

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT

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

Permit No.	MO-0001961
Owner:	City Utilities of Springfield
Address:	P.O. Box 551, Springfield, MO 65801
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	James River Power Station
Facility Address:	5701 South Kissick Road, Springfield, MO 65804
Legal Description:	See Page 2
Receiving Stream:	See Page 2
First Classified Stream and ID:	See Page 2
USGS Basin & Sub-watershed No.:	See Page 2

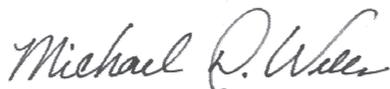
is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

See Page 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.

January 13, 2005
Effective Date



Michael D. Wells, Acting Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

January 12, 2010
Expiration Date

R. Bruce Martin, Director, Southwest Regional Office

LEGAL DESCRIPTION

Outfalls #001, 002, 003, & 005:

SW ¼, SW ¼, Sec. 20, T28N, R21W, Greene County

Outfall #004:

SE ¼, NE ¼, Sec. 30, T28N, R21W, Greene County

Outfall #006:

NE ¼, NW ¼, Sec. 29, T28N, R21W, Greene County

Outfall #007:

SE ¼, SE ¼, Sec. 19, T28N, R21W, Greene County

Outfall #008:

SW ¼, SE ¼, SW ¼, Sec. 20, T28N, R21W, Greene County

Outfalls #009 & 010:

NE ¼, SE ¼, SE ¼, Sec. 19, T28N, R21W, Greene County

Ash Pond Monitoring Well #2:

NE ¼, NE ¼, Sec. 30, T28N, R21W, Greene County

James River (upstream of ash landfill):

SE ¼, NE ¼, Sec. 30, T28N, R21W, Greene County

James River (downstream of ash landfill):

NE ¼, SE ¼, Sec. 30, T28N, R21W, Greene County

RECEIVING STREAM & BASIN INFORMATION

Outfalls #001, 002, 003, & 008:

Receiving Stream:	Lake Springfield (L3)
First Classified Stream and ID:	Lake Springfield (L3) (07312)
USGS Basin & Sub-watershed No.:	(11010002-010005)

Outfalls #004, 005, 006, 007, 009, & 010:

Receiving Stream:	James River (P) 303(d)
First Classified Stream and ID:	James River (P) (02362) 303(d)
USGS Basin & Sub-watershed No.:	(11010002-020002)

FACILITY DESCRIPTION (continued)

Outfalls #001, 002, & 003 – Power Plant – SIC #4931

Cooling water.

Design flow is 324 million gallons per day (total of the three outfalls).

Outfall #004 – Power Plant – SIC #4931

Ash pond, including the discharge from the ash landfill detention pond.

Design flow is 7.0 million gallons per day.

Outfall #005 – Power Plant – SIC #4931

Emergency bypass of cooling water around dam. Flow can include discharge from deep well #3 and the ash pond. If flow from the ash pond is discharged through Outfall #005 then compliance with all effluent limitations and monitoring requirements as listed for Outfall #004 shall be achieved.

Design flow is 3.1 million gallons per day.

Outfall #006 – Power Plant – SIC #4931

Stormwater runoff.

South side of power plant – drains a peaking facility and a railroad spur.

Outfall #007 – Power Plant – SIC #4931

Stormwater runoff.

Northeast side of power plant– drains equipment storage area, store room, and magnetic belt discharge.

Outfall #008 – Power Plant – SIC #4931

Cooling Water Intake

Outfall #009 – Power Plant – SIC #4931

James River (Immediately Below the Dam)

Outfall #010 – Power Plant – SIC #4931

James River (100 Yards Downstream of the Dam)

