

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, 92<sup>nd</sup> Congress) as amended,

Permit No. MO-0041173

Owner: City of Memphis  
Address: 125 West Jefferson Street, Memphis, MO 63555

Continuing Authority: Same as above  
Address: Same as above

Facility Name: Memphis Municipal Wastewater Treatment Facility  
Facility Address: East terminus of unnamed road ~0.3 mile south of Hwy 136 on Hwy MM  
Memphis, MO 63555

Legal Description: NW ¼, SW ¼, NW ¼, Sec. 17, T65N, R11W, Scotland County  
Latitude/Longitude: X=571902.361, Y=4477414.753

Receiving Stream: Gunns Branch (U)  
First Classified Stream and ID: North Fabius River (P) (00056)  
USGS Basin & Sub-watershed No.: (07110002-070001)

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 –POTW – SIC #4952 – Certified “D” Operator Required**

Three-cell lagoon formed by baffle curtains /grinder pumps at the headwork/ sludge is retained in lagoon.  
Design population equivalent is 2,143.  
Design flow is 214,300 gallons per day.  
Actual flow is 325,260 gallons per day.  
Design sludge production is 32.2 dry tons/year.

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.

April 1, 2011  
Effective Date

March 31, 2016  
Expiration Date

Sara Parker Pauley, Director  
Department of Natural Resources

Irene Crawford  
Regional Director, Northeast Regional Office

<b>A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS</b>					PAGE NUMBER 2 of 9	
					PERMIT NUMBER MO-0041173	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect until <u>March 31, 2014</u> . Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u>						
Flow	MGD	*		*	once/weekday**	24 hr. estimate
Biochemical Oxygen Demand <sub>5</sub> ***	mg/L		65	45	once/month	grab
Total Suspended Solids***	mg/L		120	80	once/month	grab
pH – Units	SU	****		****	once/month	grab
Ammonia as N	mg/L	*		*	once/month	grab
Temperature	°C	*		*	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Rainfall*****	inches	*		total	once/weekday**	total
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MAY 28, 2011</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Whole Effluent Toxicity (WET) test	% Survival	See Special Conditions #11		once/year	grab	
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>JANUARY 28, 2012</u> .						
<b>B. STANDARD CONDITIONS</b>						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I, II, &amp; III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- \* Monitoring requirement only.
- \*\* Once each weekday means: Monday, Tuesday, Wednesday, Thursday, and Friday.
- \*\*\* This facility is required to meet a removal efficiency of 65% or more.
- \*\*\*\* pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.
- \*\*\*\*\* Rainfall is to be measured at the lagoon.

<b>A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS</b>					PAGE NUMBER 3 of 9	
					PERMIT NUMBER MO-0041173	
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 April 1, 2014, 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
<u>Outfall #001</u>						
Flow	MGD	*		*	once/weekday**	24 hr. estimate
Biochemical Oxygen Demand <sub>5</sub> ***	mg/L		65	45	once/month	grab
Total Suspended Solids***	mg/L		120	80	once/month	grab
pH – Units	SU	****		****	once/month	grab
Ammonia as N						
Summer (May 1 – Oct 31)	mg/L	12.1		3.1	once/month	grab
Winter (Nov 1 – April 30)	mg/L	12.1		3.7	once/month	grab
Temperature	°C	*		*	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Rainfall*****	inches	*		total	once/weekday**	total
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>MAY 28, 2014</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Whole Effluent Toxicity (WET) test	% Survival	See Special Conditions #11			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>JANUARY 28, 2012</u> .						
<b>B. STANDARD CONDITIONS</b>						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I, II, &amp; III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)**

- \* Monitoring requirement only.
- \*\* Once each weekday means: Monday, Tuesday, Wednesday, Thursday, and Friday.
- \*\*\* This facility is required to meet a removal efficiency of 65% or more.
- \*\*\*\* pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.
- \*\*\*\*\* Rainfall is to be measured at the lagoon.

<b>C. INFLUENT MONITORING REQUIREMENTS</b>			
The facility is required to meet a removal efficiency of 65% or more. The monitoring requirements shall become effective upon issuance and remain in effect until expiration of the permit. To determine removal efficiencies, the influent wastewater shall be monitored by the permittee as specified below:			
SAMPLING LOCATION AND PARAMETER(S)	UNITS	MONITORING REQUIREMENTS	
		MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Influent</u>			
Biochemical Oxygen Demand <sub>5</sub>	mg/L	once/quarter*****	grab
Total Suspended Solids	mg/L	once/quarter*****	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>JULY 28, 2011</u>			

**C. INFLUENT MONITORING REQUIREMENTS (continued)**

- \*\*\*\*\* Sample once per quarter in the months of March, June, September, and December.

D. SPECIAL CONDITIONS

1. 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.

2. All outfalls must be clearly marked in the field.
3. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B)1. or 2. within 90 days of notice of its availability. The permittee shall obtain department approval for closure or alternate use of the facility.
4. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

- (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
    - (1) One hundred micrograms per liter (100 µg/L);
    - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
    - (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
    - (4) The level established in Part A of the permit by the Director.
  - (b) That they have begun or expect to begin, to use or manufacture, as an intermediate or final product or byproduct, any toxic pollutant which was not reported in the permit application.
5. Report as "no-discharge" when a discharge does not occur during the monitoring period.

6. 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.

