

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-0055590

Owner: City of Greenfield  
Address: 115 S. Main Street, Greenfield, MO 65661

Continuing Authority: Same as Above  
Address: Same as Above

Facility Name: Greenfield West WWTF (Sharpe) **Class D Operator Required**  
Facility Address: Hwy BB, Greenfield MO 65661

Legal Description: SE $\frac{1}{4}$ , NW $\frac{1}{4}$ , SW $\frac{1}{4}$ , Sec. 13, T31N, R27W, Dade County  
Lat / Long: +3725175 / -09351255

Receiving Stream: Unnamed Tributary to Wetzel Branch (U)  
First Classified Stream and ID: Sons Creek (P) (01375)  
USGS Basin & Sub-watershed No.: (10290106-040002)

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

See Page 2 and 3

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.

July 31, 2008                      June 1, 2009  
Effective Date                      (Revised)

  
Mark N. Templeton, Director Department of Natural Resources

July 30, 2013  
Expiration Date

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Cynthia S. Davies, Regional Director, Southwest Regional Office

**FACILITY DESCRIPTION (continued)**

Outfall #001 – Irrigation System Design  
Partial discharge System

Two cell storage lagoon / wastewater irrigation / sludge is retained in lagoon.

Design organic population equivalent is 1,280.  
 Design flow is 128,000 gallons per day (1-in-10 year design flow including net rainfall minus evaporation).  
 Design average daily flow is 107,967 gallons per day (dry weather flows).  
 Design sludge production is 19.2 dry tons/year.

Outfall #002 – Eliminated

Discharge from this peak flow outfall are no longer authorized. Future discharges must be reported as a bypass in accordance with Standard Conditions Part I, Section B, item 5.

**IRRIGATION SYSTEM DESIGN**

Outfall #001

**Receiving Stream Watershed:** a gaining stream setting

**Facility Type:** Partial Irrigation System for irrigation and discharges of excess flows from March through November and a permitted lagoon discharge from November through February.

**Storm Water Flows: (Dade County)**

Average Annual Rainfall: 40.25 inches  
 1-in-10 Year Annual Rainfall: 52.00 inches  
 25-year-24-hour storm: 6.6 inches

1-in-10 Year Flows: Annual  
 Runoff from earth areas: (lagoon berm, lots, etc.) 2.5 ft  
 Rainfall minus evaporation (R-E) on lagoon water surface: 1.6 ft  
 Berm top width: 10 feet Berm runoff area (centerline to emergency spillway): 30,287.6 sq.ft.  
 1-in-10 year annual storm water flows into lagoon (R-E): 977,553 cu.ft. (7,295,172 gallons)

**Cell #001**

<b><u>Lagoon Dimensions:</u></b>	<b><u>(Length x Width)</u></b>	<b><u>Surface Area</u></b>	<b><u>Depth from Bottom</u></b>
Inside Top Berm:	Irregular	308,247 sq.ft.	by <u>8</u> feet depth
Emergency Spillway:	Irregular	286,439 sq.ft.	by <u>6</u> feet depth
Freeboard: (top berm to spillway):			<u>2</u> feet depth
Maximum operating level:			<u>5</u> feet depth
Minimum operating level:			<u>2</u> feet depth
Storage volume (minimum to maximum water levels) <u>5,842,906</u> gallons			

**Cell #001**

<b><u>Lagoon Dimensions:</u></b>	<b><u>(Length x Width)</u></b>	<b><u>Surface Area</u></b>	<b><u>Depth from Bottom</u></b>
Inside Top Berm:	Irregular	298,662 sq.ft.	by <u>8</u> feet depth
Emergency Spillway:	Irregular	277,202 sq.ft.	by <u>6</u> feet depth
Freeboard: (top berm to spillway):			<u>2</u> feet depth
Maximum operating level:			<u>5</u> feet depth
Minimum operating level:			<u>2</u> feet depth
Storage volume (minimum to maximum water levels) <u>5,645,394</u> gallons			

