03/20/22 15:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	7.7	%	0.1	1	03/20/22 14:00	DXT	AOAC 955.01
Moisture	91.6	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	1.42	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	<1190	mg/Kg - dry	1190	1	03/21/22 14:30	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	1080000 d	mg/Kg - dry	357000	1	03/15/22 10:20	RDP	5210B-2016
Chloride	727	mg/Kg - dry	47.6	1	03/18/22 01:08	JCA	9056A
Nitrate (NO ₃ -N)	<11.9	mg/Kg - dry	11.9	1	03/18/22 01:08	JCA	9056A
Nitrite (NO ₂ -N)	<11.9	mg/Kg - dry	11.9	1	03/18/22 01:08	JCA	9056A
Nitrate+Nitrite-N	<11.9	mg/Kg - dry	11.9	1	03/18/22 01:08		9056A
HEM: Oil and Grease	49800	mg/Kg - dry	1730	1	03/17/22 10:30	MEJ	SW-9071B
pH	4.1	s.u.		1	03/21/22 16:40	DRS	9045D
Total Solids	9.45	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	85.0	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	<2480	mg/Kg - dry	2480	1	03/21/22 15:07	CLP	4500NORGD-2011
Phosphorus	9390	mg/Kg - dry	59.5	1	03/18/22 00:42	JTR	6010D

**Qualifiers/
Definitions**

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor

11675

Denali Water Solutions
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Project TN3

Information : Project # CONHUMB

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0101

REPORT OF ANALYSIS

Lab No : 89726

Matrix: Solids

Sample ID : CONHUMB

Sampled: 3/14/2022 5:30

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Arsenic	<5.95	mg/Kg - dry	5.95	1	03/18/22 00:42	JTR	6010D
Boron	<29.8	mg/Kg - dry	29.8	1	03/18/22 00:42	JTR	6010D
Cadmium	<1.19	mg/Kg - dry	1.19	1	03/18/22 00:42	JTR	6010D
Calcium	946	mg/Kg - dry	595	1	03/18/22 00:42	JTR	6010D
Chromium	13.3	mg/Kg - dry	2.98	1	03/18/22 00:42	JTR	6010D
Copper	12.4	mg/Kg - dry	5.95	1	03/18/22 00:42	JTR	6010D
Lead	<3.57	mg/Kg - dry	3.57	1	03/18/22 00:42	JTR	6010D
Magnesium	208	mg/Kg - dry	59.5	1	03/18/22 00:42	JTR	6010D
Manganese	7.38	mg/Kg - dry	5.95	1	03/18/22 00:42	JTR	6010D
Mercury	<0.183	mg/Kg - dry	0.183	1	03/18/22 15:26	ZMT	7471A
Molybdenum	<2.98	mg/Kg - dry	2.98	1	03/18/22 00:42	JTR	6010D
Nickel	9.89	mg/Kg - dry	2.98	1	03/18/22 00:42	JTR	6010D
Potassium	1360	mg/Kg - dry	119	1	03/18/22 00:42	JTR	6010D
Selenium	<5.95	mg/Kg - dry	5.95	1	03/18/22 00:42	JTR	6010D
Sodium	2890	mg/Kg - dry	298	1	03/18/22 00:42	JTR	6010D
Zinc	90.8	mg/Kg - dry	14.9	1	03/18/22 00:42	JTR	6010D
Sulfur	1310	mg/Kg - dry	119	1	03/18/22 00:42	JTR	6010D

**Qualifiers/
Definitions**

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor

Loading Rate Tabulation

Environmental



Facility: ConAgra Foods : ConAgra Foods - Humboldt

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0101

Internal ID: 5343

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	1,460	137.96	
Ammonia	1,190	112.46	
TKN	2,480	234.36	
Nitrates/Nitrites	11.90	1.1246	
Organic N	1,290	121.91	
Arsenic	6.00	0.5623	75 mg/kg
Cadmium	1.00	0.1125	85 mg/kg
Chromium	13.00	1.2569	3000 mg/kg
Copper	12.00	1.1718	4300 mg/kg
Lead	3.57	0.3374	840 mg/kg
Mercury	0.18	0.0173	57 mg/kg
Molybdenum	2.98	0.2816	75 mg/kg
Nickel	10.00	0.9346	420 mg/kg
Phosphorus	9,390	887.36	
Potassium	1,360	128.52	
Selenium	6.00	0.5623	100 mg/kg
Zinc	90.80	8.5806	7500 mg/kg
Iron			
Sodium	2,890	273.1050	
Barium			
Silver			
Calcium	946.00	89.40	
Magnesium	208.00	19.66	
Manganese	7.38	0.70	
Chloride	727.00	68.70	
Sulfur	1,310.00	123.80	
Oil & Grease		5	
BOD			
pcb			
TCLP			
ph	4.10		
% solidsS	9.45		
% Vol Solids	85.00		
% Moisture	91.60		
lbs/gallon	7.50		
dry tons/load	2.36		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 6.2082

Phospate (P2O5): 91.4400

Potash (K2O): 6.9400

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	90,000
Corn	150	150,000
Bermuda Pasture	240	240,000
Soybeans	60	60,000
Wheat	75	75,000

11675

Denali Water Solutions
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Project TN3

Information : Project # CSCSUGA

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0100

REPORT OF ANALYSIS

Lab No : 89725

Sample ID : CSCSUGA

Matrix: Solids

Sampled: 3/14/2022 9:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	21.7	%	0.10	1	03/21/22 09:44	JCG	LECO
Fecal Coliform	<18000	MPN/g - dry	18000	1	03/14/22 14:57	CMF	9221E-2011
Calcium (saturated paste)	5.38	meq/L	0.005	1	03/21/22 14:33	JCG	Saturate Paste
Magnesium (saturated paste)	2.03	meq/L	0.008	1	03/21/22 14:33	JCG	Saturate Paste
Sodium (saturated paste)	2.86	meq/L	0.004	1	03/21/22 14:33	JCG	Saturate Paste
Sodium Absorption Ratio	1.48			1	03/21/22 14:33	JCG	Saturate Paste
Soluble Salts	0.89	dS/m	0.01	1	03/21/22 09:00	JVP	Soluble Salts
Loss on Ignition	78.9	%		1	03/20/22 15:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	8.3	%	0.1	1	03/20/22 14:00	DXT	AOAC 955.01
Moisture	90.0	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	6.97	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	1060	mg/Kg - dry	1000	1	03/21/22 14:30	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	123000 d	mg/Kg - dry	120000	1	03/15/22 10:20	RDP	5210B-2016
Chloride	175	mg/Kg - dry	40.0	1	03/18/22 00:42	JCA	9056A
Nitrate (NO3-N)	<10.0	mg/Kg - dry	10.0	1	03/18/22 00:42	JCA	9056A
Nitrite (NO2-N)	<10.0	mg/Kg - dry	10.0	1	03/18/22 00:42	JCA	9056A
Nitrate+Nitrite-N	<10.0	mg/Kg - dry	10.0	1	03/18/22 00:42		9056A
HEM: Oil and Grease	2460	mg/Kg - dry	1470	1	03/17/22 10:30	MEJ	SW-9071B
pH	3.8	s.u.		1	03/21/22 16:40	DRS	9045D
Total Solids	9.97	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	30.1	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	979	mg/Kg - dry	500	1	03/21/22 15:06	CLP	4500NORGD-2011
Phosphorus	297	mg/Kg - dry	50.0	1	03/18/22 00:37	JTR	6010D