D. SPECIAL CONDITIONS (continued)

7. 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.
8. 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.
9. The permittee shall develop and implement a program for maintenance and repair of the collection system. The permittee shall submit a report semiannually in April and October with the Discharge and Monitoring reports which address measures taken to locate and eliminate sources of infiltration and inflow into the collection system serving the facility.
10. Bypasses are not authorized at this facility and are subject to 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3)(i), and with Standard Condition Part I, Section B, subsection 2.b.
11. Whole Effluent Toxicity (WET) tests shall be conducted as follows:

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT				
OUTFALL	AEC	FREQUENCY	SAMPLE TYPE	MONTH
001	100%	Annually	grab	August

Dilution Series						
100%	50%	25%	12.5%	6.25%	(Control) 100% upstream, if available	(Control) 100% Lab Water, also called synthetic water

Run samples at Dilutions of 100%, 50%, 25%, 12.5% & 6.25%

- (a) Test Schedule and Follow-Up Requirements
  - (1) Perform a MULTIPLE-dilution acute WET test in the months and at the frequency specified above. For tests which are successfully passed, submit test results using the department's WET test report form #MO-780-1899 along with complete copies of the test reports as received from the laboratory, including copies of chain-of-custody forms within 30 calendar days of availability to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102. If the effluent passes the test, do not repeat the test until the next test period.
    - a) For discharges of storm water, samples shall be collected within three hours from when discharge first occurs.
    - b) Samples submitted for analysis of storm water discharges shall be collected as a grab.
    - c) For discharges of non-storm water, samples shall be collected only when precipitation has not occurred for a period of forty-eight hours prior to sample collection. In no event shall sample collection occur simultaneously with the occurrence of precipitation excepting for storm water samples.
    - d) A twenty-four hour composite sample shall be submitted for analysis of non-storm water discharges.
    - e) Upstream receiving water samples, where required, shall be collected upstream from any influence of the effluent where downstream flow is clearly evident.
    - f) Samples submitted for analysis of upstream receiving water may be collected as either a grab or twenty-four-hour composite as appropriate to the nature of the discharge.
    - g) Chemical and physical analysis of the upstream control and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping.
    - h) Any and all chemical or physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% Effluent concentration in addition to analyses performed upon any other effluent concentration.

D. SPECIAL CONDITIONS (continued)

- i) All chemical analyses included in the Missouri Department of Natural Resources WET test report form #MO-780-1899 shall be performed and results shall be recorded in the appropriate field of the report form.
  - j) Where flow-weighted composite sample is required for analysis, the samples shall be composited at the laboratory where the test is to be performed.
  - k) Where in stream testing is required downstream from the discharge, sample collection shall occur immediately below the established Zone of Initial Dilution in conjunction with or immediately following a release or discharge.
  - l) Samples submitted for analysis of downstream receiving water may be collected as either a grab or twenty-four-hour composite as appropriate to the nature of the discharge.
  - m) All instream samples, including downstream samples, shall be tested for toxicity at the 100% concentration in addition to any other assigned AEC for in-stream samples.
- (2) All failing test results along with complete copies of the test reports as received from the laboratory, INCLUDING THOSE TESTS CONDUCTED UNDER CONDITION (3) BELOW, shall be reported to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the availability of the results.
  - (3) If the effluent fails the test, a multiple dilution test shall be performed for BOTH test species within 30 calendar days and biweekly thereafter (for storm water, tests shall be performed on the next and subsequent storm water discharges as they occur, but not less than 7 days apart) until one of the following conditions are met:
    - a) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.
    - b) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.
  - (4) Failure of at least two multiple-dilution tests during any period of accelerated monitoring violates the permit narrative requirement for aquatic life protection.
  - (5) The permittee shall submit a summary of all test results for the test series along with complete copies of the test reports as received from the laboratory to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.
  - (6) Additionally, the following shall apply upon failure of the third MULTIPLE DILUTION test: A toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permittee shall contact THE WATER PROTECTION PROGRAM within 14 calendar days from availability of the test results to ascertain as to whether a TIE or TRE is appropriate. The permittee shall submit a plan for conducting a TIE or TRE to the WATER PROTECTION PROGRAM within 60 calendar days of the date of DNR's direction to perform either a TIE or TRE. This plan must be approved by DNR before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.
  - (7) Upon DNR's approval, the TIE/TRE schedule may be modified if toxicity is intermittent during the TIE/TRE investigations. A revised WET test schedule may be established by DNR for this period.
  - (8) If a previously completed TIE has clearly identified the cause of toxicity, additional TIEs will not be required as long as effluent characteristics remain essentially unchanged and the permittee is proceeding according to a DNR approved schedule to complete a TRE and reduce toxicity. Regularly scheduled WET testing as required in the permit, without the follow-up requirements, will be required during this period.
  - (9) When WET test sampling is required to run over one DMR period, each DMR report shall contain a copy of the Department's WET test report form that was generated during the reporting period.
  - (10) Submit a concise summary in tabular format of all WET test results with the annual report.
- (b) PASS/FAIL procedure and effluent limitations:
- (1) To pass a multiple-dilution test:
    - a) For facilities with a computed percent effluent at the edge of the zone of initial dilution, Allowable Effluent Concentration (AEC) OF 30% OR LESS, the AEC must be less than three-tenths (0.3) of the LC<sub>50</sub> concentration for the most sensitive of the test organisms; **OR**,
    - b) For facilities with an AEC greater than 30%, the LC<sub>50</sub> concentration must be greater than 100%; **AND**,
    - c) All effluent concentrations equal to or less than the AEC must be nontoxic. Mortality observed in all effluent concentrations equal to or less than the AEC shall not be significantly different (at the 95% confidence level; p = 0.05) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; p = 0.05) than that observed in the laboratory control. The appropriate statistical tests of significance shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms or other federal guidelines as appropriate or required. Failure of one multiple-dilution test may be considered an effluent limit violation.

