STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0135275
Owner:	Matthew T. Castle, Castle Land Holdings, LLC
Address:	1790 County Road 256, Columbia, Missouri 65201
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Callaway County Mobile Home Park WWTF
Facility Address:	State Route J about one mile south of Interstate Hwy 70, Millersburg, Missouri 65251
Legal Description:	See Page 2
Latitude/Longitude:	See Page 2
Receiving Stream:	See Page 2
First Classified Stream and ID:	See Page 2
USGS Basin & Sub-watershed No.:	See Page 2

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

FACILITY DESCRIPTION

Outfall #001 – Mobile Home Park – Domestic Wastewater No-discharge System – SIC #4952 – **No Certified Operator Required**
Residential septic tanks / single cell storage basin / wastewater irrigation / sludge is hauled by contract hauler.
Design population equivalent is 90.
Design flow is 10,180 gallons per day (1-in-10 year design including net rainfall minus evaporation).
Average design flow is 9,000 gallons per day (dry weather flows).
Design sludge production is 0.63 dry tons per year.

Continued on Page 2.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

October 23, 2009
Effective Date

Mark N. Templeton, Director
Department of Natural Resources

October 22, 2014
Expiration Date

Irene Crawford
Regional Director, Northeast Regional Office

FACILITY DESCRIPTION (continued)

Facility Type:
No-discharge Storage and Irrigation System

Outfall #001, Storage Basin Emergency Spillway:
Legal Description: NE ¼, SW ¼, Sec. 14, T48N, R11W, Callaway County
Latitude/Longitude: +3856231/-092072869
Receiving Stream: Unnamed tributary to Sally Branch (U)
First Classified Stream and ID: Cedar Creek (C) (00737)
USGS Basin & Sub-watershed No.: (10300103 – 190001)

Land Application Site:
Legal Description: NW ¼, SE ¼, Sec. 14, T48N, R11W, Callaway County

Watershed 1
Receiving Stream: Unnamed tributary to Sally Branch (U)
First Classified Stream and ID: Cedar Creek (C) (00737)
USGS Basin & Sub-watershed No.: (10300103 – 190001)

Watershed 2
Receiving Stream: Unnamed tributary to Little Dixie Lake (U)
First Classified Stream and ID: Little Dixie Lake (L3) (07180)
USGS Basin & Sub-watershed No.: (10300102 – 190002)

Design Basis:	**Avg Annual**
Design dry weather flows	9,000 gpd
Design with 1-in-10 year flows	10,180 gpd

Design PE is 90 persons

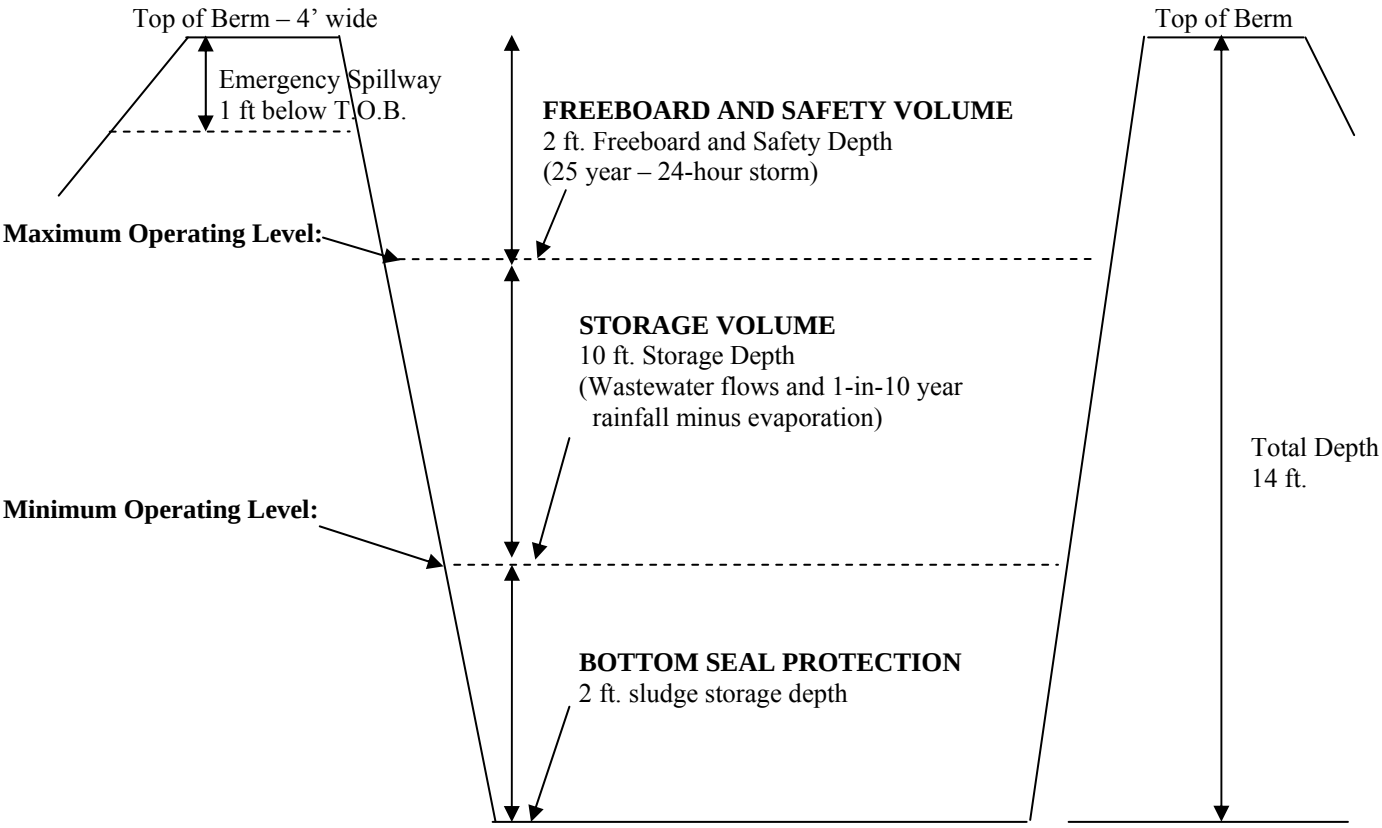
Storage Basin:
Freeboard for basin: 2 feet from top of berm, 1 foot below emergency spillway
Storage volume (minimum to maximum water levels) 1,586,000 gallons