Qualifiers/ Definitions

d
MQL

BOD Dilution Water
Method Quantitation Limit

DF

Dilution Factor

11675

Denali Water Solutions
Ms. Vanya Colburn
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Russellville, AR 72802

Project TN3

Information : Project # CSCSUGA

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0100

REPORT OF ANALYSIS

Lab No : 89725
Sample ID : CSCSUGA

Matrix: Solids
Sampled: 3/14/2022 9:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Arsenic	<5.00	mg/Kg - dry	5.00	1	03/18/22 00:37	JTR	6010D
Boron	<25.0	mg/Kg - dry	25.0	1	03/18/22 00:37	JTR	6010D
Cadmium	<1.00	mg/Kg - dry	1.00	1	03/18/22 00:37	JTR	6010D
Calcium	1430	mg/Kg - dry	500	1	03/18/22 00:37	JTR	6010D
Chromium	<2.50	mg/Kg - dry	2.50	1	03/18/22 00:37	JTR	6010D
Copper	27.0	mg/Kg - dry	5.00	1	03/18/22 00:37	JTR	6010D
Lead	<3.00	mg/Kg - dry	3.00	1	03/18/22 00:37	JTR	6010D
Magnesium	239	mg/Kg - dry	50.0	1	03/18/22 00:37	JTR	6010D
Manganese	7.03	mg/Kg - dry	5.00	1	03/18/22 00:37	JTR	6010D
Mercury	<0.150	mg/Kg - dry	0.150	1	03/18/22 15:24	ZMT	7471A
Molybdenum	<2.50	mg/Kg - dry	2.50	1	03/18/22 00:37	JTR	6010D
Nickel	<2.50	mg/Kg - dry	2.50	1	03/18/22 00:37	JTR	6010D
Potassium	371	mg/Kg - dry	100	1	03/18/22 00:37	JTR	6010D
Selenium	<5.00	mg/Kg - dry	5.00	1	03/18/22 00:37	JTR	6010D
Sodium	981	mg/Kg - dry	250	1	03/18/22 00:37	JTR	6010D
Zinc	22.0	mg/Kg - dry	12.5	1	03/18/22 00:37	JTR	6010D
Sulfur	148	mg/Kg - dry	100	1	03/18/22 00:37	JTR	6010D

**Qualifiers/
Definitions**

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor

Loading Rate Tabulation

Environmental



Facility: CSC Sugar - Covington TN

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0100

Internal ID: 5342

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	1,054	105.06	
Ammonia	1,060	105.68	
TKN	979	97.61	
Nitrates/Nitrites	10.00	0.9970	
Organic N	-81	-8.08	
Arsenic	5.00	0.4985	75 mg/kg
Cadmium	1.00	0.0997	85 mg/kg
Chromium	3.00	0.2493	3000 mg/kg
Copper	27.00	2.6919	4300 mg/kg
Lead	3.00	0.2991	840 mg/kg
Mercury	0.15	0.0150	57 mg/kg
Molybdenum	2.50	0.2493	75 mg/kg
Nickel	3.00	0.2493	420 mg/kg
Phosphorus	297	29.61	
Potassium	371	36.99	
Selenium	5.00	0.4985	100 mg/kg
Zinc	22.00	2.1934	7500 mg/kg
Iron			
Sodium	981	97.8057	
Barium			
Silver			
Calcium	1,430.00	142.57	
Magnesium	239.00	23.83	
Manganese	7.03	0.70	
Chloride	175.00	17.45	
Sulfur	148.00	14.76	
Oil & Grease		0	
BOD			
pcb			
TCLP			
ph	3.80		
% solidsS	9.97		
% Vol Solids	30.10		
% Moisture	90.00		
lbs/gallon	7.50		
dry tons/load	2.49		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 4.7279

Phosphate (P2O5): 3.0500

Potash (K2O): 2.0000

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	108,000
Corn	150	180,000
Bermuda Pasture	240	288,000
Soybeans	60	72,000
Wheat	75	90,000

11675

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Project TN3

Information : Project # BONGARD

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0106

REPORT OF ANALYSIS

Lab No : 89732

Matrix: Solids

Sample ID : BONGARD

Sampled: 3/14/2022 6:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	31.0	%	0.10	1	03/21/22 10:01	JCG	LECO
Fecal Coliform	<46200	MPN/g - dry	46200	1	03/14/22 14:57	CMF	9221E-2011
Calcium (saturated paste)	5.10	meq/L	0.005	1	03/21/22 14:33	JCG	Saturate Paste
Magnesium (saturated paste)	5.98	meq/L	0.008	1	03/21/22 14:33	JCG	Saturate Paste
Sodium (saturated paste)	4.04	meq/L	0.004	1	03/21/22 14:33	JCG	Saturate Paste
Sodium Absorption Ratio	1.71			1	03/21/22 14:33	JCG	Saturate Paste
Soluble Salts	1.45	dS/m	0.01	1	03/21/22 09:00	JVP	Soluble Salts
Loss on Ignition	54.7	%		1	03/20/22 15:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	8.1	%	0.1	1	03/20/22 14:00	DXT	AOAC 955.01
Moisture	96.1	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	1.71	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	<2560	mg/Kg - dry	2560	1	03/21/22 14:30	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	577000 d	mg/Kg - dry	154000	1	03/15/22 10:20	RDP	5210B-2016
Chloride	3330	mg/Kg - dry	103	1	03/18/22 17:44	JCA	9056A
Nitrate (NO3-N)	<25.6	mg/Kg - dry	25.6	1	03/18/22 17:44	JCA	9056A
Nitrite (NO2-N)	<25.6	mg/Kg - dry	25.6	1	03/18/22 17:44	JCA	9056A
Nitrate+Nitrite-N	<25.6	mg/Kg - dry	25.6	1	03/18/22 17:44		9056A
HEM: Oil and Grease	152000	mg/Kg - dry	3620	1	03/17/22 10:30	MEJ	SW-9071B
pH	6.0	s.u.		1	03/21/22 16:40	DRS	9045D
Total Solids	3.91	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	56.4	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	14700	mg/Kg - dry	4850	1	03/21/22 15:12	CLP	4500NORGD-2011
Phosphorus	13500	mg/Kg - dry	128	1	03/18/22 01:18	JTR	6010D