D. SPECIAL CONDITIONS (continued)

(c) Test Conditions

- (1) Test Type: Acute Static non-renewal
- (2) All tests, including repeat tests for previous failures, shall include both test species listed below.
- (3) Test species: *Ceriodaphnia dubia* and *Pimephales promelas* (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.
- (4) Test period: 48 hours at the "Acceptable Effluent Concentration" (AEC) specified above.
- (5) Upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.
- (6) Multiple-dilution tests will be run with:
  - a) 100%, 50%, 25%, 12.5%, and 6.25% effluent, unless the AEC is less than 25% effluent, in which case dilutions will be 4 times the AEC, two times the AEC, AEC, 1/2 AEC and 1/4 AEC;
  - b) 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent; and
  - c) reconstituted water.
- (7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
- (8) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.

D. SPECIAL CONDITIONS (continued)

**SUMMARY OF TEST METHODOLOGY FOR WHOLE-EFFLUENT TOXICITY TESTS**

Whole-effluent-toxicity test required in NPDES permits shall use the following test conditions when performing single or multiple dilution methods. Any future changes in methodology will be supplied to the permittee by the Missouri Department of Natural Resources (MDNR). Unless more stringent methods are specified by the DNR, the procedures shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.

Test conditions for Ceriodaphnia dubia:

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light, 8 h dark
Size of test vessel:	30 mL (minimum)
Volume of test solution:	15 mL (minimum)
Age of test organisms:	<24 h old
No. of animals/test vessel:	5
No. of replicates/concentration:	4
No. of organisms/concentration:	20 (minimum)
Feeding regime:	None (feed prior to test)
Aeration:	None
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$ )
Test acceptability criterion:	90% or greater survival in controls

Test conditions for (Pimephales promelas):

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light/ 8 h dark
Size of test vessel:	250 mL (minimum)
Volume of test solution:	200 mL (minimum)
Age of test organisms:	1-14 days (all same age)
No. of animals/test vessel:	10
No. of replicates/concentration:	4 (minimum) single dilution method 2 (minimum) multiple dilution method
No. of organisms/concentration:	40 (minimum) single dilution method 20 (minimum) multiple dilution method
Feeding regime:	None (feed prior to test)
Aeration:	None, unless DO concentration falls below 4.0 mg/L; rate should not exceed 100 bubbles/min.
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$ )
Test Acceptability criterion:	90% or greater survival in controls

## E. SCHEDULES OF COMPLIANCE

### AMMONIA AS N

1. The final daily maximum and monthly average of Ammonia as N limits shall become effective three (3) years after the issue date of this permit. Therefore, modification to the facility must be made if required to meet the final effluent limits of this permit.
2. If modifications to the facility are required to meet the final effluent limits of this permit, the City of Memphis shall submit engineering plans, engineering specifications, and a construction permit application by **October 1, 2012**, for changes to the Memphis Municipal Wastewater Treatment Facility so the discharge from the facility will meet the final effluent limits for Ammonia as N.
3. If completion of construction will be more than one (1) year, the City of Memphis shall submit interim progress reports every 12 months from the issue date of the construction permit for the upgrades.
4. If the City of Memphis determines that modifications to the facility are not needed to meet the final effluent limits of this permit, the City of Memphis shall submit a letter to the department by **October 1, 2012**, stating that modifications are not needed for the Memphis Municipal Wastewater Treatment Facility to meet the final effluent limitations of this permit.
5. The Memphis Municipal Wastewater Treatment Facility will meet final effluent limits by **April 1, 2014**.

### HYDRAULIC OVERLOADING

1. The City of Memphis is to have an engineering study conducted to address the hydraulic overloading of the Memphis Municipal Wastewater Treatment Facility. The engineering study shall determine if upgrades or improvements to the facility and any rehabilitation of the collection system are needed. The City of Memphis shall submit this report to the Northeast Regional Office by **October 1, 2012** for review.
2. The City of Memphis will submit a proposal that lists the plan of action to be taken to comply with the findings of the engineering report, along with estimated costs for any actions to be taken. This shall include a timeframe for completing any needed rehabilitation of the collection system that has been identified. This proposal shall be submitted to the Northeast Regional Office by **October 1, 2012**.
3. The City of Memphis is to have completed the upgrades to the facility, mandated by the engineering study, by **April 1, 2014**. This deadline does not include the rehabilitation of the collection system, which is an on going process.

### 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.

**Missouri Department of Natural Resources**  
**Statement of Basis**  
**Memphis Municipal WWTF**  
**MO-0041173**

A Statement of Basis (Statement) gives pertinent information regarding the applicable regulations and rationale for the development of the NPDES Missouri State Operating Permit (operating permit). This Statement includes Wasteload Allocations, Water Quality Based Effluent Limitations, and Reasonable Potential Analysis calculations as well as any other calculations that effect the effluent limitations of this operating permit.