Days of Storage
Storage Capacity:

Design for Dry weather Flows:	176 days
Design with 1-in 10 year flows:	156 days

Land Application:
Irrigation Volume/year: 3,715,220 gallons at design loading (including 1-in-10 year flows)
Irrigation areas: 5.7 acres at design loading (6.7 acres total available)
Application rates: ½ inch/hour; 1 inch/day; 3 inches/week; 24 inches/year
Field slopes: less than or equal to 2 percent
Equipment type: perforated pipe distribution
Vegetation: pasture land
Application rate is based on: hydraulic loading rate

STORAGE BASIN PROFILE



	Surface Area	Depth from Bottom	Pump down depth (from berm)
Center Line Top Berm:	36,861 sq. ft.	14 feet	
Inside Top Berm:	35,264 sq. ft.	14 feet	
Freeboard & Safety Vol:	30,800 sq. ft.	12 feet	12 feet
Maximum operating level:		12 feet	2 feet
Minimum operating level:		2 feet	12 feet
Aerobic BOD design basis:		3 feet	11 feet

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001 - Emergency discharge from storage basin (Note 1)						
Flow	MGD	*			once/day**	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		45	30	once/week**	grab
Total Suspended Solids	mg/L		45	30	once/week**	grab
pH	SU	***		***	once/week**	grab
Ammonia Nitrogen as N	mg/L				once/week**	grab
(May 1 – Oct 31)		8.1		3.1		
(Nov 1 – Apr 30)		9.0		3.5		
Temperature	°C	*		*	once/week**	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JANUARY 28, 2010. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Land Application Operational Monitoring (Note 2)						
Storage basin Freeboard (Note 3)	feet	*			once/month	measured
Irrigation Period	hours	*			daily	total
Volume Irrigated	gallons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	inches	*			daily	total
Rainfall	inches	*			daily	total
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE JANUARY 28, 2010 .						
Irrigated Wastewater (Note 4)						
Total Kjeldahl Nitrogen as N (Note 5)	mg/L	*			once/year	grab
Nitrate Nitrogen as N (Note 5)	mg/L	*		*	once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE JANUARY 28, 2010.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I & III STANDARD CONDITIONS DATED October 1, 1980 and August 15, 1994, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only.
** Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period.
*** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.0-9.0 pH units.

Note 1 - **No-discharge facility requirements**. Wastewater shall be stored and land applied during suitable conditions so that there is no discharge from the storage basin or irrigation site. An emergency discharge may occur when excess wastewater has accumulated above feasible irrigation rates due to precipitation exceeding the 1-in-10-year, 365-day rainfall or the 25-year, 24-hour storm event.

Note 2 - Records shall be maintained and submitted in an annual report, which shall be submitted by January 28th of each year for the previous calendar year period using report forms approved by the Department. The annual report shall also include the following additional information:

a. Record of maintenance and repairs performed during the year, average number of times per month the facility is checked to see if it is operating properly, and description of any unusual operating conditions encountered during the year;
b. The reason(s) the emergency discharge(s) occurred; and
c. A summary of the irrigation operations including crops grown, crop yields per acre, and calculations for nitrogen applied and crop removal of nitrogen if required (See Special Conditions #7 j.)

Note 3 - Storage basin freeboard shall be reported as water level in feet below the overflow level. See Special Conditions for Wastewater Irrigation System requirements.

Note 4 - Wastewater that is irrigated shall be sampled at the irrigation pump or wet well.

Note 5 - Wastewater irrigation rates shall not exceed a nitrogen application rate of 150 pounds total nitrogen per acre per year, and the applied wastewater shall not exceed ten (10) mg/l of nitrate nitrogen as N. If the nitrogen application exceeds a rate of 150 pounds total nitrogen per acre per year, and/or the applied wastewater exceeds ten (10) mg/l of nitrate nitrogen as N, see Special Condition #7 j. for additional requirements.