**FACILITY DESCRIPTION (continued)**

**Storage Capacity:**                      **Average Annual**

Design for dry weather flows:              106 days  
Design with 1-in-10 year flows:           101 days

**Land Application:**

Irrigation volume per year:                  39,407,955 gallons (including 1-in-10 year flows)  
Irrigation areas:                                60.5 acres at design loading  
Application rates per acre:                  0.2 inch / hour; 1.0 inch / day; 3.0 inches / week; 24 inches / year >  
Field slopes:                                    less than 8 percent  
Equipment type:                                traveling gun  
Vegetation:                                      grass land  
Application rate is based on:                hydraulic loading rate

**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 interim effluent limitations shall become effective upon issuance and remain in effect until **September 30, 2009**. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	INTERIM LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u> – Emergency & Seasonal discharge from lagoon or irrigation sites (Note 1)						
Flow	MGD	*		*	once/day**	24 hr. estimate
Biochemical Oxygen Demand <sub>5</sub>	mg/L		65	45	once/month**	****
Total Suspended Solids	mg/L		110	70	once/month**	****
pH – Units	SU	***		***	once/month**	grab
Fecal Coliform	#/100mL	****		****	once/month**	grab
Ammonia Nitrogen as N	mg/L	****		****	once/month**	grab
Temperature (degrees)	C°	****		****	once/month**	grab
Dissolved Oxygen	mg/L	*		*	once/month**	grab
Oil & Grease	mg/L	*		*	once/month**	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE **July 28, 2009**.

Whole Effluent Toxicity (WET) Test	% survival	See Special Conditions #12			Once/permit cycle	24 hr. composite
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MONITORING REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE **December 2010**.

Outfall #001 – Land Application Operational Monitoring (Notes 2 & 3)

Lagoon Freeboard	feet	*			once/month	measured
Irrigation Period	hours	*			daily	total
Volume Irrigated	gallons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	inches / acre	*			daily	total
Rainfall	inches	*			daily	total

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE **July 28, 2009**.

Outfall #001 – Irrigated Wastewater (Notes 4 & 5)

pH – Units	SU	***			once/quarter	grab
Total Kjeldahl Nitrogen as N	mg/L	*			once/quarter	grab
Nitrate / Nitrite as N	mg/L	*			once/quarter	grab
Ammonia Nitrogen as N	mg/L	*			once/quarter	grab
Total Phosphorus as P	mg/L	*			once/quarter	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE **July 28, 2009**. THERE SHALL BE NO DISCHARGE OF FLOATING OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 5 of 16	
					PERMIT NUMBER MO-0055590	
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 <b>October 1, 2009</b> 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> – Emergency & Seasonal discharge from lagoon or irrigation sites (Note 1)						
Flow	MGD	*		*	once/day**	24 hr. estimate
Biochemical Oxygen Demand <sub>5</sub>	mg/L		65	45	once/month**	****
Total Suspended Solids	mg/L		110	70	once/month**	****
pH – Units	SU	***		***	once/month**	grab
Fecal Coliform	#/100mL	****		****	once/month**	grab
Ammonia Nitrogen as N	mg/L	****		****	once/month**	grab
Temperature (degrees)	C°	****		****	once/month**	grab
Dissolved Oxygen	mg/L	*		*	once/month**	grab
Oil & Grease	mg/L	15		10	once/month**	grab
MONITORING REPORTS SHALL BE SUBMITTED <b>QUARTERLY</b> ; THE FIRST REPORT IS DUE <b>January 28, 2010</b> .						
Whole Effluent Toxicity (WET) Test	% survival	See Special Conditions #12			Once/permit cycle	24 hr. composite
MONITORING REPORTS SHALL BE SUBMITTED <b>ONCE PER PERMIT CYCLE</b> ; THE FIRST REPORT IS DUE <b>December 2010</b>						
<u>Outfall #001</u> – Land Application Operational Monitoring (Note 2 & 3)						
Lagoon Freeboard	feet	*			once/month	measured
Irrigation Period	hours	*			daily	total
Volume Irrigated	gallons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	inches / acre	*			daily	total
Rainfall	inches	*			daily	total
MONITORING REPORTS SHALL BE SUBMITTED <b>QUARTERLY</b> ; THE FIRST REPORT IS DUE <b>January 28, 2010</b> .						
<u>Outfall #001</u> – Irrigated Wastewater (Notes 4 & 5)						
pH – Units	SU	***			once/quarter	grab
Total Kjeldahl Nitrogen as N	mg/L	*			once/quarter	grab
Nitrate / Nitrite as N	mg/L	*			once/quarter	grab
Ammonia Nitrogen as N	mg/L	*			once/quarter	grab
Total Phosphorus as P	mg/L	*			once/quarter	grab
MONITORING REPORTS SHALL BE SUBMITTED <b>QUARTERLY</b> ; THE FIRST REPORT IS DUE <b>January 28, 2010</b> . THERE SHALL BE NO DISCHARGE OF FLOATING OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
<b>B. STANDARD CONDITIONS</b>						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I &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.
- \*\* 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 to be maintained at or above 6.0 pH units.
- \*\*\*\* Comply with water quality standards per Special Conditions #5.
- \*\*\*\*\* Measure depth of groundwater as feet below the ground surface.
- \*\*\*\*\* A composite sample made up from a minimum of four grab samples collected within a 24-hour period with a minimum of two hours between each grab sample.