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

**Part I – Facility Information**

Facility Type: POTW  
Facility SIC Code(s): #4952

**Facility Description:**

The facility consists of a three-cell lagoon formed by baffle curtains with the sludge retained in the lagoon. There are two grinder pumps at the headwork of the facility. The design population equivalent is 2,143. The design flow is 214,300 gallons per day and the actual flow is 325,260 gallons per day based on the average of the submitted discharge monitoring reports. The design sludge production is 32.2 dry tons per year.

**OUTFALL(S) TABLE:**

OUTFALL	DESIGN FLOW (GPD)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
#001	214,300	equivalent to secondary	domestic wastewater	~ 4.8

**Receiving Water Body's Water Quality & Facility Performance History:**

No Low Flow Studies or Stream Surveys have been completed by the department for this facility. A water quality impact study for the facility was conducted by MEC Water Resources, Inc during the summer of 2006 and submitted to the department on Feb. 1, 2007. The study found that the facility did impact the receiving stream with minor sludge deposits, duckweed, and sestonic algae observed downstream of the outfall.

The facility was in compliance when it was last inspected by the department on July 6, 2009. This was a routine compliance inspection and Sanitary Sewer Overflow inspection. The inspector did not note any sludge, duckweed, or algae from the facility in the receiving stream. The inspector observed that the baffle curtains let just enough water over the top allowing floating material to float towards the outfall.

The facility was inspected in July 2010 by United States Environmental Protection Agency (USEPA). The facility was issued a Letter of Warning by USEPA on Oct. 27, 2010, for failing to maintain and calibrate the effluent flow meter. The inspector found the flow meter was grossly underestimating the effluent flow but was unable to determine the cause of the erroneous readings. The inspector observed the receiving stream at the outfall and did not observe any solids from the facility. The inspector expressed concern for the influent sampling location, as a representative sample could not be readily taken. The inspector found the facility was generally well maintained but expressed concern that it may be hydraulically overloaded.

The facility has met all permitted limits during the past permit cycle according to submitted discharge monitoring reports. The City of Memphis was sent a Letter of Warning on June 15, 2010, for reporting air temperature instead of reporting the effluent temperature on their Jan., Feb., March and April 2010 Discharge Monitoring Reports. A response was received from the city on June 28, 2010.

**Comments:**

According to a file review, the lagoon was originally built in 1969. The city upgraded the lagoon in 1985 by installing the baffle curtain dividers. It should be noted that in the 1985 engineering report titled Municipal Compliance Plan, the installation of the baffle curtains would be considered a temporary upgrade, "until grant and financing funds become available," and the report assumed probable funding in 1987. The design flow was reduced when the baffle curtains were installed by reducing the size of the primary cell. Short circuiting of the lagoon can occur if the curtains are not maintained and they sag under the surface, allowing water to flow freely from one cell to another.

The City continues to face severe Inflow and Infiltration (I & I) issues due to the age and condition of the collection system and the size of the lagoon. The City has replaced portions of the collection system in the past and has started a program of using smoke testing and cameras to observe possible I & I sources. The City will submit I & I progress reports semiannually. The City is not getting a Schedule of Compliance for I & I because they had a schedule of compliance in their previous permit to address I & I. An engineering study was to be conducted to determine locations of I & I, which was to be submitted to the Department by September 1, 2005, for review and it was to include cost estimates for needed repairs and a timeframe for completing the repairs. The City was sent a Letter of Warning on April 5, 2006, and a Notice of Violation on January 26, 2007, for not submitting the required report. The Department received a response on February 13, 2007, indicating the City had contacted Wade & Associates of Lawrence, Kansas for a cost estimate for an I & I study. An actual I & I study as outlined in the requirement was not received by the Department but a response received on September 25, 2007, was accepted in its place, indicating the City was performing smoke testing and would purchase a jetter and camera. The City is now getting a Schedule of Compliance for Hydraulic Overloading which will address the I & I issues.

The legal description of the facility has been updated. The previous legal description was based on the location of the entire lagoon; the updated legal description is based on the location of the outfall pipe.

**Part II A – Operator Certification Requirements**

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain their facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.030] and any other applicable state laws or regulations. As per [10 CSR 20-9.020(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, serving population equivalents greater than two hundred (200) or with fifty (50) or more service connections, as listed below:

- Owned or operated by or for:
  - Municipalities
  - Public Sewer District:
  - County
  - Public Water Supply Districts:
  - Private sewer company regulated by the Public Service Commission:
  - State or Federal agencies:

As per [10 CSR 20-9.020(2)(D)] this facility currently requires an operator with a Level D Certification. Please see **Appendix A - Classification Worksheet**. Modifications made to the wastewater treatment facility may cause the classification to be modified. According to the facility’s application, the current operator at the facility is:

Operator’s Name: Dennis Howard  
 Certification Number: 3182  
 Certification Level: D

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate records and determined that the name listed on the operating permit application has the correct and applicable Certification Level.

**Part II B – Operational Monitoring**

As per [10 CSR 20-9.010(4)], this facility is required to conduct operational monitoring.

**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 seven (7) categories listed below. Each category lists 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. The category of waters of the state the facility discharges to is:

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

10 CSR 20-7.031 Missouri Water Quality Standards, 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 1<sup>st</sup> 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**
Gunns Branch	U	N/A	General Criteria	07110002	Central Plains/ Cuivre/ Salt
North Fabius River	P	00056	IRR, LWW, AQL, SCR, DWS, 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), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Whole Body Contact Recreation (WBC), Industrial (IND), Groundwater (GRW).