C. SPECIAL CONDITIONS

1. Outfalls must be marked in field and on the topographic site map submitted with the permit application.

2. Permittee will cease discharge by connection to areawide wastewater treatment system within 90 days of notice of its availability.

3. Water Quality Standards
   a. Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
   b. General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
      (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
      (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
      (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
      (5) There shall be no significant human health hazard from incidental contact with the water;
      (6) There shall be no acute toxicity to livestock or wildlife watering;
      (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
      (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

4. This permit may be reopened and modified, or alternatively revoked and reissued, to:
   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) controls any pollutant not limited in the permit.
   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

5. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities
   (a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.
   (b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

6. Storage basins and earthen basins shall have a liner that is designed, constructed and maintained. If operating records indicate excessive percolation, the department may require corrective action as necessary to eliminate excess leakage.

7. Wastewater Irrigation System.

   a. Discharge Reporting. Any unauthorized discharge from the storage basin or irrigation system shall be reported to the department as soon as possible but always within 24 hours. Discharge is allowed only as described in the Facility Description and Effluent Limitations sections of this permit.

   b. Storage basin Operating Levels - No-discharge Systems. The minimum and maximum operating water levels for the storage basin shall be clearly marked. Each storage basin shall be operated so that the maximum water elevation does not exceed one foot below the overflow point except due to exceedances of the 1-in-10 year, 365-day or 25-year, 24-hour storm events. Wastewater shall be land applied whenever feasible based on soil and weather conditions and permit requirements. Storage basin(s) shall be lowered to the minimum operating level prior to each winter by November 30.

C. SPECIAL CONDITIONS (continued)

7. Wastewater Irrigation System (continued)

c. Emergency Spillway. Storage basins and earthen storage basins should have an emergency spillway to protect the structural integrity of earthen structures during operation at near full water levels and in the event of overflow conditions. The spillway shall be at least one foot below top of berm.

d. General Irrigation Requirements. The wastewater irrigation system shall be operated so as to provide uniform distribution of irrigated wastewater over the entire irrigation site. A complete ground cover of vegetation shall be maintained on the irrigation site unless the system is approved for row crop irrigation. Wastewater shall be land applied only during daylight hours. The wastewater irrigation system shall be capable of irrigating the annual design flow during an application period of less than 100 days or 800 hours per year.

e. Saturated/Frozen Conditions. There shall be no irrigation during ground frost, frozen, snow covered, or saturated soil conditions, or when precipitation is imminent or occurring.

f. Buffer Zones. There shall be no irrigation within 300 feet of any down gradient pond, lake, sinkhole, losing stream or water supply withdrawal; 100 feet of gaining streams or tributaries; 150 feet of dwelling or public use areas; or 50 feet of the property line.

g. Public Access Restrictions. Public access shall not be allowed to public use area irrigation sites when application is occurring.

h. Irrigated Wastewater Disinfection. Wastewater shall be disinfected prior to land application (not storage) to public use areas.

i. Operation and Maintenance Manual.
The permittee shall develop, maintain and implement an Operation and Maintenance (O&M) Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to Regional Office for review and approval. The O&M Manual shall be reviewed and updated at least every five years.

j. Nitrogen Loading Rates. Wastewater irrigation rates shall not exceed a nitrogen application rate of 150 pounds total nitrogen per acre per year, and the applied wastewater shall not exceed ten (10) mg/l of nitrate nitrogen as N. Hydraulic application rates exceeding 60 inches per acre per year shall calculate nitrogen loading rates and include results in the annual report. The calculation procedures are as follows: (Total N) x (0.226) x (inches per acre irrigated) = pounds total N per acre. Where Total N = [Total Kjeldahl Nitrogen (TKN) as N] + [Nitrate Nitrogen as N]. If the applied wastewater exceeds 150 pounds total nitrogen per acre/year, the permittee must reduce the application rates or submit a revised permit application to request use of the Plant Available Nitrogen (PAN) method based on crop nitrogen requirements for harvested crops, along with calculations to show the amount of plant-available nitrogen provided and the amount of nitrogen that will be utilized by the vegetation to be grown. PAN availability factors for surface application are: [Ammonia N x 0.6] + [Nitrate N x 0.9] + [Organic N x 0.6] = PAN. If the applied wastewater exceeds ten (10) mg/l of nitrate nitrogen as N, then the facility shall submit a revised permit application to request use of the Plant Available Nitrogen (PAN) method based on crop nitrogen requirements for harvested crops, along with calculations to show the amount of plant-available nitrogen provided and the amount of nitrogen that will be utilized by the vegetation to be grown.

k. Equipment Checks during Irrigation. The irrigation system and application site shall be visually inspected at least once/day during wastewater irrigation to check for equipment malfunctions and runoff from the irrigation site.

8. Land Application Sites. To add additional land application sites, the permittee shall document that the new land application site(s) meet the setback requirements referenced in Special Conditions #7 (f). Additionally, the O&M Manual shall be updated to include the additional land application site(s) and a copy of the updated sections of the O&M Manual shall be submitted to the Northeast Regional Office in accordance with Special Condition #7 (i).