**Qualifiers/
Definitions**

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor

11675
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Project TN3
Information : Project # BONGARD

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0106

REPORT OF ANALYSIS

Lab No : 89732
Sample ID : BONGARD

Matrix: Solids
Sampled: 3/14/2022 6:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Arsenic	<12.8	mg/Kg - dry	12.8	1	03/18/22 01:18	JTR	6010D
Boron	<64.1	mg/Kg - dry	64.1	1	03/18/22 01:18	JTR	6010D
Cadmium	<2.56	mg/Kg - dry	2.56	1	03/18/22 01:18	JTR	6010D
Calcium	2240	mg/Kg - dry	1280	1	03/18/22 01:18	JTR	6010D
Chromium	10.8	mg/Kg - dry	6.41	1	03/18/22 01:18	JTR	6010D
Copper	<12.8	mg/Kg - dry	12.8	1	03/18/22 01:18	JTR	6010D
Lead	<7.69	mg/Kg - dry	7.69	1	03/18/22 01:18	JTR	6010D
Magnesium	223	mg/Kg - dry	128	1	03/18/22 01:18	JTR	6010D
Manganese	<12.8	mg/Kg - dry	12.8	1	03/18/22 01:18	JTR	6010D
Mercury	<0.369	mg/Kg - dry	0.369	1	03/18/22 15:46	ZMT	7471A
Molybdenum	<6.41	mg/Kg - dry	6.41	1	03/18/22 01:18	JTR	6010D
Nickel	<6.41	mg/Kg - dry	6.41	1	03/18/22 01:18	JTR	6010D
Potassium	1600	mg/Kg - dry	256	1	03/18/22 01:18	JTR	6010D
Selenium	<12.8	mg/Kg - dry	12.8	1	03/18/22 01:18	JTR	6010D
Sodium	6540	mg/Kg - dry	641	1	03/18/22 01:18	JTR	6010D
Zinc	<32.1	mg/Kg - dry	32.1	1	03/18/22 01:18	JTR	6010D
Sulfur	3050	mg/Kg - dry	256	1	03/18/22 01:18	JTR	6010D

**Qualifiers/
Definitions**

d
MQL

BOD Dilution Water
Method Quantitation Limit

DF

Dilution Factor

Loading Rate Tabulation

Environmental



Facility: Bongards - Humboldt

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0106

Internal ID: 5347

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	5,014	196.03	
Ammonia	2,560	100.10	
TKN	14,700	574.77	
Nitrates/Nitrites	25.60	1.0010	
Organic N	12,140	474.67	
Arsenic	13.00	0.5005	75 mg/kg
Cadmium	3.00	0.1001	85 mg/kg
Chromium	11.00	0.4223	3000 mg/kg
Copper	13.00	0.5005	4300 mg/kg
Lead	7.69	0.3007	840 mg/kg
Mercury	0.37	0.0144	57 mg/kg
Molybdenum	6.41	0.2506	75 mg/kg
Nickel	6.00	0.2506	420 mg/kg
Phosphorus	13,500	527.85	
Potassium	1,600	62.56	
Selenium	13.00	0.5005	100 mg/kg
Zinc	32.10	1.2551	7500 mg/kg
Iron			
Sodium	6,540	255.7140	
Barium			
Silver			
Calcium	2,240.00	87.58	
Magnesium	223.00	8.72	
Manganese	12.80	0.50	
Chloride	3,330.00	130.20	
Sulfur	3,050.00	119.26	
Oil & Grease		15	
BOD			
pcb			
TCLP			
ph	6.00		
% solidsS	3.91		
% Vol Solids	56.40		
% Moisture	96.10		
lbs/gallon	7.50		
dry tons/load	0.98		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 8.8214

Phospate (P2O5): 54.3900

Potash (K2O): 3.3800

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	60,000
Corn	150	100,000
Bermuda Pasture	240	160,000
Soybeans	60	40,000
Wheat	75	50,000

Terra Renewal, LLC.
Regional Environmental Mgr.
Post Office Box 3036
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TN
Sub

ANALYTICAL RESULTS

AIC No. 173210-1

Sample Identification: DarPro-Memphis, TN

Analyte	Result	RL	Units	Qualifier
pH	4.0		Units	
EPA 9045C	Prep: 05-Dec-2013 1307 by 308 Analyzed: 05-Dec-2013 1440 by 308		Batch: W45866	
Electrical Conductivity	1000	2	umho/cm	
Mod. EPA 9050A	Prep: 10-Dec-2013 1736 by 93 Analyzed: 10-Dec-2013 1830 by 93		Batch: W45915	
Total Solids	1.5	0.01	wt %	
SM 2540 G 1997	Prep: 09-Dec-2013 0925 by 285 Analyzed: 10-Dec-2013 1127 by 285		Batch: W45895	
Volatile Solids	94	0.01	wt %	
SM 2540 G 1997	Prep: 09-Dec-2013 0926 by 285 Analyzed: 10-Dec-2013 1127 by 285		Batch: W45895	
Ammonia as N	730	200	mg/Kg	
SM 4500-NH3 B, G 1997	Prep: 05-Dec-2013 1349 by 93 Analyzed: 05-Dec-2013 1734 by 302		Batch: W45867	
Total Kjeldahl Nitrogen	31000	4000	mg/Kg	
SM 4500-Norg D 1997	Prep: 05-Dec-2013 1542 by 93 Analyzed: 10-Dec-2013 1511 by 93		Batch: W45881	
BOD 5-day	1200000	300000	mg/Kg	
SM 5210 B 2001	Prep: 05-Dec-2013 1625 by 285 Analyzed: 10-Dec-2013 1201 by 285		Batch: W45873	
Arsenic	< 5	5	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Cadmium	< 0.4	0.4	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Chromium	4.2	0.7	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Copper	35	0.6	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Lead	< 4	4	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Molybdenum	< 0.8	0.8	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Nickel	7.6	1	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Phosphorus	820	10	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Potassium	510	100	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Selenium	< 7	7	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Sodium	3500	100	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	
Sodium Absorption Ratio	24			
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1500 by 305		Batch: S35926	
Zinc	20	0.2	mg/Kg	
EPA 3051A, 6010C	Prep: 10-Dec-2013 1413 by 271 Analyzed: 11-Dec-2013 1458 by 305		Batch: S35926	