\*\* - Ecological Drainage Unit

\*\*\* - UAA has not been conducted.

N/A – Not applicable.

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

**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.

- All limits in this statement are at least as protective as the previous established limits; therefore, backsliding does not apply.

**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.

- Renewal no degradation proposed and no further review necessary.

**AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:**

As per [10 CSR 20-6.010(3)(B)], ...An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

**BIOSOLIDS, 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. Additional information regarding biosolids and sludge is located at the following web address: <http://dnr.mo.gov/env/wpp/pub/index.html>, items WQ422 through WQ449.

- Sludge/biosolids are removed by contract hauler or are stored in the lagoon.

**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)].

Pretreatment programs are required at any POTW (or combination of POTW operated by the same authority) and/or municipality with a total design flow greater than 5.0 MGD and receiving industrial wastes that interfere with or pass through the treatment works or are otherwise subject to the pretreatment standards. Pretreatment programs can also be required at POTWs/municipals with a design flow less than 5.0 MGD if needed to prevent interference with operations or pass through.

Several special conditions pertaining to the permittee's pretreatment program may be included in the permit, and are as follows:

- Implementation and enforcement of the program,
- Annual pretreatment report submittal,
- Submittal of list of industrial users,
- Technical evaluation of need to establish local limitations, and
- Submittal of the results of the evaluation

Not Applicable  - The permittee, at this time, is not required to have a Pretreatment Program or does not have an approved pretreatment program.

**REASONABLE POTENTIAL ANALYSIS (RPA):**

Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric Water Quality Standard (WQS).

In accordance with [40 CFR Part 122.44(d)(iii)] if the permit writer determines that any given pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

Applicable  - A RPA was conducted for Ammonia as N and it was found that the facility is likely to cause an excursion above the applicable water quality criteria. Please see **APPENDIX B – RPA RESULTS**.

**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<sub>5</sub>) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals. 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 at [www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm](http://www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm)

Applicable  - Equivalent to Secondary Treatment is 65% removal [40 CFR Part 105(a)(3) & (b)(3)].

**SANITARY SEWER OVERFLOWS (SSO) AND INFLOW AND INFILTRATION (I&I):**

Sanitary Sewer Overflows (SSOs) are defined as an untreated or partially treated sewage release and they are considered bypassing under state regulation [10 CSR 20-2.010(11)] and should not be confused with the federal definition of bypass. SSOs have a variety of causes including blockages, line breaks, and sewer defects that allow excess storm water and ground water to (1) enter and overload the collection system, and (2) overload the treatment facility. Additionally, SSOs can be also be caused by lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. SSOs also include overflows out of manholes and onto city streets, sidewalks, and other terrestrial locations.

Additionally, Missouri RSMo §644.026.1 the Clean Water Commission mandates that the Department require proper maintenance and operation of treatment facilities and sewer systems and proper disposal of residual waste from all such facilities.

Applicable  - In accordance with Missouri RSMo §644.026.1.(15) and 40 CFR Part 122.41(e), the permittee is required to develop and/or implement a program for maintenance and repair of the collection system in this operating permit by either means of a Special Condition or Schedule of Compliance. In addition, the Department considers the development of this program as an implementation of this condition. Additionally, 40 CFR Part 403.3(o) defines a POTW to include any device and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW Treatment Plant.

At this time, the department recommends the US EPA's Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (Document # EPA 305-B-05-002). The CMOM identifies some of the criteria used by the EPA to evaluate a collection system's management, operation, and maintenance and was intended for use by the EPA, state, regulated community, and/or third party entities. The CMOM is applicable to small, medium, and large systems; both public and privately owned, and both regional and satellite collection systems. The CMOM does not substitute for the Clean Water Act, the Missouri Clean Water Law, or any federal and state regulations, as it is not a regulation but a guidance document.

**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.

Applicable  - The facility has been given two Schedules of Compliance to address hydraulic overloading, including I & I issues, and to meet Ammonia Limits. The City of Memphis has been given 18 months to submit an engineering plan for facility upgrades, to be implemented upon Department approval. The facility has been given three (3) years to upgrade in order to meet the final effluent limitation parameter of Ammonia as N, which was established in accordance with [10 CSR 20-7.031(10)]. The timeframe and schedule of events for both schedules of compliance are the same to simplify upgrading the facility. Only one set of engineering plans, engineering specifications, construction permit application and interim reports will need to be submitted as long as all concerned issues are addressed. The hydraulic SOC was updated to include a timeline for the rehabilitation of the collection system. The three year deadline does not apply to the completion of the rehabilitation of the collection system, as this is an on going project, which may take years to accomplish.

**WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:**

As per [10 CSR 20-2.010(78)], the amount of pollutants each discharger is allowed by the department to release into a given stream after the department has determined the total amount of pollutants 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:

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

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). Acute wasteload allocations were determined using applicable water quality criteria (CMC: Criteria Maximum Concentration).

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).

Number of Samples "n": Additionally, in accordance with the TSD for water quality-based permitting, effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying distribution or treatment performance, which should be, at a minimum, targeted to comply with the values dictated by the WLA. Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of "n" for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for "n" must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is "n = 4" at a minimum. For Ammonia as Nitrogen, "n = 30" is used.