9. The permittee shall comply with any applicable requirements listed in 10 CSR 20-8 and 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the department for review and, if deemed necessary, approval.

PERMIT TRANSFER

This permit may be transferred to a new owner by submitting an "Application for Transfer of Operating Permit" signed by the seller and buyer of the facility, along with the appropriate modification fee.

PERMIT RENEWAL REQUIREMENTS

Unless this permit is terminated, the permittee shall submit an application for the renewal of this permit no later than six (6) months prior to the permit's expiration date. Failure to apply for renewal may result in termination of this permit and enforcement action to compel compliance with this condition and the Missouri Clean Water Law.

TERMINATION

In order to terminate this permit, the permittee shall notify the department by submitting Form J, included with the State Operating Permit. The permittee shall complete Form J and mail it to the department at the address noted in the cover letter of this permit. Proper closure of any storage structure is required prior to permit termination. A closure plan shall be submitted to the department and approved prior to initiating closure activities.

DUTY OF COMPLIANCE

The permittee shall comply with all conditions of this permit. Any noncompliance with this permit constitutes a violation of Chapter 644, Missouri Clean Water Law, and 10 CSR 20-6. Noncompliance may result in enforcement action, termination of this authorization, or denial of the permittee's request for renewal.

This permit authorizes only the activities described in this permit. Compliance with this permit may not be considered a shield from compliance with any local ordinance, State Regulation or State Law.

Missouri Department of Natural Resources
FACT SHEET
FOR THE PURPOSE OF CONSTRUCTION AND OPERATION
OF
MO-0135275
CALLAWAY COUNTY MOBILE HOME PARK WWTF

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

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Major ☐, Minor ☒, Industrial Facility ☐; Variance ☐;
Master General Permit ☐; General Permit Covered Facility ☐; and/or permit with widespread public interest ☐.

Part I – Facility Information

Facility Address: State Route J about one mile south of Interstate Hwy 70, Millersburg, MO 65251
Facility Type: NON-POTW, Mobile Home Park
Facility SIC Code(s): 4952

Facility Description:
Outfall #001 – Mobile Home Park – Domestic Wastewater No-discharge System
Residential septic tanks / single cell storage basin / wastewater irrigation / sludge is hauled by contractor.
Design population equivalent is 90.
Design flow is 10,180 gallons per day (1-in-10 year design including net rainfall minus evaporation).
Average design flow is 9,000 gallons per day (dry weather flows).
Design sludge production is 0.63 dry tons per year.

Application Date: June 25, 2008
Expiration Date: Not Applicable
Last Inspection: Not Applicable

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	0.02	Storage / Equivalent to Secondary	Domestic	2.4 mi.

Outfall #001
Legal Description: NE ¼, SW ¼, Sec. 14, T48N, R11W, Callaway County
Latitude/Longitude: +3856231/-092072869
Receiving Stream: Unnamed tributary to Sally Branch (U)
First Classified Stream and ID: Cedar Creek (C) (00737)
USGS Basin & Sub-watershed No.: (10300103 – 190001)

Land Application
Legal Description: NW ¼, SE ¼, Sec. 14, T48N, R11W, Callaway County

Watershed 1
Receiving Stream: Unnamed tributary to Sally Branch (U)
First Classified Stream and ID: Cedar Creek (C) (00737)
USGS Basin & Sub-watershed No.: (10300103 – 190001)

Watershed 2
Receiving Stream: Unnamed tributary to Little Dixie Lake (U)
First Classified Stream and ID: Little Dixie Lake (L3) (07180)
USGS Basin & Sub-watershed No.: (10300102 – 190002)

Water Quality History:
This is a new facility. There is no water quality history.

Comments:
The proposed facility will be a no-discharge system. The irrigation will be conducted on land owned by the facility owner within a watershed that drains to Cedar Creek and a watershed that drains to Little Dixie Lake.

Part II – Operator Certification Requirements

As per [10 CSR 20-9.020(2)(A)],requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Not Applicable ☒;
This facility is not required to have a certified operator.

Part III – Receiving Stream Information

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category list effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

Please mark the correct designated waters of the state categories of the receiving stream.

Missouri or Mississippi River [10 CSR 20-7.015(2)]:	Yes ☐; No ☒
Lake or Reservoir [10 CSR 20-7.015(3)]:	Yes ☒; No ☐
Losing [10 CSR 20-7.015(4)]:	Yes ☐; No ☒
Metropolitan No-Discharge [10 CSR 20-7.015(5)]:	Yes ☐; No ☒
Special Stream [10 CSR 20-7.015(6)]:	Yes ☐; No ☒
Subsurface Water [10 CSR 20-7.015(7)]:	Yes ☐; No ☒
All Other Waters [10 CSR 20-7.015(8)]:	Yes ☒; No ☐

10 CSR 20-7.031 Missouri Water Quality Standards, the department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1st classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

RECEIVING STREAM(S) TABLE:

WATERBODY NAME	CLASS	WBID	DESIGNATED USES*	8-DIGIT HUC	EDU**
Watershed 1					
Unnamed Tributary to Sally Branch	U	--	General Criteria	10300103	Ozark / Moreau / Loutre
Sally Branch	U	--	General Criteria		
Cedar Creek	C	00737	LWW, AQL, WBC***		
Watershed 2					
Unnamed tributary to Little Dixie Lake	U	--	General Criteria	10300102	Ozark / Moreau / Loutre
Little Dixie Lake	L3	07180	LWW, AQL, WBC****, SCR		

* - Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery(CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).
** - Ecological Drainage Unit
*** - UAA conducted on August 29 – 30, 2007; WBC use retained on November 21, 2007.
**** - UAA has not been conducted.