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

PAGE NUMBER 5 of 14

PERMIT NUMBER MO-0001961

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 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 #005</u> Emergency bypass of cooling water.						
Flow	MGD	*			once/day*****	24 hr. estimate
Temperature	°F	90			once/day*****	grab
Total Phosphorus	mg/L	*			once/week	grab
Intake Total Suspended Solids (Note 7)	mg/L	*		*	once/week	grab
Net Total Suspended Solids (Notes 6 & 7)	mg/L	100		30	once/week	grab
Oil & Grease (Note 7)	mg/L	15		10	once/week	grab
pH – Units (Note 7)	SU	****		****	once/week	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE February 28, 2005.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)					PAGE NUMBER 6 of 14	
					PERMIT NUMBER MO-0001961	
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfalls #006 & 007</u> Stormwater runoff.						
Flow	cfs	*		*	once/quarter*****	instantaneous estimate
Rainfall	inches	*		*	once/quarter*****	24 hr. total
Total Phosphorus	mg/L	*		*	once/quarter*****	grab
Total Suspended Solids	mg/L	100		30	once/quarter*****	grab
pH – Units	SU	****		****	once/quarter*****	grab
Oil & Grease	mg/L	15		10	once/quarter*****	grab
<u>Outfall #008 (Notes 3 & 4)</u> Cooling Water Intake						
Temperature	°F	*		*	continuous***	grab
<u>Outfall #009 (Notes 3 & 8)</u> James River (Immediately Below the Dam)						
Dissolved Oxygen, Total	mg/L	*		*	four (4)/day	grab
Temperature	°F	*		*	four (4)/day	grab
<u>Outfall #010</u> James River (100 Yards Downstream of the Dam)						
Dissolved Oxygen, Total (Notes 3 & 8)	mg/L	*		*	four (4)/day	grab
Temperature (Notes 3, 4, & 9)	°F	*			continuous***	grab
Outfall #008 < 85° F	Δ°F	5			continuous***	grab
85° F ≤ Outfall #008 < 88° F	°F	90			continuous***	grab
Outfall #008 ≥ 88° F	Δ°F	2			continuous***	grab
<u>James River</u>						
(Note 10)	mg/L	*			once/quarter*****	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2005.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)					PAGE NUMBER 7 of 14	
					PERMIT NUMBER MO-0001961	
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Ash Pond Monitoring Well #2</u>						
Aluminum, Total Recoverable	mg/L	*			once/quarter*****	grab
Arsenic, Total Recoverable	mg/L	*			once/quarter*****	grab
Barium, Total Recoverable	mg/L	*			once/quarter*****	grab
Boron, Total Recoverable	mg/L	*			once/quarter*****	grab
Cadmium, Total Recoverable	mg/L	*			once/quarter*****	grab
Calcium, Total Recoverable	mg/L	*			once/quarter*****	grab
Chromium, Total Recoverable	mg/L	*			once/quarter*****	grab
Cobalt, Total Recoverable	mg/L	*			once/quarter*****	grab
Copper, Total Recoverable	mg/L	*			once/quarter*****	grab
Iron, Total Recoverable	mg/L	*			once/quarter*****	grab
Lead, Total Recoverable	mg/L	*			once/quarter*****	grab
Magnesium, Total Recoverable	mg/L	*			once/quarter*****	grab
Mercury, Total Recoverable	mg/L	*			once/quarter*****	grab
Selenium, Total Recoverable	mg/L	*			once/quarter*****	grab
Silver, Total Recoverable	mg/L	*			once/quarter*****	grab
Sodium, Total Recoverable	mg/L	*			once/quarter*****	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2005.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)					PAGE NUMBER 8 of 14	
					PERMIT NUMBER MO-0001961	
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Ash Pond Monitoring Well #2</u> (continued)						
Hardness	mg/L	*			once/quarter*****	grab
pH – Units	SU	****			once/quarter*****	grab
Conductivity	µmhos/cm	*			once/quarter*****	grab
Chemical Oxygen Demand	mg/L	*			once/quarter*****	grab
Ammonia	mg/L	*			once/quarter*****	grab
Nitrate / Nitrite as N	mg/L	*			once/quarter*****	grab
Total Phosphorus	mg/L	*			once/quarter*****	grab
Sulfate	mg/L	*			once/quarter*****	grab
Fluoride	mg/L	*			once/quarter*****	grab
Chloride	mg/L	*			once/quarter*****	grab
Total Dissolved Solids	mg/L	*			once/quarter*****	grab
Total Organic Carbon	mg/L	*			once/quarter*****	grab
Total Organic Halogens	mg/L	*			once/quarter*****	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>April 28, 2005</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
B. STANDARD CONDITIONS						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I</u> STANDARD CONDITIONS DATED <u>October 1, 1980</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.**
- *** If the situation occurs that the continuous monitoring equipment fails then temperature readings shall be taken four (4) times per day and be representative of all operating / loading conditions of the power plant. Note that samples shall be taken during daylight hours due to personnel safety issues.
- **** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.0-9.0 pH units.
- ***** Parameters shall be monitored daily when this outfall is used to bypass cooling water around the lake and dam. Report as no-discharge when a discharge does not occur during the reporting period.
- ***** Sampling and analysis to be conducted once/quarter in the specific months of **January, April, July, and October.**