**WATER QUALITY STANDARDS:**

Per [10 CSR 20-7.031(3)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the department to establish in each NPDES permit conditions to achieve water quality as established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

**WHOLE EFFLUENT TOXICITY (WET) TEST:**

A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

Applicable  - Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in 10 CSR 20-6.010(8)(A)7., and the Water Quality Standards 10 CSR 20-7.031(3)(D),(F),(G),(I)2.A & B are being met. Under 10 CSR 20-6.010(8)(A)4, the department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act (CWA) and related regulations of the Missouri Clean Water Commission. In addition the following RSMo apply: §644.051.3 requires the department to set permit conditions that comply with the Missouri Clean Water Law and CWA; §644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc...); and §644.051.5 is the basic authority to require testing conditions. WET testing will be required by all facilities meeting any of the following criteria:

- Facility is a designated Major.
- Facility continuously or routinely exceeds its design flow.
- Facility (industrial) that alters its production process throughout the year.
- Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
- Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH<sub>3</sub>)
- Facility is a municipality or domestic discharger with a Design Flow ≥ 22,500 gpd.

**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.

Applicable  - The North Fabius River is listed on the 1998 and 2002 Missouri 303(d) List for sediment from agricultural non-point sources. A TMDL for the North Fabius River was developed and approved by USEPA in 2006.

The TMDL considered all the wastewater facilities within the watershed of the North Fabius River and based on the assessment of all sources, determined that point sources do not contribute to the water quality impairment relative to sediment impacts on the stream biology. This facility, being a point source, is not considered to contribute to the impairment of the North Fabius River and therefore permitted limitations are not being modified due to the impairment.

**40 CFR 122.41(M) - BYPASSES:**

The federal Clean Water Act (CWA), Section 402 prohibits wastewater treatment facilities from “bypassing” untreated or partially treated sewage (wastewater) beyond the headworks. A bypass, which includes blending, is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-2.010(11) defines a bypass as the diversion of wastewater from any portion of a wastewater treatment facility or sewer system to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting requirements in 40 CFR 122.41(l)(6) and per Missouri’s Standard Conditions I, Section B, part 2.b. Additionally, anticipated bypasses include bypasses from peak flow basins or similar structures.

Not Applicable  - This facility does not bypass.

**Part V – Effluent Limits Determination**

**Outfall #001 – Main Facility Outfall**

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

**EFFLUENT LIMITATIONS TABLE:**

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
Flow	MGD	1	*		*	NO	S
Biochemical Oxygen Demand <sub>5</sub>	mg/L	1/4		65	45	NO	S
Total Suspended Solids	mg/L	1/4		120	80	NO	S
pH	SU	1/4	≥ 6.5		≥ 6.5	YES	≥ 6.0
Temperature	°C	1/5/9	*		*	NO	S
Ammonia as N (Interim)	mg/L	2/3/5	*		*	NO	S
Ammonia as N (Final) Summer (May 1 – Oct 31)	mg/L	2/3/5	12.1		3.1	YES	*
Ammonia as N (Final) Winter (Nov 1 – Apr 30)	mg/L	2/3/5	12.1		3.7	YES	*
Oil & Grease	mg/L	1/9	15		10	N/A	**
Rainfall	inches	9	*			N/A	**
Whole Effluent Toxicity (WET) Test		11	Please see WET Test in the Derivation and Discussion Section below.				
Monitoring Frequency	Please see Minimum Sampling and Reporting Frequency Requirements in the Derivation and Discussion Section below.						

\* - Monitoring requirement only

\*\* - Parameter was not established in previous state operating permit.

N/A – Not applicable

S – Same as previous operating permit

Basis for Limitations Codes:

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

**OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:**

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification.
- **Biochemical Oxygen Demand (BOD<sub>5</sub>).** Effluent limitations from the previous state operating permit have been reassessed and verified that they are still protective of the receiving stream’s Water Quality. Therefore, effluent limitations have been retained from previous state operating permit. [10 CSR 20-7.015(8)(A)3.A]
- **Total Suspended Solids (TSS).** Effluent limitations from the previous state operating permit have been reassessed and verified that they are still protective of the receiving stream’s Water Quality. Therefore, effluent limitations have been retained from previous state operating permit. [10 CSR 20-7.015(8)(A)3.A]
- **pH.** Effluent limitations have been modified to reflect the change in the Code of State Regulations. [10 CSR 20-7.015(8)(A)3.A]
- **Temperature.** Monitoring requirement due to the toxicity of Ammonia varies by temperature. [10 CSR 20-7.031(4)(B)7]
- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3]. Default pH 7.8 SU; Background total ammonia nitrogen = 0.01 mg/L. Chronic criterion does not apply to unclassified streams, therefore ammonia oxidation (decay) allowed to the confluence with the first classified stream segment for chronic criterion only when calculating the limits. The acute criterion applies to unclassified streams.

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

$C_e = [NH_3N] / e^{-kt}$ ; where  $C_e$  is the ammonia concentration at the outfall;  $[NH_3N]$  is the allowed ammonia concentration at the confluence with the classified segment;  $k$  is the ammonia oxidation constant with temperature correction factor and equals  $(0.3)(1.083)^{(Temp-20)}$ ; and  $t$  is the time for effluent to travel to the first classified segment in days. Travel time of 3.55 days was submitted by the facility.

Summer: May 1 – October 31

Given  $k = (0.3)(1.083)^{(26-20)} = 0.4841$  and  $t = 3.55$  days;  $e^{-kt} = e^{-(0.4841)(3.55)} = e^{-1.718} = 0.1794$ .