Mixing Zone: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].
Zone of Initial Dilution: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(b)].

RECEIVING STREAM MONITORING REQUIREMENTS:

No receiving water monitoring requirements recommended at this time.

Part IV – Rationale and Derivation of Effluent Limitations & Permit Conditions

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:
As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

Not Applicable ☒;
The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

Not Applicable ☒;
This is the first permit issued for this facility.

ANTIDEGRADATION:
In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)], the department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - This is a no-discharge facility. An Antidegradation Review is not required.

APPLICABLE PERMIT PARAMETERS:
Effluent parameters contained in Factsheets and Missouri State Operating Permits are obtained from Technology Based Effluent Limit (TBEL), Missouri's Effluent Regulations [10 CSR 20-7.015], Missouri's Water Quality Standards [10 CSR 20-7.031], previous Missouri State Operating Permits, and from Operating Permit Applications.

BIO-SOLIDS, SLUDGE, & SEWAGE SLUDGE:
Bio-solids are solid materials resulting from wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sludge is any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works.

Applicable (new operating permits) ☒;
The permittee has proposed that sludge and bio-solids are to be removed by a contract hauler for this facility.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

Not Applicable ☒;
The permittee/facility is not currently under Water Protection Program enforcement action.

PRETREATMENT PROGRAM:
The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)].

Not Applicable ☒;
At this time, the permittee is not required to implement and enforce a Pretreatment Program.

REASONABLE POTENTIAL ANALYSIS (RPA):
Limitations must control all pollutants or pollutant parameters that are or may be discharged at a level which will cause, have reasonable potential to cause, or contribute to an excursion above the Missouri Water Quality Standards.

Not Applicable ☒;
A RPA was not conducted for this facility.

REMOVAL EFFICIENCY:
Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD_5) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs). Please see the United States Environmental Protection Agency's (EPA) website for interpretation of percent removal requirements for National Pollutant Discharge Elimination System Permit Application Requirements for Publicly Owned Treatment Works and Other Treatment Works Treating Domestic Sewage @ www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm

Not Applicable ☒;
This wastewater treatment facility is not a POTW. Influent monitoring is not being required to determine percent removal.

SANITARY SEWER OVERFLOWS (SSOS), AND INFLOW & INFILTRATION (I&I):
Collection systems are a critical element in the successful performance of the wastewater treatment process. Under certain conditions, poorly designed, built, managed, operated, and/or maintained systems can pose risks to public health, the environment, or both. Causes of SSOs include, but are not limited to, the following: high levels of I&I during wet weather; blockages; structural, mechanical, or electrical failures; collapsed or broken sewer pipes; insufficient conveyance capacity; and vandalism. Effective and continuous management, operation, and maintenance, as well as ensuring adequate capacity and rehabilitation when necessary are critical to maintaining collection system capacity and performance while extending the life of the system.

Not Applicable ☒;
This facility is not required to develop or implement a program for maintenance and repair of the collection system; however, it is a violation of Missouri State Environmental Laws and Regulations to allow untreated wastewater to discharge to waters of the state.

SCHEDULE OF COMPLIANCE (SOC):
A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit.

Not Applicable ☒;
This permit does not contain a SOC.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP):
A plan to schedule activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. The plan may include, but is not limited to, treatment requirements, operating procedures, and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Not Applicable ☒;
At this time, the permittee is not required to develop and implement a SWPPP.

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

Not Applicable ☒;
This operating permit is not drafted under premises of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the department to release into a given stream after the department has determined to total amount of pollutant that may be discharged into that stream without endangering its water quality.

Applicable ☒;
Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)}$$ (EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration
Cs = upstream concentration
Qs = upstream flow
Ce = effluent concentration
Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

WLA MODELING:

Not Applicable ☒;
A WLA study was either not submitted or determined not applicable by department staff.

WHOLE EFFLUENT TOXICITY (WET) TEST:
As per [10 CSR 20-7.031(1)(CC)], a toxicity test conducted under specified laboratory conditions on specific indicator organism; and as per [40 CFR Part 122.2], the aggregate toxic effect of an effluent measured directly by a toxicity test.

Not Applicable ☒;
At this time, the permittee is not required to conduct WET test for this facility.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

Not Applicable ☒;
This facility does not discharge to a 303(d) listed stream.