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- Note 1 - When adding Betz Clam-Trol (CT-1) to the cooling water for clam control, permittee shall monitor the discharge for the concentration of CT-1. Prior to discharge, cooling water must be actively detoxified to the < 0.2 mg/L level. The department shall be notified at least 30 days in advance of permittee's intent to apply the clamicide, and all monitoring results shall be submitted to the department within 30 days after such discharge.
- Note 2 - During the period between April 1 and October 31 all flow shall be directed through Outfall #003. Only de-minimis flows are allowed to be discharged through Outfalls #001 and #002. Report Outfalls #001 and #002 as no-discharge when a discharge does not occur or only a de minimis discharge occurs during the report period.
- Note 3 - Final limitations and monitoring requirements for Temperature and Total Dissolved Oxygen are applicable only during the season from April 1 through October 31.
- Note 4 - Continuous temperature readings must be available in the operations center and monitored by the operator.
- Note 5 - Monitoring for Total Residual Bromine and Chlorine will be required only during periods of biocide use. The discharge monitoring reports shall contain a complete report on biocide use. In addition, at least twice during the first year following permit reissuance, permittee shall monitor for Total Residual Bromine and Chlorine at a point 100 feet beyond the outfall location at times when biocide use is occurring. Results shall be submitted to the department within 30 days following each sample date.
- Note 6 - Intake Total Suspended Solids values may be used to calculate 'net' limitations, however, permittee shall continue to maintain the ash pond system for adequate retention time for settling. Solids present in the intake water are 'treated' in the ash pond system but treatment levels are dependent on concentration and types of solids present in the intake water.
- Note 7 - Parameters shall be monitored once per week when flow from the ash pond is discharged through this outfall. Report as no-discharge for these parameters when no flow from the ash pond has been discharged through this outfall during the reporting period.
- Note 8 - These readings must be taken at different times of the day and be representative of all operating / loading conditions of the power plant. Note that samples shall be taken during daylight hours due to personnel safety issues.
- Note 9 - When the temperature as measured at Outfall #008 is less than 85 degrees Fahrenheit then a temperature rise of more than five (5) degrees Fahrenheit over any period of 48 running hours, based on hourly averages (For example, 9 a.m. Tuesday to 9 a.m. Thursday, then 10 a.m. Tuesday to 10 a.m. Thursday, etc.), attributed to the operation of the James River Power Plant shall not occur at this location. Temperature rise shall be determined by subtracting the temperature at Outfall #008 from Outfall #010. If a temperature rise of more than five (5) degrees occurs, documentation providing an assessment of possible causes in addition to and /or in place of the James River Power Plant operation shall be submitted with the Discharge Monitoring Report.
- When the temperature as measured at Outfall #008 is equal to or greater than 85 degrees Fahrenheit and less than 88 degrees Fahrenheit then a maximum instantaneous temperature of 90° Fahrenheit is allowed.
- When the temperature as measured at Outfall #008 is equal to or greater than 88 degrees Fahrenheit then an instantaneous temperature difference of more than two (2) degrees Fahrenheit (based on hourly averages), attributed to the operation of the James River Power Plant shall not occur at this location. Temperature rise shall be determined by subtracting the temperature at Outfall #008 from Outfall #010. If a temperature rise of more than two (2) degrees occurs, documentation providing an assessment of possible causes in addition to and /or in place of the James River Power Plant operation shall be submitted with the Discharge Monitoring Report.
- Note 10 - Monitoring locations shall be established and permanent monuments established for monitoring the James River upstream and downstream of Ash Pond Monitoring Well #2. Effluent parameters, measurement frequency, and sample type shall be identical to those required for Ash Pond Monitoring Well #2.