Which means 17.9% of the ammonia concentration remains after leaving the facility and reaching the first classified stream segment.

Chronic WLA:  $C_e = (1.5 \text{ mg/L}) / 0.1794$   
 $C_e = 8.36 \text{ mg/L}$

Acute WLA:  $C_e = 12.1 \text{ mg/L}$

$LTA_c = 8.36 \text{ mg/L} (0.639) = 5.34 \text{ mg/L}$  [CV = 1.12, 99th Percentile, 30 day average]  
 $LTA_a = 12.1 \text{ mg/L} (0.185) = \mathbf{2.24 \text{ mg/L}}$  [CV = 1.12, 99th Percentile]

Use most protective number of  $LTA_c$  or  $LTA_a$ .

MDL =  $2.24 \text{ mg/L} (5.40) = 12.10 \text{ mg/L}$  [CV = 1.12, 99th Percentile]  
 AML =  $2.24 \text{ mg/L} (1.37) = 3.07 \text{ mg/L}$  [CV = 1.12, 95th Percentile, n = 30]

Winter: November 1 – April 30

Given  $k = (0.3)(1.083)^{(6-20)} = 0.0982$  and  $t = 3.55$  days;  $e^{-kt} = e^{-(0.0982)(3.55)} = e^{-0.349} = 0.7055$ .

Which means 70.6% of the ammonia concentration remains after leaving the facility and reaching the first classified stream segment.

Chronic WLA:  $C_e = (3.1 \text{ mg/L}) / 0.7055$   
 $C_e = 4.39 \text{ mg/L}$

Acute WLA:  $C_e = 12.1 \text{ mg/L}$

$LTA_c = 4.39 \text{ mg/L} (0.709) = 3.11 \text{ mg/L}$  [CV = 0.84, 99th Percentile, 30 day average]  
 $LTA_a = 12.1 \text{ mg/L} (0.238) = \mathbf{2.88 \text{ mg/L}}$  [CV = 0.84, 99th Percentile]

Use most protective number of  $LTA_c$  or  $LTA_a$ .

MDL =  $2.88 \text{ mg/L} (4.20) = 12.10 \text{ mg/L}$  [CV = 0.84, 99th Percentile]  
 AML =  $2.88 \text{ mg/L} (1.27) = 3.66 \text{ mg/L}$  [CV = 0.84, 95th Percentile, n = 30]

Season	Maximum Daily Limit (mg/L)	Average Monthly Limit (mg/L)
Summer	12.1	3.1
Winter	12.1	3.7

- **Oil & Grease.** Conventional pollutant. Effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. [10 CSR 20-7.031(4)(B)1 & Table A]
- **Rainfall.** Daily monitoring requirement at the lagoon due to the facility routinely exceeding its design flow. IT is noted that 407,286 gallons of water are added directly to the lagoon for each inch of rain that falls on it, not including run off from the berm area. Daily rainfall data at the lagoon will help determine the percentage of high flows attributed to I&I issues in the collection system and direct contribution to the lagoon.

- **WET Test.** WET Testing schedules and intervals are established in accordance with the department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring*. It is recommended that WET testing be conducted during the period of lowest stream flow.
  - Chronic
  - Acute
  - No less than ONCE/PERMIT CYCLE:**
    - Municipality or domestic facility with a design flow  $\geq$  22,500 gpd, but less than 1.0 MGD.
    - Other, please justify.
  - No less than ONCE/YEAR:**
    - Facility is designated as a Major facility or has a design flow  $\geq$  1.0 MGD.
    - Facility continuously or routinely exceeds their design flow.
    - Facility exceeds its design population equivalent (PE) for BOD<sub>5</sub> whether or not its design flow is being exceeded.
    - Facility has Water Quality-based effluent limitations for toxic substances (other than NH<sub>3</sub>).
  - No less than TWICE/YEAR:**
    - Facility is subject to production processes alterations throughout the year.
    - Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
    - Facility has been granted seasonal relief of numeric limitations.
- **Minimum Sampling and Reporting Frequency Requirements.** Sampling and reporting frequency requirements have been retained from the previous state operating permit.

## **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.

**Date of Statement of Basis:** 4/30/10 **Updated:** 6/23/10; 7/29/10, 10/6/10, 12/16/10, 3/23/11

**Date of Public Notice:** February 18, 2011

Submitted by:

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Terrie Burch

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Date

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Brant Farris

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Date

TB/mm

**Part VII – Appendices**

**APPENDIX A - CLASSIFICATION WORKSHEET:**

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Maximum Population Equivalent (P.E.) served (Max 10 pts.)	1 pt. / 10,000 PE or major fraction thereof.	0.2
Maximum: 10 pt Design Flow (avg. day) or peak month; use greater (Max 10 pts.)	1 pt. / MGD or major fraction thereof.	0.5
<b>EFFLUENT DISCHARGE RECEIVING WATER SENSITIVITY:</b>		
Missouri or Mississippi River	0	-
All other stream discharges except to losing streams and stream reaches supporting whole body contact	1	1
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	-
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	-
<b>PRELIMINARY TREATMENT – Headworks</b>		
Screening and/or comminution	3	-
Grit removal	3	-
Plant pumping of main flow (lift station at the headworks)	3	3
<b>PRIMARY TREATMENT</b>		
Primary clarifiers	5	-
Combined sedimentation/digestion	5	-
Chemical addition (except chlorine, enzymes)	4	-
<b>REQUIRED LABORATORY CONTROL – performed by plant personnel (highest level only)</b>		
Lab work conducted outside of plant	0	-
Push – button or visual methods for simple test such as pH, settleable solids	3	-
Additional procedures such as DO, COD, BOD, titrations, solids, volatile content	5	5
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	7	-
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	-
<b>ALTERNATIVE FATE OF EFFLUENT</b>		
Direct reuse or recycle of effluent	6	-
Land Disposal – low rate	3	-
High rate	5	-
Overland flow	4	-
<b>Total from page ONE (1)</b>	----	9.7