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ANALYTICAL RESULTS

AIC No. 173210-1 (Continued)

Sample Identification: DarPro-Memphis, TN

Analyte	Result	RL	Units	Qualifier
Soluble Phosphorus	61	10	mg/Kg	
EPA 6010C	Prep: 10-Dec-2013 1417 by 271	Analyzed: 11-Dec-2013 1143 by 305	Batch: S35927	
Mercury	< 0.1	0.1	mg/Kg	
EPA 7471B	Prep: 09-Dec-2013 1543 by 311	Analyzed: 10-Dec-2013 1504 by 311	Batch: S35918	
Carbon	58	0.01	wt %	
Induction Furnace	Analyzed: 10-Dec-2013 0841 by 07		Batch: S35923	
Calcium Carbonate Equivalence	< 0.1	0.1	wt %	
AOAC 955.01	Analyzed: 09-Dec-2013 0935 by 07		Batch: C16285	
Nitrate + Nitrite as N	< 40	40	mg/Kg	
EPA 9056A	Prep: 05-Dec-2013 1320 by 07	Analyzed: 05-Dec-2013 2119 by 07	Batch: C16279	
Oil and Grease	2.2	0.03	wt %	W
AR OG	Analyzed: 05-Dec-2013 1329 by 295		Batch: B8690	
Fecal Coliform	30000	20000	MPN/g	
SM 9221 E 2006	Analyzed: 05-Dec-2013 1451 by 295		Batch: M4160	
Salmonella	7.9	3	MPN/4g	
SM 9260 D	Analyzed: 05-Dec-2013 1452 by 21		Batch: M4161	

Loading Rate Tabulation

Environmental



Facility: DarPro-Memphis, TN

Analysis Date: 12/12/2013

Analysis Note:

Product: Sludge

State: TN

Application Type: SubSurface

AIC Control #: 173210

LRT #:

Internal ID: 22853

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

~~PAN~~

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	6,824	102.36	
Ammonia	730	10.95	
TKN	31,000	465.00	
Nitrates/Nitrites	40.00	0.6000	
Organic N	30,270	454.05	
Arsenic	5.00	0.0750	75 mg/kg
Cadmium	0.00	0.0060	85 mg/kg
Chromium	4.00	0.0630	3000 mg/kg
Copper	35.00	0.5250	4300 mg/kg
Lead	4.00	0.0600	840 mg/kg
Mercury	0.10	0.0015	57 mg/kg
Molybdenum	0.80	0.0120	75 mg/kg
Nickel	8.00	0.1140	420 mg/kg
Phosphorus	820	12.30	
Potassium	510	7.65	
Selenium	7.00	0.1050	100 mg/kg
Zinc	20.00	0.3000	7500 mg/kg
Iron	0.0000	0.0000	
Soluble P	61	0.9150	
Sodium	3,500	52.5000	
Barium	0.00	0.00	
Silver	0.00	0.00	
Calcium	0.00	0.00	
Magnesium	0.00	0.00	
Manganese	0.00	0.00	
Chloride	0.00	0.00	
Sulfur	0.00	0.00	
Oil & Grease		2	
BOD	1,200,000		
pcb			
Fecal Coliform	30000		
TCLP			
ph	4.0		
% solidsS	1.50		
% Vol Solids	1.40		
% Moisture	0.00		
lbs/gallon	7.50		
dry tons/load	0.38		

Pounds per 6000 gallon load:

Plant-available nitrogen: 5.0000

Phosphate (P2O5): 1.2700

Potash (K2O): 0.4100

SP: 0.04

Max. Allowable App Rate at:

Crop	PAN	App Rate
Bermuda Pasture	200	240,000
Corn	150	180,000
Fescue Hay	120	144,000
Soybeans	270	324,000
Wheat	140	168,000

11675
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Project TN3
Information : Project # Tyson Humboldt

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : **22-073-0103**

REPORT OF ANALYSIS

Lab No : **89728**
Sample ID : **Tyson Humboldt**

Matrix: **Solids**
Sampled: **3/14/2022 5:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	61.5	%	0.10	1	03/21/22 09:53	JCG	LECO
Calcium (saturated paste)	2.16	meq/L	0.005	1	03/21/22 14:33	JCG	Saturate Paste
Magnesium (saturated paste)	3.48	meq/L	0.008	1	03/21/22 14:33	JCG	Saturate Paste
Sodium (saturated paste)	2.71	meq/L	0.004	1	03/21/22 14:33	JCG	Saturate Paste
Sodium Absorption Ratio	1.61			1	03/21/22 14:33	JCG	Saturate Paste
Soluble Salts	6.81	dS/m	0.01	1	03/21/22 09:00	JVP	Soluble Salts
Loss on Ignition	59.7	%		1	03/20/22 15:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	8.6	%	0.1	1	03/20/22 14:00	DXT	AOAC 955.01
Moisture	90.7	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	0.567	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	19100	mg/Kg - dry	1080	1	03/21/22 14:30	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	888000 d	mg/Kg - dry	215000	1	03/15/22 10:20	RDP	5210B-2016
Chloride	537	mg/Kg - dry	43.0	1	03/18/22 16:26	JCA	9056A
Nitrate (NO3-N)	<10.8	mg/Kg - dry	10.8	1	03/18/22 16:26	JCA	9056A
Nitrite (NO2-N)	<10.8	mg/Kg - dry	10.8	1	03/18/22 16:26	JCA	9056A
Nitrate+Nitrite-N	<10.8	mg/Kg - dry	10.8	1	03/18/22 16:26		9056A
HEM: Oil and Grease	297000	mg/Kg - dry	1540	1	03/17/22 10:30	MEJ	SW-9071B
pH	6.3	s.u.		1	03/21/22 16:40	DRS	9045D
Total Solids	9.27	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	93.9	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	73900	mg/Kg - dry	2570	1	03/21/22 15:09	CLP	4500NORGD-2011
Phosphorus	11700	mg/Kg - dry	53.8	1	03/18/22 00:52	JTR	6010D
Arsenic	<5.38	mg/Kg - dry	5.38	1	03/18/22 00:52	JTR	6010D