Note 1 Partial Irrigation Facility requirements: Wastewater shall be irrigated during the growing season whenever feasible. A discharge may occur when an excess wastewater has accumulated above feasible irrigation rates during March through October. Discharge is permitted from November through February.

Note 1 Partial Irrigation (consumptive irrigation): Wastewater shall be used during the growing season for consumptive irrigation on cropland when additional water is needed to supply crop moisture requirements. Wastewater flows exceeding consumptive irrigation needs will be discharged.

Note 2 Records shall be maintained and summarized into an annual operating report, which shall be submitted by **January 28<sup>th</sup>** of each year for the previous calendar year. The report shall include the following:

- a. Record of maintenance and repairs 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 number of days the lagoon has discharged during the year, the discharge flow, the reasons discharged occurred and effluent analysis performed; and
- c. A summary of the irrigation operations including freeboard at the start and end of the irrigation season, the number of days of irrigation for each month, the total gallons irrigated, the total acres used, crops grown, crop yields per acre, the application rate in inches per acre per day and for the year, the monthly and annual precipitation received at the facility and summary of testing results.

Note 3 – Lagoon freeboard shall be reported as lagoon 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 – Monitor once per quarter in the months of March, June, September, and December.

<b>C. INFLUENT MONITORING REQUIREMENTS</b>		PAGE NUMBER 7 of 16	
		PERMIT NUMBER MO-0055590	
The facility is required to meet a removal efficiency of <b>65% or more during the months of November through February</b> . 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> (Note 1)			
Biochemical Oxygen Demand <sub>5</sub>	mg/L	once / month**	****
Total Suspended Solids	mg/L	once / month**	****
MONITORING REPORTS SHALL BE SUBMITTED <b><u>QUARTERLY</u></b> ; THE FIRST REPORT IS DUE <b><u>July 28, 2009</u></b> .			

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

\*\* Reports shall be submitted by the 28<sup>th</sup> day of the month following the reporting period, e.g. Reporting period is the month of March, report due by April 28<sup>th</sup>. Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period.

\*\*\*\* A composite sample made up from a minimum of four grab samples collected within a 24-hour period with a minimum of two hours between each grab sample.

Note 1 - Influent monitoring is required during the months of permitted discharge (November through February) to determine the removal efficiency.