Part V – Effluent Limits Determination

Outfall #001 – Emergency Spillway at Storage Basin

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
FLOW	GPD	1	*		*	N/A	N/A
BOD_5	MG/L	1		45	30	N/A	N/A
TSS	MG/L	1		45	30	N/A	N/A
PH (S.U.)	SU	1	6.0 – 9.0		6.0 – 9.0	N/A	N/A
TEMPERATURE (°C)	°C	1/5	*		*	N/A	N/A
AMMONIA AS N (MAY 1 – OCT 31)	MG/L	2/3/5	8.1		3.1	N/A	N/A
AMMONIA AS N (NOV 1 – APR 30)	MG/L	2/3/5	9.0		3.5	N/A	N/A
MONITORING FREQUENCY	Please see Minimum Sampling and Reporting Frequency Requirements in the Derivation and Discussion Section below.						

* - Monitoring requirement only
N/A – Not applicable

Basis for Limitations Codes:
1. State or Federal Regulation/Law
2. Water Quality Standard (includes RPA)
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Dissolved Oxygen Policy
7. Antidegradation Policy
8. Water Quality Model
9. Best Professional Judgment
10. TMDL or Permit in lieu of TMDL
11. WET test Policy

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Biochemical Oxygen Demand (BOD_5).** 45 mg/L as a Weekly Average and 30 mg/L as a Monthly Average. Please see **APPENDIX #1 – WATER QUALITY REVIEW SHEET.**
- **Total Suspended Solids (TSS).** 45 mg/L as a Weekly Average and 30 mg/L as a Monthly Average. Please see **APPENDIX #1 – WATER QUALITY REVIEW SHEET.**
- **pH**. pH shall be maintained in the range of six to nine (6 – 9) standard units. Please see **APPENDIX #1 – WATER QUALITY REVIEW SHEET.**

- **Temperature.** Monitoring requirement due to the toxicity of Ammonia varies by temperature. Please see **APPENDIX #1 – WATER QUALITY REVIEW SHEET.**

- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3]. Please see **APPENDIX #1 – WATER QUALITY REVIEW SHEET.**

Minimum Sampling and Reporting Frequency Requirements.

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
FLOW	ONCE/DAY	ONCE/QUARTER
BIOCHEMICAL OXYGEN DEMAND$_5$	ONCE/WEEK	ONCE/QUARTER
TOTAL SUSPENDED SOLIDS	ONCE/WEEK	ONCE/QUARTER
PH	ONCE/WEEK	ONCE/QUARTER
TEMPERATURE	ONCE/WEEK	ONCE/QUARTER
AMMONIA AS N (MAY 1 – OCT 31)	ONCE/WEEK	ONCE/QUARTER
AMMONIA AS N (NOV 1 – APR 30)	ONCE/WEEK	ONCE/QUARTER

Land Application Operational Monitoring and Irrigated Wastewater

MONITORING PARAMETERS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
STORAGE BASIN FREEBOARD	FEET	9	*			N/A	N/A
IRRIGATION PERIOD	HOURS	9	*			N/A	N/A
VOLUME IRRIGATED	GALLONS	9	*			N/A	N/A
APPLICATION AREA	ACRES	9	*			N/A	N/A
APPLICATION RATE	INCHES	9	*			N/A	N/A
RAINFALL	INCHES	9	*			N/A	N/A
TOTAL KJELDAHL NITROGEN AS N	MG/L	9	*			N/A	N/A
NITRATE NITROGEN AS N	MG/L	9	*		*	N/A	N/A
MONITORING FREQUENCY	Please see Minimum Sampling and Reporting Frequency Requirements in the Derivation and Discussion Section below.						

* - Monitoring requirement only
N/A – Not applicable

Basis for Limitations Codes:

7. State or Federal Regulation/Law
8. Water Quality Standard (includes RPA)
9. Water Quality Based Effluent Limits
10. Lagoon Policy
11. Ammonia Policy
12. Dissolved Oxygen Policy
7. Antidegradation Policy
8. Water Quality Model
9. Best Professional Judgment
10. TMDL or Permit in lieu of TMDL
11. WET test Policy

LAND APPLICATION – DERIVATION AND DISCUSSION OF MONITORING REQUIREMENTS:

- **Storage basin Freeboard, Irrigation Period, Volume Irrigated, Application Area, Application Rate, Rainfall.** Monitoring requirements added according to best professional judgment. These are standard monitoring parameters in no-discharge permits to show that the facility is operating according to the design guidelines contained in Regulation 10 CSR 20-8.020(15), *Land Application of Wastewater*.

- **Total Kjeldahl Nitrogen as N, Nitrate Nitrogen as N.** Monitoring requirement to show that the permittee is meeting the requirements of Special Condition 7.j. Nitrogen Loading Rates.

Minimum Sampling and Reporting Frequency Requirements.