Qualifiers/
Definitions

d BOD Dilution Water
MQL Method Quantitation Limit

DF Dilution Factor



2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

11675
Denali Water Solutions
Ms. Vanya Colburn
P.O. Box 3036
Russellville, AR 72802

Project TN3
Information : Project # Tyson Humboldt

Report Date : 03/23/2022
Received : 03/14/2022

Report Number : 22-073-0103

REPORT OF ANALYSIS

Lab No : 89728
Sample ID : Tyson Humboldt

Matrix: Solids
Sampled: 3/14/2022 5:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Boron	<26.9	mg/Kg - dry	26.9	1	03/18/22 00:52	JTR	6010D
Cadmium	<1.08	mg/Kg - dry	1.08	1	03/18/22 00:52	JTR	6010D
Calcium	4460	mg/Kg - dry	538	1	03/18/22 00:52	JTR	6010D
Chromium	13.0	mg/Kg - dry	2.69	1	03/18/22 00:52	JTR	6010D
Copper	43.2	mg/Kg - dry	5.38	1	03/18/22 00:52	JTR	6010D
Lead	<3.23	mg/Kg - dry	3.23	1	03/18/22 00:52	JTR	6010D
Magnesium	1560	mg/Kg - dry	53.8	1	03/18/22 00:52	JTR	6010D
Manganese	24.9	mg/Kg - dry	5.38	1	03/18/22 00:52	JTR	6010D
Mercury	<0.168	mg/Kg - dry	0.168	1	03/18/22 15:29	ZMT	7471A
Molybdenum	<2.69	mg/Kg - dry	2.69	1	03/18/22 00:52	JTR	6010D
Nickel	9.19	mg/Kg - dry	2.69	1	03/18/22 00:52	JTR	6010D
Potassium	5980	mg/Kg - dry	108	1	03/18/22 00:52	JTR	6010D
Selenium	<5.38	mg/Kg - dry	5.38	1	03/18/22 00:52	JTR	6010D
Sodium	1140	mg/Kg - dry	269	1	03/18/22 00:52	JTR	6010D
Zinc	185	mg/Kg - dry	13.4	1	03/18/22 00:52	JTR	6010D
Sulfur	4160	mg/Kg - dry	108	1	03/18/22 00:52	JTR	6010D

Qualifiers/ Definitions	d MQL	BOD Dilution Water Method Quantitation Limit	DF	Dilution Factor
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Loading Rate Tabulation

Environmental



Facility: Tyson Foods Inc : Tyson Foods Inc - Tyson Hum

Analysis Date: 3/23/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-073-0103

Internal ID: 5344

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	30,071	2787.56	
Ammonia	19,100	1770.57	
TKN	73,900	6850.53	
Nitrates/Nitrites	10.80	1.0012	
Organic N	54,800	5079.96	
Arsenic	5.00	0.4987	75 mg/kg
Cadmium	1.00	0.1001	85 mg/kg
Chromium	13.00	1.2051	3000 mg/kg
Copper	43.00	4.0046	4300 mg/kg
Lead	3.23	0.2994	840 mg/kg
Mercury	0.17	0.0156	57 mg/kg
Molybdenum	2.69	0.2494	75 mg/kg
Nickel	9.00	0.8519	420 mg/kg
Phosphorus	11,700	1084.59	
Potassium	5,980	554.35	
Selenium	5.00	0.4987	100 mg/kg
Zinc	185.00	17.1495	7500 mg/kg
Iron			
Sodium	1,140	105.6780	
Barium			
Silver			
Calcium	4,460.00	413.44	
Magnesium	1,560.00	144.61	
Manganese	24.90	2.31	
Chloride	537.00	49.78	
Sulfur	4,160.00	385.63	
Oil & Grease		30	
BOD			
pcb			
TCLP			
ph	6.30		
% solidsS	9.27		
% Vol Solids	93.90		
% Moisture	90.70		
lbs/gallon	7.50		
dry tons/load	2.32		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 125.4403

Phosphate (P2O5): 111.7700

Potash (K2O): 29.9300

SP:

Max. Allowable App Rate at:

Crop	PAN	App Rate
Cotton	90	4,320
Corn	150	7,200
Bermuda Pasture	240	11,520
Soybeans	60	2,880
Wheat	75	3,600

11675

Denali Water Solutions
Ms. Vanya Colburn
P.O. Box 3036
Russellville, AR 72802

Project TN3
Information : TYUNION

Report Date : 04/01/2022
Received : 03/16/2022

Report Number : **22-075-0089**

REPORT OF ANALYSIS

Lab No : **91696**
Sample ID : **TYUNION**

Matrix: **Solids**
Sampled: **3/15/2022 18:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Carbon, Total	71.3	%	0.10	1	03/23/22 13:52	JCG	LECO
Calcium (saturated paste)	7.80	meq/L	0.005	1	03/22/22 15:15	JCG	Saturate Paste
Magnesium (saturated paste)	3.69	meq/L	0.008	1	03/22/22 15:15	JCG	Saturate Paste
Sodium (saturated paste)	2.89	meq/L	0.004	1	03/22/22 15:15	JCG	Saturate Paste
Sodium Absorption Ratio	1.21			1	03/22/22 15:15	JCG	Saturate Paste
Soluble Salts	3.90	dS/m	0.01	1	03/22/22 09:00	JVP	Soluble Salts
Fecal Coliform	495000 H	MPN/g - dry	4050	1	03/18/22 10:12	SBA	9221E-2011
Loss on Ignition	73.2	%		1	03/23/22 11:00	VVP	AOAC 2.7.06
Neutralizing Value (%CCE)	8.1	%	0.1	1	03/31/22 10:33	VVP	AOAC 955.01
Moisture	55.6	%		1	03/17/22 16:57	FMM	SW-DRYWT
Ash	0.354	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Ammonia Nitrogen	883	mg/Kg - dry	225	1	03/23/22 13:07	JPJ	4500NH3C-2011
Biochemical Oxygen Demand (5-day)	387000	mg/Kg - dry	135000	1	03/17/22 09:50	RDP	5210B-2016
Chloride	232	mg/Kg - dry	90.1	10	03/18/22 19:01	JCA	9056A
Nitrate (NO3-N)	<22.5	mg/Kg - dry	22.5	10	03/18/22 19:01	JCA	9056A
Nitrite (NO2-N)	<22.5	mg/Kg - dry	22.5	10	03/18/22 19:01	JCA	9056A
Nitrate+Nitrite-N	<22.5	mg/Kg - dry	22.5	10	03/18/22 19:01		9056A
HEM: Oil and Grease	676000	mg/Kg - dry	331	1	03/21/22 08:41	MEJ	SW-9071B
pH	4.1	s.u.		1	03/23/22 15:45	DRS	9045D
Total Solids	44.4	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Volatile Solids	99.2	%	0.010	1	03/17/22 16:57	FMM	2540G-2011
Total Kjeldahl Nitrogen	6280	mg/Kg - dry	507	1	03/22/22 14:59	CLP	4500NORGD-2011
Phosphorus	1970	mg/Kg - dry	11.3	1	03/24/22 04:56	JTR	6010D