**D. SPECIAL CONDITIONS**

1. Report as no-discharge when a discharge does not occur during the reporting period.
2. Outfalls must be marked in the field and on the topographic site map submitted with the permit application.
3. Permittee will cease discharge by connection to area wide wastewater treatment system within 180 days of notice of its availability.
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 for 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.

C. SPECIAL CONDITIONS (continued)

5. Water Quality Standards

- (a) Discharges to waters of the state shall not cause a violation of water quality standards rule 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.

6. 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.

D. SPECIAL CONDITIONS (continued)

7. Lagoons and earthen basins shall have a liner that is designed, constructed and maintained in accordance with 10 CSR 20-8.020(13)(A)4. If operating records indicate, excessive percolation, the department may require a water balance test in accordance with 10 CSR 20-8.020(16) or other investigations to evaluate adequacy of the lagoon seal. The department may require corrective action as necessary to eliminate excess leakage.
8. The permittee shall develop and implement a program for maintenance and repair of the collection system in accordance with the US EPA's Guide For Evaluating Capacity, Management, Operation, And Maintenance (CMOM) Programs At Sanitary Sewer Collection Systems (Document number EPA 305-B-05-002). The permittee shall submit a report semi-annually 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 City's collection system.
9. The permittee shall comply with any applicable requirements listed in 10 CSR 20-8 and 10 CSR 20-9. 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.
10. Wastewater Irrigation System
  - (a) Discharge Reporting. Any unauthorized discharge from the lagoon 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) Irrigation Design. Permittee shall operate the land application system in accordance with 10 CSR 20-8.020(15). Permittee shall operate the land application system in accordance with the design parameters listed in the Facility Description section of this permit:
    - (1) Partial Irrigation System. When the Facility Description is "Partial Irrigation" or combined irrigation and discharge, wastewater will be irrigated when feasible and discharges are allowed as specifically authorized under the Effluent Limitations and Monitoring Requirements in Section A of this permit.
  - (c) Lagoon Operating Levels – No-discharge Systems. The minimum and maximum operating water levels for the storage lagoon shall be clearly marked. Each lagoon shall be operated so that the maximum water elevation does not exceed one foot (1') below the overflow point except due to any exceedance of the 1-in-10 year or 25-year-24-hour rainfall events. Wastewater shall be land applied whenever feasible based on soil and weather conditions and permit requirements. Storage lagoon(s) shall be lowered to the minimum operating level prior to each winter by November 30<sup>th</sup>.
  - (d) Emergency Spillway. Lagoons 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 (1') below the top of berm. The department may waive the requirement for overflow structures on small existing basins.
  - (e) 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.
  - (f) Saturated / Frozen Conditions. There shall be no irrigation during frozen, snow covered, or saturated soil conditions. There shall be no irrigation on days when more than 0.2 inches of precipitation is received or when there is observation by operator of an imminent or impending rainfall event.
  - (g) 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 dwellings; or 50 feet of the property line.
  - (h) Public Access Restrictions. Public access shall not be allowed to the irrigation site(s). Fencing and public access restrictions to land application sites shall be in accordance with requirements in 10 CSR 20-8.020(15)(B)(5).