**APPENDIX A - CLASSIFICATION WORKSHEET (CONTINUED):**

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
<b>VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)</b>		
Variation do not exceed those normally or typically expected	0	-
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	2
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	-
Raw wastes subject to toxic waste discharge	6	-
<b>SECONDARY TREATMENT</b>		
Trickling filter and other fixed film media with secondary clarifiers	10	-
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	-
Stabilization ponds without aeration	5	5
Aerated lagoon	8	-
Advanced Waste Treatment Polishing Pond	2	-
Chemical/physical – without secondary	15	-
Chemical/physical – following secondary	10	-
Biological or chemical/biological	12	-
Carbon regeneration	4	-
<b>DISINFECTION</b>		
Chlorination or comparable	5	-
Dechlorination	2	-
On-site generation of disinfectant (except UV light)	5	-
UV light	4	-
<b>SOLIDS HANDLING – SLUDGE</b>		
Solids Handling Thickening	5	-
Anaerobic digestion	10	-
Aerobic digestion	6	-
Evaporative sludge drying	2	-
Mechanical dewatering	8	-
Solids reduction (incineration, wet oxidation)	12	-
Land application	6	-
<b>Total from page TWO (2)</b>	<b>----</b>	<b>7</b>
<b>Total from page ONE (1)</b>	<b>---</b>	<b>9.7</b>
<b>Grand Total</b>	<b>---</b>	<b>16.7</b>

- A: 71 points and greater
- B: 51 points – 70 points
- C: 26 points – 50 points
- D: 0 points – 25 points

**APPENDIX B – RPA RESULTS:**

CONSTITUENT	CMC*	CCC*	RWC *	REASONABLE POTENTIAL	# OF SAMPLES**	CV***
Ammonia as N - Summer (May 1 – Oct 31)	12.1	1.5	57.15	YES	31	1.12
Ammonia as N - Winter (Nov 1 – Apr 30)	12.1	3.1	78.43	YES	31	0.843

\* - Units are mg/L.

\*\* - If the number of samples is greater than 10, then the CV value must be used in the WQBEL for the applicable constituent.

\*\*\* - Coefficient of Variation (CV) is calculated by dividing the Standard Deviation ( $\sigma$ ) of the sample set by the Mean ( $\mu$ ) of the same sample set.

CMC - Criteria Maximum Concentration. It is the maximum acute concentration of the constituent allowed in the receiving water as specified by 10 CSR 20-7.031.

CCC - Criteria Continuous Concentration. It is the maximum chronic concentration of the constituent allowed in the receiving stream as specified by 10 CSR 20-7.031.

RWC – Receiving Water Concentration. It is the projected maximum concentration of the constituent discharged from the facility calculated from available data.

Reasonable Potential Analysis was conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2).

**Step 1** Determine the number of total Observations (“n”) for a particular set of effluent data and determine the highest value from that data set.

Summer: n = 31; max = 18.8 mg/L

Winter: n = 31; max = 31.7 mg/L

**Step 2** Determine the coefficient of variation for the data set. For a data set where n < 10, the coefficient of variation (CV) is estimated to equal 0.6, or the CV is calculated from data obtained from the discharger. For a data set where n > 10, the CV is calculated as the standard deviation/mean. For data sets with less than 10 items, the uncertainty in the CV is too large to calculate a standard deviation or mean with sufficient confidence, therefore a default CV is used.

$$CV = \sigma / \mu$$

Summer:  $\sigma = 4.515$

$\mu = 4.049$

CV = 4.515/4.049 = 1.12

Winter:  $\sigma = 6.229$

$\mu = 7.393$

CV = 6.229/7.393 = 0.84

**Step 3** Determine the appropriate ratio from Table 3-1, 3-2, or using the appropriate equation, the tables are based on.

Summer: 3.040

Winter: 2.474

**Step 4** Multiply the highest value from a data set by the value from Table 3-1 or 3-2. Use this value with the appropriate dilution to project a maximum receiving water concentration (RWC).

Unclassified stream, therefore no dilution allowed.

Summer: 18.8 mg/L X 3.040 = 57.15 mg/L

Winter: 31.7 mg/L X 2.474 = 78.43 mg/L

**Step 5** Compare the projected maximum RWC to the applicable standard (criteria maximum concentration [CMC], criteria continuous concentration [CCC], or reference ambient concentration). EPA recommends that permitting authorities find reasonable potential when the projected RWC is greater than an ambient criterion.

Summer: 57.2 > 12.1 (acute); 57.2 > 1.5 (chronic)

Winter 78.4 > 12.1 (acute); 78.4 > 3.1 (chronic)

There is a reasonable potential for the facility to cause an excursion above the CMC and the CCC, therefore limits will be given for Ammonia as N.