Qualifiers/	B	Analyte detected in blank	DF	Dilution Factor
Definitions	H	Beyond holding time	MQL	Method Quantitation Limit



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www.waypointanalytical.com

11675
Denali Water Solutions
Ms. Vanya Colburn
P.O. Box 3036
Russellville , AR 72802

Project TN3
Information : TYUNION

Report Date : 04/01/2022
Received : 03/16/2022

Report Number : 22-075-0089

REPORT OF ANALYSIS

Lab No : 91696
Sample ID : TYUNION

Matrix: Solids
Sampled: 3/15/2022 18:00

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Arsenic	<1.13	mg/Kg - dry	1.13	1	03/24/22 04:56	JTR	6010D
Boron	<5.63	mg/Kg - dry	5.63	1	03/24/22 04:56	JTR	6010D
Cadmium	<0.225	mg/Kg - dry	0.225	1	03/24/22 04:56	JTR	6010D
Calcium	435	mg/Kg - dry	113	1	03/24/22 04:56	JTR	6010D
Chromium	3.13	mg/Kg - dry	0.563	1	03/25/22 19:26	EAL	6010D
Copper	11.3	mg/Kg - dry	1.13	1	03/24/22 04:56	JTR	6010D
Lead	<0.675	mg/Kg - dry	0.675	1	03/24/22 04:56	JTR	6010D
Magnesium	91.4	mg/Kg - dry	11.3	1	03/24/22 04:56	JTR	6010D
Manganese	4.82 B	mg/Kg - dry	1.13	1	03/25/22 19:26	EAL	6010D
Mercury	<0.0354	mg/Kg - dry	0.0354	1	03/21/22 15:55	ZMT	7471A
Molybdenum	<0.563	mg/Kg - dry	0.563	1	03/24/22 04:56	JTR	6010D
Nickel	1.65	mg/Kg - dry	0.563	1	03/24/22 04:56	JTR	6010D
Potassium	340	mg/Kg - dry	22.5	1	03/24/22 04:56	JTR	6010D
Selenium	1.13	mg/Kg - dry	1.13	1	03/24/22 04:56	JTR	6010D
Sodium	156	mg/Kg - dry	56.3	1	03/24/22 04:56	JTR	6010D
Zinc	21.9	mg/Kg - dry	2.82	1	03/24/22 04:56	JTR	6010D
Sulfur	1280	mg/Kg - dry	22.5	1	03/24/22 04:56	JTR	6010D

Qualifiers/ Definitions	B	Analyte detected in blank	DF	Dilution Factor
	H	Beyond holding time	MQL	Method Quantitation Limit

Loading Rate Tabulation

Environmental



Facility: Tyson Foods Inc : Tyson Foods - Union City

Analysis Date: 4/1/2022

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 22-075-0089

Internal ID: 5377

PAN: 20.00%(TKN - Ammonia) + %100.00Ammonia + NO3 + NO2

Parameter	Concentration (mg/kg)		Limits
	dry	wet	
PAN	1,985	881.30	
Ammonia	883	392.05	
TKN	6,280	2788.32	
Nitrates/Nitrites	22.50	9.9900	
Organic N	5,397	2396.27	
Arsenic	1.00	0.5017	75 mg/kg
Cadmium	0.00	0.0999	85 mg/kg
Chromium	3.00	1.3897	3000 mg/kg
Copper	11.00	5.0172	4300 mg/kg
Lead	0.68	0.2997	840 mg/kg
Mercury	0.04	0.0157	57 mg/kg
Molybdenum	0.56	0.2500	75 mg/kg
Nickel	2.00	0.7326	420 mg/kg
Phosphorus	1,970	874.68	
Potassium	340	150.96	
Selenium	1.00	0.5017	100 mg/kg
Zinc	21.90	9.7236	7500 mg/kg
Iron			
Sodium	156	69.2640	
Barium			
Silver			
Calcium	435.00	193.14	
Magnesium	91.40	40.58	
Manganese	4.82	2.14	
Chloride	232.00	103.01	
Sulfur	1,280.00	568.32	
Oil & Grease		68	
BOD			
pcb			
TCLP			
ph	4.10		
% solidsS	44.40		
% Vol Solids	99.20		
% Moisture	55.60		
lbs/gallon	7.50		
dry tons/load	11.11		

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 39.6583

Phospate (P2O5): 90.1400

Potash (K2O): 8.1500

SP:

Max. Allowable App Rate at:

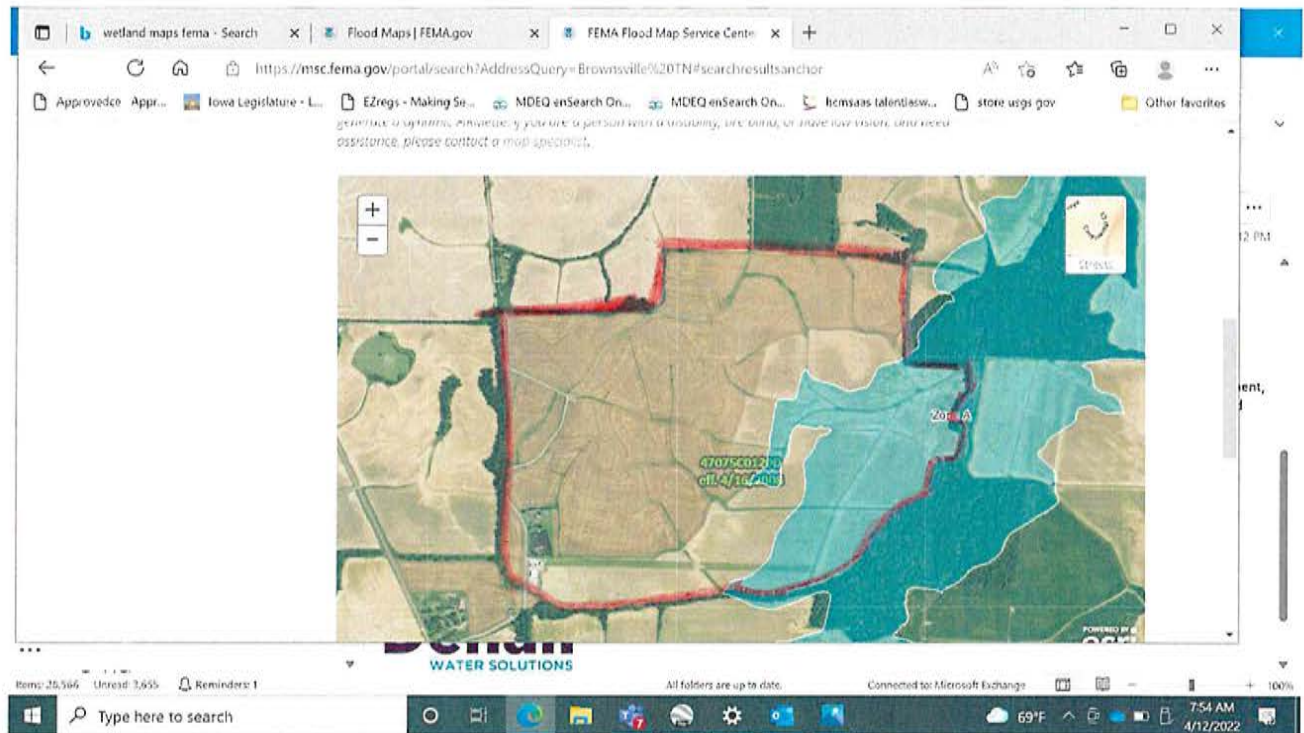
Crop	PAN	App Rate
Cotton	90	13,500
Corn	150	22,500
Bermuda Pasture	240	36,000
Soybeans	60	9,000
Wheat	75	11,250