D. SPECIAL CONDITIONS (continued)

- (i) Equipment Checks During Irrigation. The irrigation system and application site shall be visually inspected at least once per day during wastewater irrigation to check for equipment malfunctions and runoff from the irrigation site.
- (j) 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 the departments' Water Pollution Control Program and the appropriate Regional Office for review and approval. The O&M Manual shall be reviewed and updated at least every five years.
- (k) Nitrogen Loading Rates. Wastewater irrigation rates shall not exceed a nitrogen application rate of 150 pounds total nitrogen per acre per year. The calculation procedures are as follows:  $(\text{Total N}) \times (0.226) \times (\text{inches per acre irrigated}) = \text{pounds total N per acre}$ . Where  $\text{Total N} = [\text{Total Kjeldahl Nitrogen (TKN) as N}] + [\text{Nitrate Nitrogen as N}]$ . If the applied wastewater exceeds 150 pounds total nitrogen per acre/year or if the applied wastewater exceeds ten (10) mg/L of nitrate nitrogen as N, 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. PAN availability factors for surface application are:  $[\text{Ammonia N} \times 0.6] + [\text{Nitrate N} \times 0.9] + [\text{Organic N} \times 0.6] = \text{PAN}$ .
- (l) Public Access Restrictions. Public access shall not be allowed to the irrigation site(s). Fencing and public access restrictions to land application sites shall be in accordance with requirements in 10 CSR 20-8.020(15)(B)(5).
- (m) Equipment Checks During Irrigation. The irrigation system and application site shall be visually inspected at least once per hour during wastewater irrigation to check for equipment malfunctions and runoff from the irrigation site.
- (n) 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 the departments' Water Pollution Control Program and the appropriate Regional Office for review and approval. The O&M Manual shall be reviewed and updated at least every five years.

11. Nutrient Management

- (a) Nitrogen. The permittee shall not exceed the plant available nitrogen management approach as listed in this permit.
- (b) Phosphorus. When soil test phosphorus (P) levels are above 120 pounds per acres using Bray P-1 test method, the sludge application rate shall not exceed the annual crop requirements for available phosphorus in accordance with state NRCS guidelines. When state NRCS standards and guidelines become available, the permit will be revised to include the Phosphorus Threshold and Phosphorus Index methods to be developed under the USDA, NRCS National Policy, General Manual, Part 402.06.
- (c) The actual application rates for a given year or growing season must be adjusted based on the approved management approach and the actual sludge and soil testing results and crop requirement. If crop yields are less than that predicted in the permit application, the application rates must be reduced or the yields increased through appropriate changes in management practice.
- (d) This permit will be modified to require a Nutrient Management Plan (NMP) after promulgation of applicable state, EPA and USDA rules and guidelines. The NMP will replace the current PAN and phosphorus methods.

12. Whole Effluent Toxicity (WET) tests shall be conducted as follows:

SUMMARY OF WET TESTING FOR THIS PERMIT				
OUTFALL	A.E.C. %	FREQUENCY	SAMPLE TYPE	MONTH
001	100%	Once per permit cycle	24 hour composite	<b>December 2010</b>

\* Sample only once either in the months of July, August, or September

D. SPECIAL CONDITIONS (continued)

(a) Test Schedule and Follow-Up Requirements

- (1) Perform a single-dilution 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 stormwater, samples shall be collected within three hours from when discharge first occurs.
  - b. Samples submitted for analysis of stormwater discharges shall be collected as a grab.
  - c. For discharges of non-stormwater, 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.
  - d. A twenty-four hour composite sample shall be submitted for analysis of non-stormwater 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.
  - 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.
- (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 within 30 calendar days and biweekly thereafter, 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 three multiple-dilution tests during any period of accelerated monitoring violates the permit narrative requirement for aquatic life protection.
- (5) The permittee shall submit a CONCISE summary of all test results for the test series 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.

D. SPECIAL CONDITIONS (continued)

(10) Submit a concise summary in tabular format of all test results with the annual report.

(b) PASS/FAIL procedure and effluent limitations:

(1) To pass a single-dilution test, 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 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.

(2) 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  $LC_{50}$  concentration for the most sensitive of the test organisms; **OR**,
- b. For facilities with an AEC greater than 30% the  $LC_{50}$  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.

(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) When dilutions are required, 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) Single-dilution tests will be run with:
  - a. Effluent at the AEC concentration;
  - 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) 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.
- (8) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
- (9) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.