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
STORAGE BASIN FREEBOARD	ONCE/MONTH	ONCE/YEAR
IRRIGATION PERIOD	ONCE/DAY	ONCE/YEAR
VOLUME IRRIGATED	ONCE/DAY	ONCE/YEAR
APPLICATION AREA	ONCE/DAY	ONCE/YEAR
APPLICATION RATE	ONCE/DAY	ONCE/YEAR
RAINFALL	ONCE/DAY	ONCE/YEAR
TOTAL KJELDAHL NITROGEN AS N	ONCE/YEAR	ONCE/YEAR
NITRATE NITROGEN AS N	ONCE/YEAR	ONCE/YEAR

Part VI – Administrative Requirements

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

PUBLIC NOTICE:
As per the Missouri Clean Water Law, the Missouri Clean Water Commission, and the federal Clean Water Act, persons wishing to comment on Missouri State Operating Permits are directed to do so by a department approved Public Notice coversheet. This Public Notice coversheet is attached to a Missouri State Operating Permit during the Public Notice period.

☒ - The Public Notice period for this operating permit was from August 22, 2008 to September 22, 2008. No responses received or responses to the Public Notice of this operating permit do not warrant the modification of effluent limits and/or the terms and conditions of this permit.

Date of Factsheet: July 25,2008; Updated October 21, 2009
Date of Public Notice: August 22, 2008

Submitted by

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Philip Ryan Wilson, P.E. Date

Matt Sperry Date

Part VII – Appendices

APPENDIX #1 – WATER QUALITY REVIEW SHEET

The WQRS begins on the next page.

Missouri Department of Natural Resources
Water Protection Program
NPDES Permits and Engineering Section

Water Quality Review Sheet

Determination of Effluent Limits and Monitoring Requirements

FACILITY INFORMATION

FACILITY NAME: Callaway County Mobile Home Park NPDES #: NEW

FACILITY TYPE/DESCRIPTION: Design flow will be 0.011 MGD. Treatment of residential wastewater for a mobile home community of approximately 36 units. Mechanical treatment.

EDU*: Ozark/Moreau/Loutre Drainages 8- DIGIT HUC: 10300102 COUNTY: Callaway

* - Ecological Drainage Unit

LEGAL DESCRIPTION: Center section 14, T48N, R11W LATITUDE/LONGITUDE: NA

WATER QUALITY HISTORY: No history. New facility.

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	RECEIVING WATERBODY	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	0.02	Secondary	Sally Branch	2.4

RECEIVING WATERBODY INFORMATION

WATERBODY NAME	CLASS	WBID	LOW-FLOW VALUES (CFS)			DESIGNATED USES**
			1Q10	7Q10	30Q10	
Sally Branch	U	-	-	-	-	General Criteria
Cedar Creek	C	737	-	-	-	LWW, AQL, WBC(B)

** Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery (CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND)

COMMENTS: No Geohydrological evaluation was submitted with the request. Time of travel was submitted by Brush & Associates for ammonia decay determination. Several miles upstream of the Sally Branch's confluence with Cedar Creek is a 303 (d) listed segment. The impairment is due to abandoned mine land.

ANTIDEGRADATION POLICY

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the department is to develop a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review which documents that the use of a water body's available assimilative capacity is justified. Effective tentatively August 2008

(depending on the rulemaking process), a facility will be required to use *Missouri's Antidegradation Implementation Procedure*. This procedure will be applicable to new and expanded wastewater facilities.

GENERAL ASSUMPTIONS OF THE WATER QUALITY REVIEW SHEET

1. A Water Quality Review Sheet (WQRS) assumes that [10 CSR 20-6.010(3) Continuing Authorities] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
2. A WQRS does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
3. Changes to Federal and State Regulations made after the drafting of this WQRS may alter Water Quality Based Effluent Limits (WQBEL).
4. Effluent limitations derived from Federal or Missouri State Regulations (FSR) may be WQBEL or Effluent Limit Guidelines (ELG).
5. WQBEL supercede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
6. A WQRS does not allow discharges to waters of the state, and shall not be construed as a National Pollution Discharge Elimination System or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
7. Limitations and other requirements in a WQRS may change as Water Quality Standards, Methodology, and Implementation procedures change.
8. Nothing in this WQRS removes any obligations to comply with county or other local ordinances or restrictions.

MIXING CONSIDERATIONS

Mixing Zone (MZ): Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].
Zone of Initial Dilution (ZID): Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(b)]

PERMIT LIMITS AND INFORMATION

WASTELOAD ALLOCATION STUDY CONDUCTED (Y OR N): N

USE ATTAINABILITY ANALYSIS CONDUCTED (Y OR N): N

WHOLE BODY CONTACT USE RETAINED (Y OR N): Y

OUTFALL #001

WET TEST (Y OR N): N FREQUENCY: NA AEC: NA METHOD: NA

PARAMETER	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	WQBEL (NOTE 2)	MONITORING FREQUENCY
FLOW	*		*	N/A	ONCE/QUARTER
BOD_5 (MG/L)		45	30	FSR	ONCE/QUARTER
TSS (MG/L)		45	30	FSR	ONCE/QUARTER
PH (S.U.)	6.0 – 9.0		6.0 – 9.0	FSR	ONCE/QUARTER
TEMPERATURE (°C)	*		*	N/A	ONCE/QUARTER
AMMONIA AS N (MG/L) (MAY 1 – OCT 31)	8.1		3.1	Y	ONCE/QUARTER
AMMONIA AS N (MG/L) (NOV 1 – APR 30)	9.0		3.5	Y	ONCE/QUARTER
ESHERICHIA COLIFORM (E. COLI)	Please see the E. coli discussion in the Derivation & Discussion of Limits section of this WQRS below.				