Attachment G

100 year Flood Plain Map

FEMA 100 year flood hazard map – GC-1_2 Field Site

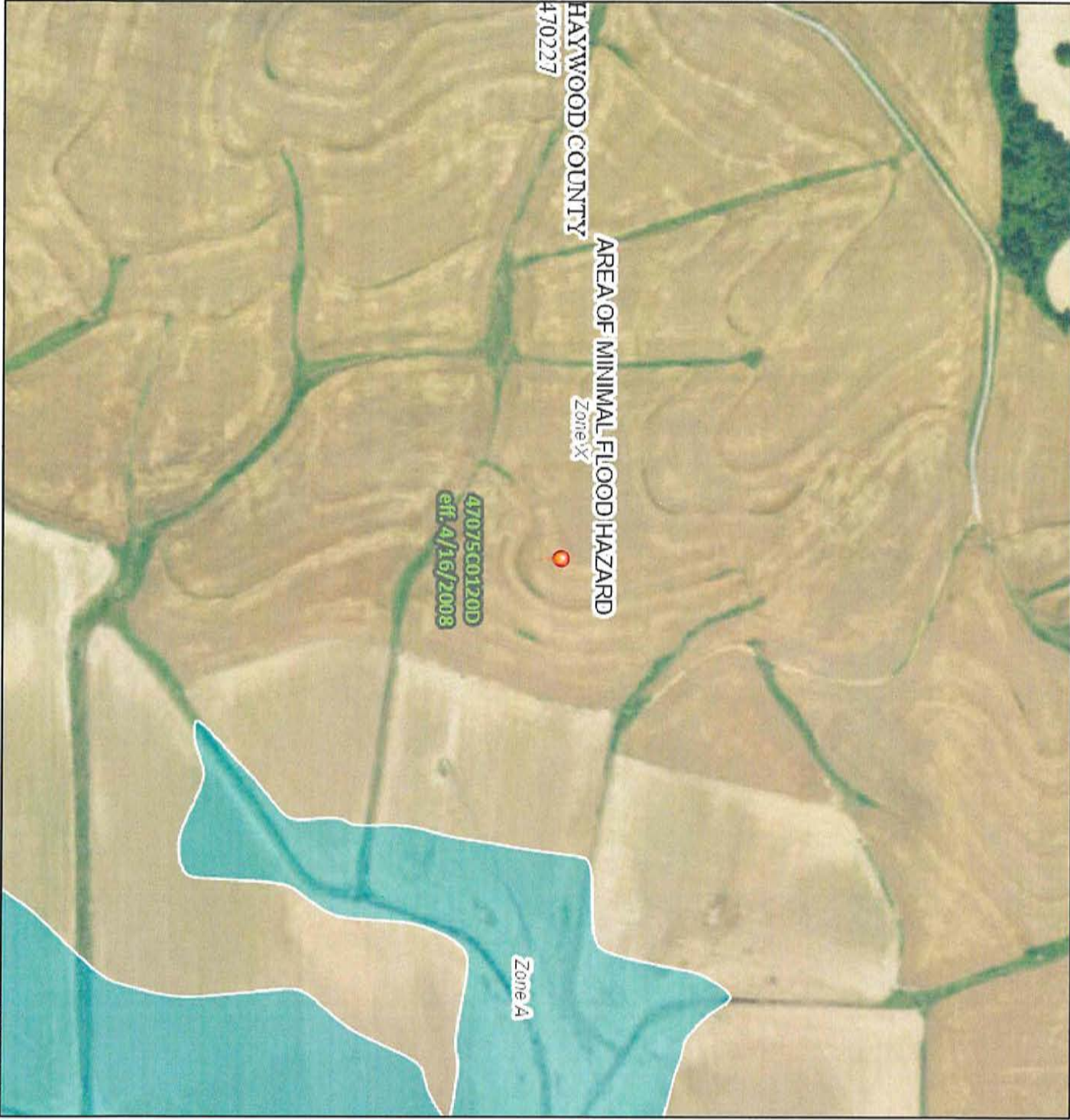
~~Field~~ Field GC-1, GC-2 outlined in red



National Flood Hazard Layer FIRMette



89°16'43"W 35°39'2"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
Zone A, V, AE, AO, AH, VE, AR
With BFE or Depth Zone AE, AO, AH, VE, AR
Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard. An area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile.
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes, Zone X
- Area with Flood Risk due to Levee Zone X

OTHER AREAS GENERAL STRUCTURES

- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRS
- Area of Undetermined Flood Hazard Zone X
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- Cross Sections with 1% Annual Chance Flood Hazard
- Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/12/2022 at 8:59 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmapped areas cannot be used for regulatory purposes.