12. Plant Available Nitrogen (PAN) Procedure

- (a) Wastewater, sludge and fertilizer nitrogen application shall not exceed the crop nitrogen requirements based on realistic crop yield goals and the Plant Available Nitrogen (PAN method). The wastewater application rate shall be calculated as follows:

$$PAN = CNR - SRN - CFN$$

D. SPECIAL CONDITIONS (continued)

WHERE: **CFN** = Commercial Fertilizer Nitrogen applied in pounds N/acre.  
**CNR** = Crop Nitrogen Requirement in pounds N/acre.  
**PAN** = Plant Available Nitrogen in wastewater and sludge expressed as annual pounds N/acres.  
**SRN** = Soil Residual Nitrogen in pounds N/acre.

(b) Plant Available Nitrogen (PAN) is calculated as follows:

$$\begin{aligned} \text{PAN} = & \text{[Ammonia Nitrogen]} \quad \times \quad \text{[Availability Factor]} \\ & + \text{[Organic Nitrogen]} \quad \times \quad \text{[Availability Factor]} \\ & + \text{[Nitrate Nitrogen]} \quad \times \quad \text{[Availability Factor]} \end{aligned}$$

For anaerobic treated wastewater and sludge, the nitrate nitrogen amounts will be negligible and can be ignored.

(c) Plant Available Nitrogen (PAN) Availability factors are as follows:

(1) Average Availability factors for all fields:

<u>Types of Nitrogen</u>	<u>Surface Application</u>	<u>Immediate Incorporation or Subsurface Injection</u>
Organic	0.25 – 0.75*	0.25 – 0.75*
Ammonia	0.6**	0.9**
Nitrate	0.9**	0.9**

\* Organic Nitrogen = [Total Kjeldahl Nitrogen as N] – [Ammonia as N]. Availability Factors based on time after application and waste type are:

<u>Type of Wastewater And Sludge Treatment Method</u>	<u>Organic Nitrogen Availability Factor by Time Period</u>			
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Cumulative Year 3+</u>
	Aerobic wastewater lagoon and sludge	0.20	0.10	0.05
Anaerobic wastewater lagoon and sludge	0.40	0.20	0.10	0.70
Aerobic sludge-only storage basin/lagoon	0.40	0.20	0.10	0.70
Extended aeration plant and sludge	0.40	0.20	0.10	0.70
Waste activated treatment plant (liquids, primary/secondary sludges)	0.40	0.20	0.10	0.70
Lime Stabilized Sludge	0.40	0.20	0.10	0.70
Aerobic Sludge Digester	0.30	0.15	0.08	0.53
Anaerobic Sludge Digester	0.20	0.10	0.05	0.35
Composted Sludge (Class A)	0.10	0.05	0.03	0.18

NOTES: Year 1 is the current year of waste application; year 2 is the previous year of waste application; and year 3 is waste application two years ago. Nitrogen availability for years 1, 2 and 3 must be added when waste is applied in consecutive years. The cumulative factor is used when waste is applied at about the same rate for 3 consecutive years or longer.

\*\* Average inorganic nitrogen availability based on the typical soil and climate conditions when considering additions due to precipitation, dry deposition, and foliar absorption versus losses due to volatilization and denitrification (10% denitrification loss is included). The permittee may choose to use this average value for all fields or may adjust the N availability based on site specific soil conditions using the following tables under 'field Specific Availability Factors for Inorganic Nitrogen'.

D. SPECIAL CONDITIONS (continued)

(2) Field Specific Availability Factors for Inorganic Nitrogen.

For ammonia and nitrate nitrogen factors, the permittee may choose to use the average value for all fields under paragraph C.1. above, or may use the alternate factors on a field specific basis using the tables below. The approved factors for each field will be included in the O&M Manual.

<b>Table A. Alternate Field Specific Availability Factors for Surface Application</b>					
% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively Well drained	Well Drained	Moderately Well drained	Somewhat Poorly Drained	Poorly Drained
< 2	71	66	62	56	45
2-5	66	60	56	49	30
> 5	63	56	49	38	19

Adapted from USDA – NRCS, national Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.