C. 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. 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.
4. Report as no-discharge when a discharge does not occur during the report period.

5. 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;

C. SPECIAL CONDITIONS (continued)

- (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 authorizes the continued use of existing or new storm sewers to convey uncontaminated stormwater runoff. Such uncontaminated outfalls do not require monitoring or limitations. Also authorized is the continued return of uncontaminated stormwater to Lake Springfield. Monitoring or limitations are not required for such outfalls.
 7. There shall be no discharge of cooling tower maintenance chemicals which contain any 'priority pollutant' as currently defined under federal and state regulations.
 8. Any pesticide discharge from any point source shall comply with the requirements of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 136 et. seq.) and the use of such pesticides shall be in a manner consistent with its label.
 9. Except for any untreated overflow from facilities designed, constructed, and operated to treat the volume of material storage runoff which is associated with a 10-year, 24-hour rainfall event; discharges resulting from material storage runoff shall comply with the following limitations:
 - (a) Total Suspended Solids shall not exceed 50 mg/L at any time.
 - (b) The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units at any time.
 10. In the event that it should become necessary for the permittee to pump ground water to maintain lake water levels, prior notification shall be made to the department's Southwest Regional Office and to the Water Protection Program. Such notification shall include an estimate of the rate of ground water withdrawal proposed. In order to maintain the beneficial uses of Lake Springfield, the department may specify monitoring requirements and / or effluent limitations applicable to such discharges.
 11. 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
Outfalls #001-004	100 %	Annually	24 hour composite	April

(a) Test Schedule and Follow-Up Requirements

- (1) Perform a single-dilution test in the months and at the frequency specified above. If the effluent passes the test, do not repeat the test until the next test period. Submit test results along with complete copies of the test reports as received from the laboratory within 30 calendar days of availability to the Water Protection Program, P.O. Box 176, Jefferson City, MO 65102.

C. SPECIAL CONDITIONS (continued)

- (2) 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.
 - (3) 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 WPCP, Planning Section, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.
 - (4) Additionally, the following shall apply upon failure of the third test: A toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permittee shall contact WPCP, Planning Section 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 Planning Section of the WPCP 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.
 - (5) 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.
 - (6) 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.
 - (7) All failing test results shall be reported to WPCP, Planning Section, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the availability of the results.
 - (8) When WET test sampling is required to run over one DMR period, each DMR report shall contain information generated during the reporting period.
 - (9) Submit a concise summary 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. The appropriate statistical tests of significance will be those outlined in the most current USEPA acute toxicity manual or those specified by the MDNR.
 - (2) To pass a multiple-dilution test:
 - a. the computed percent effluent at the edge of the zone of initial dilution, Acceptable Effluent Concentration (AEC), must be less than three-tenths (0.3) of the LC_{50} concentration for the most sensitive of the test organisms; or,
 - b. all dilutions equal to or greater than the AEC must be nontoxic. Failure of one multiple-dilution test is an effluent limit violation.
- (c) Test Conditions
- (1) Test Type: Acute Static non-renewal

C. SPECIAL CONDITIONS (continued)

- (2) 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.
- (3) Test period: 48 hours at the "Acceptable Effluent Concentration" (AEC) specified above.
- (4) 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.
- (5) 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.
- (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.

C. 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