* - Monitoring requirements only.
NOTE 2 – THIS FIELD INFORMS THE APPLICANT IF THE PARAMETER'S EFFLUENT LIMITATION IS A WATER QUALITY BASED EFFLUENT LIMITATION (WQBEL): Y – YES; FSR – FEDERAL/STATE REGULATION; AND N/A – NOT APPLICABLE. ALSO, PLEASE SEE THE **GENERAL ASSUMPTIONS OF THE WQRS #4 & #5.**

RECEIVING WATER MONITORING REQUIREMENTS

No receiving water monitoring requirements recommended at this time.

DERIVATION AND DISCUSSION OF LIMITS

Wasteload allocations were calculated using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)}$$ (EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration
Cs = upstream concentration
Qs = upstream flow
Ce = effluent concentration
Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow. Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow.

Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Outfall #001 – Main Facility Outfall

- **Biochemical Oxygen Demand (BOD_5).** 30 mg/L monthly average, 45 mg/L weekly average [10 CSR 20-7.015(8)(B)1]. Influent monitoring may be required for this facility in its Missouri State Operating Permit.

- **Total Suspended Solids (TSS).** 30 mg/L monthly average, 45 mg/L weekly average [10 CSR 20-7.015(8)(B)1]. Influent monitoring may be required for this facility in its Missouri State Operating Permit.

- **pH.** pH shall be maintained in the range from six to nine (6 – 9) standard units [10 CSR 20-7.015 (8)(B)2.].

    - **Temperature.** Monitoring requirement only. Temperature affects the toxicity of Ammonia.

- **E. coli**. This facility may be required to have E. coli effluent limitations when Missouri adopts the implementation of the E. coli effluent regulations. Also, please see **GENERAL ASSUMPTIONS OF THE WQRS #7.**

- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3]. Background total ammonia nitrogen = 0.01 mg/L

Season	Temp (^oC)	pH (SU)	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: May 1 – October 31, Winter: November 1 – April 30.

Staff utilized a modified Feed Forward Reaction decay formula to allow degradation for ammonia prior to reaching the first classified water body:

$[NH_3N]_t = [NH_3N]_{t=0} * e^{-kt}$

Where
$[NH_3N]_t$ = ammonia concentration at confluence with classified segment.
$[NH_3N]_{t=0}$ = ammonia concentration at pipe = C_e
k = NH_3 oxidation per day $(k_{1,20})\Xi_1^{(Temp-20)}$
$k_{1,20} = 0.3(day^{-1})$
Ξ_1 = temperature correction factor = 1.083

t = time for effluent to travel to first classified segment (in days) = 1.6
Travel time was calculated using site-specific data submitted by Brush and Associates, Inc

Summer Temp. = 26ºC

Given $k = (0.3)(1.083)^{(26-20)} = 0.4841$ and t = 1.6 days; $e^{-kt} = e^{-(0.4841)(1.6)} = 0.46$.

Which means 46 % of the ammonia concentration remains after leaving the facility and reaching the first classified stream segment.

C_e = (1.5 mg/L) / 0.46 = 3.3 mg/L

LTA_c = 3.3 mg/L (0.780) = **2.6 mg/L** [CV = 0.6, 99th Percentile, 30 day average]

MDL = 2.6 mg/L (3.11) = 8.1 mg/L [CV = 0.6, 99th Percentile]
AML = 2.6 mg/L (1.19) = 3.1 mg/L [CV = 0.6, 95th Percentile, n = 30]

Winter Temp. = 6ºC

Given $k = (0.3)(1.083)^{(6-20)} = 0.0982$ and t = 1.6 days; $e^{-kt} = e^{-(0.0982)(1.6)} = 0.85$.

Which means 85% of the ammonia concentration remains after leaving the facility and reaching the first classified stream segment.

C_e = (3.1 mg/L) /0.85 = 3.7 mg/L

LTA_c = 3.7 mg/L (0.780) = **2.9 mg/L** [CV = 0.6, 99th Percentile, 30 day average]
MDL = 2.9 mg/L (3.11) = 9.0 mg/L [CV = 0.6, 99th Percentile]
AML = 2.9 mg/L (1.19) = 3.5 mg/L [CV = 0.6, 95th Percentile, n = 30]

Season	Maximum Daily Limit (mg/l)	Average Monthly Limit (mg/l)
Summer	8.1	3.1
Winter	9.0	3.5

Reviewer: Todd J. Blanc
Date: January 24, 2008
Unit Chief: Refaat Mefrakis

Monitoring and effluent limits contained within this document have been developed in accordance with EPA guidelines using the best available data and are believed to be consistent with Missouri's Water Quality Standards and Effluent Regulations. If additional water quality data or anecdotal information are available that may affect the recommended monitoring and effluent limits, please forward these data and information to the author.