<b>Table B. Alternate Field Specific Availability Factors for Sub-Surface Injection or Immediate Incorporation.</b>					
% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively Well drained	Well Drained	Moderately Well drained	Somewhat Poorly Drained	Poorly Drained
< 2	89	84	78	70	57
2-5	84	76	70	62	38
> 5	80	70	62	48	24

Adapted from USDA – NRCS, national Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.

(d) Soil Residual Nitrogen (SRN).

- (1) For Annual Crops, the nitrogen availability from soil organic matter must be included based on soil CEC and crop season as follows:

$$\text{SRN in pound N/acre}^* = [\text{percent organic matter}] \times \text{Soil Availability Factor}$$

<u>Growing Season</u>	<u>Soil Availability Factor</u> <u>By Soil CEC Ranges and Organic Matter</u>			
	<u>Organic Matter</u>	<u>CEC &lt;10</u>	<u>CEC 10-18</u>	<u>CEC &gt;18</u>
<b>Summer</b>	<b>1%</b>	<b>40*</b>	<b>20</b>	<b>10</b>
<b>Winter</b>	<b>1%</b>	<b>20*</b>	<b>10</b>	<b>5</b>

**\*Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pound nitrogen for summer and 30 pounds for winter.

- (2) For Perennial Crops the SRN is considered zero (0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.

- (e) Crop nitrogen requirements shall be based on University of Missouri publication, Soil Test Interpretations and Recommendations Handbook, as revised or one of the other reference publications listed in this permit. Alternate reference publications may be used only upon prior approval by the department and shall be listed in the approved Operation and Maintenance Manual.

D. SPECIAL CONDITIONS (continued)

- (f) If a crop is not harvested, the PAN rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.
- (g) PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.
- (h) Conversion Factors for laboratory testing results:

$$[\text{mg/L or mg/kg or ppm}] \times [\text{conversion factor}] = [\text{pounds per Unit Volume}]$$

<u>Unit Volume</u>	<u>Conversion Factors</u>
1 lbs/acre inch	0.226
1 lbs/1,000 gallons	0.0083
1 lbs/100 cubic feet	0.0062
1lbs/ton (wet wt)	0.002

- (i) Alternate nitrogen availability factors may be considered based upon site-specific conditions for each filed and submittal of scientific justification. Alternate factors will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- (j) Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- (k) Primary reference publications used herein are:
  - (1) Livestock Waste Facilities Handbook, Midwest Plan Service, MWPS-18, April 1993.
  - (2) National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
  - (3) Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc. 1991
  - (4) Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December 1992.
  - (5) Land Application of Sewage Sludge, EPA/831-B-002b, U.S. Environmental Protection Agency, December, 1994

E. SCHEDULE OF COMPLIANCE

- 1. On **January 2009** submit a progress report detailing progress of meeting the new Oil & Grease effluent limit that goes into effect on **October 1, 2009**. If the facility is unable to meet the new limits, a reason detailing why this cannot be met shall be submitted. If the facility can meet the limit by **October 1, 2009** then a summary of the test results from issuance until **September 30, 2009** shall be submitted by this date.

If you have questions you may contact the Missouri Department of Natural Resources, Southwest Regional Office by calling 417-891-4300 or by mail at 2040 West Woodland, Springfield, Missouri, 65807.

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

**Missouri Department of Natural Resources**  
**Statement of Basis**  
**NPDES #: MO-0055590**

This Statement of Basis (Statement) gives pertinent information regarding minor/simple modification(s) to the above listed operating permit without the need for a public comment process.

A Statement is not an enforceable part of a Missouri State Operating Permit.

FACILITY DESCRIPTION

Two cell storage lagoon / wastewater irrigation / sludge is retained in lagoon.

MODIFICATION RATIONALE

This operating permit is hereby modified to change facility type from lagoon discharge from December through February to November through February.