Attachment H

TN Karst Hazard Map

Karst Areas of Tennessee

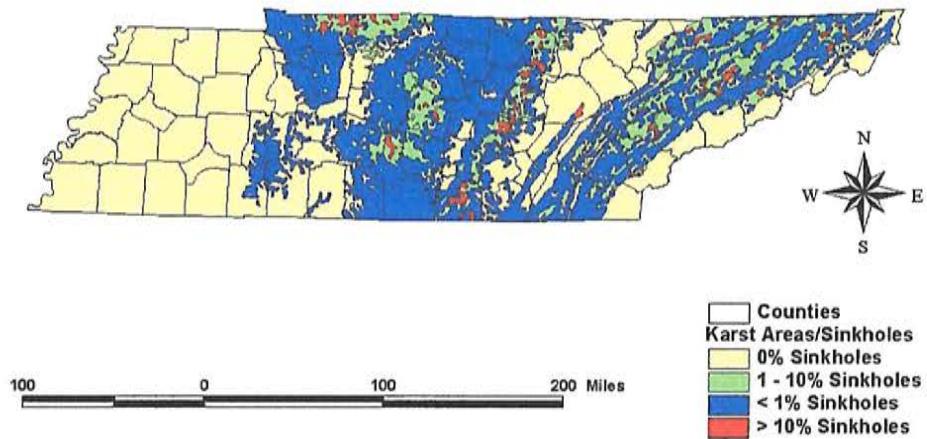


Figure 4

Attachment I

Agency Participation Request Letters:

TDEC-Water Pollution Control
TDEC-Division of Natural Heritage
US Army Corps of Engrs
US Fish and Wildlife Service

Agency Responses:

Will be forwarded upon receipt



3308 Bernice Avenue
Russellville, AR 72802
PO Box 3036 • Russellville, AR 72811
Phone: 479-498-0500

April 11, 2022

Attn: Mgr, Water Pollution Control
Jackson Environmental Field Office
Division of Water Pollution Control
1625 Hollywood Drive
Columbia, TN 38305

RE: Stream Determination for Site: GC-1, CG-2 – Haywood County

To Whom it May Concern:

Denali Water Solutions is submitting a permit application to the Jackson Environmental Field Office, Solid Waste Branch of TDEC to land apply food processing residuals to a crop field as a beneficial fertilizer. A map review for the farm field to determine adjacent streams is part of the field site review.

I have attached the summary list and maps of the proposed farm field that is included in the permit application. Can your department review the enclosed maps and confirm the adjacent stream? The enclosed maps will show a buffer setback of 100 feet for Nixon Creek and we want to confirm there are no other adjacent surface waters to this field site.

Please contact me with any questions at: (479) 264-5383, or
John.Pipkin@denaliwater.com.

Thank you,

A handwritten signature in blue ink, appearing to read "John Pipkin".

John Pipkin
Land & Environmental Director
Denali Water Solutions



3308 Bernice Avenue
Russellville, AR 72802
PO Box 3036 • Russellville, AR 72811
Phone: 479-498-0500

April 11, 2022

TDEC - Division of Natural Areas
Natural Heritage Program
312 Rosa L. Parks Avenue, 2 Floor
Nashville, TN 37243

RE: Denali Water Permit Application – Haywood County–Site: GC-1_2

To Whom It May Concern:

Denali Water Solutions is submitting a permit application to the Jackson, TN Solid Waste Branch of the Tennessee Department of Environment and Conservation (TDEC) to land apply food processing wastewater residuals to farmland as a beneficial fertilizer. The permit application requires a confirmation that no natural heritage area is adjacent to the farm field included in the permit application. The farm field is currently used for seasonal row crops such as corn, wheat and soybeans.

I have attached the site table, topographic map and satellite map that denote the CG-1_2 field for the Department of Heritage agency map review. Can your department review these maps and determine if any heritage areas have ever been located at the identified field site?

Please contact me with any questions at: (479) 264-5383 or email:
john.pipkin@denaliwater.com.

Thank you,

A handwritten signature in black ink, appearing to read "John Pipkin".

John Pipkin
Land & Environmental Director



3308 Bernice Avenue
Russellville, AR 72802
PO Box 3036 • Russellville, AR 72811
Phone: 479-498-0500

April 12, 2022

Mr. Tom Skelton
US Army Corps of Engineers
Attn: Regulatory Branch
167 N Main B-202
Memphis, TN 38103

RE: Wetland Review for Farm Site: CG-1_2 – Haywood County

Dear Mr. Skelton:

Denali Water Solutions is submitting a permit application to the Jackson, TN Field Office to the Attention of: Solid Waste Branch, Tennessee Department of Environment and Conservation (TDEC) to land apply food processing residuals (liquid organic based material) to farmland as a beneficial fertilizer. We need to determine if the farm fields included in the permit application are adjacent to any defined wetlands. I have attached the FEMA map showing the 100 year floodplain and there is an area along the eastern boundary of the field that has the eastern part of the field identified inside the 100 year flood hazard on the FEMA map. The liquid material is sub-soil injected into the upper 8 inches of the field to incorporate the material into the soil. A buffer setback of 100 feet for any surface water is part of the land application protocols when applying the liquid material to the farm site.

I have attached the site list and maps of the proposed farm field for your review. Can your department compare these maps to any wetland maps you have on file and determine if the attached field map is adjacent to any defined wetlands?

Please contact me with any questions at: (479) 264-5383, email: John.Pipkin@denaliwater.com, and I appreciate your assistance with this matter.

Thank you,

A handwritten signature in black ink, appearing to read "John Pipkin".

John Pipkin
Land & Environmental Mgr



3308 Bernice Avenue
Russellville, AR 72802
PO Box 3036 • Russellville, AR 72811
Phone: 479-498-0500

US Fish and Wildlife Service
TN Ecological Field Office
446 Neal Street
Cookeville, TN 38501

RE: Wetland Map Review for Site: CG-1, CG-2 Haywood County

To Whom It May Concern:

Denali Water Solutions is submitting a permit application to the Solid Waste Branch of the Tennessee Department of Environment and Conservation (TDEC) to land apply food processing residuals to farmland as a beneficial fertilizer. We need to determine if the farm field in the permit application is adjacent to any defined wetlands by a map review of the CG-1 and CG-2 field areas.

I have attached the land site list, flood plain maps, buffer setback map, google earth map and topographic map of the proposed farm fields for your review. Can your department compare these maps to any you have on file for wetlands in Haywood County for the identified field area and determine if the field identified is adjacent to any defined wetlands? There is some of the eastern field edge of the CG-2 field that has the 100 year flood map area identified in the field area. There is a buffer setback of 100 feet for any surface water feature and the food processing residuals are incorporated into the soil to prevent runoff from the field site. Surface water features will not be impacted by the spreading of the organic fertilizer material and normal farming equipment is utilized to apply the liquid material to the field.

Please contact me with any questions at: (479) 264-5383 or
John.Pipkin@denaliwater.com.

Thank you,

A handwritten signature in black ink, appearing to read "John Pipkin".

John Pipkin
Land & Environmental Mgr