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-0027111
Owner:	City of Herculaneum
Address:	#1 Parkwood Court, Herculaneum, MO 63048
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Herculaneum Wastewater Treatment Plant
Address:	200 School Road, Herculaneum, MO 63048
Legal Description:	Land Grant 3028, Jefferson County
UTM Coordinates:	X= 729441.0 Y= 4237422.0
Receiving Stream:	Joachim Creek (P)
First Classified Stream and ID:	Joachim Creek (P)(01719)
USGS Basin & Sub-watershed No.:	(07140101-150005)

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
Influent lift Station/oxidation ditch/dual clarifiers /ultraviolet disinfection/aerobic digester/sludge dewatering/sludge is incinerated when land application is not feasible.
Design population equivalent is 9,450. Design flow is 1.045 MGD.
Design sludge production is 180 dry tons/year.

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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.

June 25, 2010
Effective Date

Mark N. Templeton, Director, Department of Natural Resources

June 24, 2015
Expiration Date

Scott B. Totten, Acting Director, Water Protection Program

Outfall #S1
Instream Monitoring , immediately upstream of outfall 001
Land Grant 3028, Jefferson County
UTM Coordinates: X= 729616.0 Y= 4237272.0

Outfall #S2
Instream Monitoring , ¼ mile downstream of outfall 001
Land Grant 3028, Jefferson County
UTM Coordinates: X= 729651.0 Y= 4237736.0

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

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

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001						
Flow	MGD	*		*	once/day	24 hr. estimate
Biochemical Oxygen Demand$_5$***	mg/L		45	30	once/month	24 hr. comp.
Total Suspended Solids***	mg/L		45	30	once/month	24 hr. comp.
pH – Units	SU	***		***	once/month	grab
Fecal Coliform (Note 1)	#/100ml	1000		400	once/month	grab
Ammonia as N						
May 1 – October 31 (Summer)	mg/L	1.9		0.9	once/month	grab
November 1 – April 30 (Winter)	mg/L	3.4		1.7	once/month	grab
Temperature (Note 2)	^{o}F	*		*	once/month	grab
Dissolved Oxygen (Note 3)	mg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE July 28, 2010 . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Hardness (as $CaCO_3$)	mg/L	*		*	once/quarter	grab
Arsenic, Total Recoverable	µg/L	*		*	once/quarter	grab
Cadmium, Total Recoverable	µg/L	*		*	once/quarter	grab
Chromium, Total Recoverable	µg/L	*		*	once/quarter	grab
Copper, Total Recoverable	µg/L	*		*	once/quarter	grab
Lead, Total Recoverable	µg/L	*		*	once/quarter	grab
Mercury, Total Recoverable	µg/L	*		*	once/quarter	grab
Nickel, Total Recoverable	µg/L	*		*	once/quarter	grab
Zinc, Total Recoverable	µg/L	*		*	once/quarter	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE October 28, 2010 . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

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

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Instream Monitoring, S1 and S2 (Note 4)						
Biochemical Oxygen Demand$_5$	mg/L	*		*	once/quarter****	grab
pH	SU	*		*	once/quarter****	grab
Ammonia as N	mg/L	*		*	once/quarter****	grab
Temperature	^{o}F	*		*	once/quarter****	grab
Dissolved Oxygen	mg/L	*		*	once/quarter****	grab
Hardness	mg/L	*		*	once/quarter****	grab
Arsenic, Total Recoverable	µg/L	*		*	once/quarter****	grab
Cadmium, Total Recoverable	µg/L	*		*	once/quarter****	grab
Chromium, Total Recoverable	µg/L	*		*	once/quarter****	grab
Copper, Total Recoverable	µg/L	*		*	once/quarter****	grab
Lead, Total Recoverable	µg/L	*		*	once/quarter****	grab
Mercury, Total Recoverable	µg/L	*		*	once/quarter****	grab
Nickel, Total Recoverable	µg/L	*		*	once/quarter****	grab
Zinc, Total Recoverable	µg/L	*		*	once/quarter****	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE October 28, 2010 . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

Outfall #001				
Whole Effluent Toxicity (WET) Test	% Survival	(See Special Condition #10)	once/year in September	24 hr. composite

MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE October 28, 2010.

B. STANDARD CONDITIONS

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

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only.
** This facility is required to meet a removal efficiency of 85% or more.
*** 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.
**** Sample once per quarter in the months of March, June, September, and December.

Note 1 Final limitations and monitoring requirements for Fecal Coliform are applicable only during the recreational season from April 1 through October 31.

Note 2 Beyond the mixing zone, water contaminant sources and physical alteration of the water shall not raise or lower the temperature of a stream more than five degrees Fahrenheit (5°F). Water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90°F).

Note 3 Dissolved Oxygen samples must be taken during the period from one hour before to one hour after sunrise.

Note 4 Upstream sampling shall be conducted immediately upstream of Outfall #001, in a location such that the samples are not influenced by WWTF effluent.

C. SPECIAL CONDITIONS

1. All outfalls must be clearly marked in the field.

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

3. 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.

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.

SPECIAL CONDITIONS (continued)

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;
      (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. Report as no-discharge when a discharge does not occur during the report period.

7. This treatment facility is required to be operated by a person having a wastewater competency certificate of at least a “B” level.

8. 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	99%	Once/year	24 hr. composite	September

   (a) Test Schedule and Follow-Up Requirements
      (1) Perform a MULTIPLE-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.

SPECIAL CONDITIONS (continued)

(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.

(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 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 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.

SPECIAL CONDITIONS (continued)

(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_{50} concentration for the most sensitive of the test organisms; **OR**,
(b) For facilities with an AEC greater than 30% the LC50 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) 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) 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) 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.
(6) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
(7) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.

RECEIVING WATER MONITORING CONDITIONS

1. Downstream samples should be taken immediately (10 yards or less) below the established mixing zone of ¼ mile. In the event that a safe, accessible location is not present at this location, a suitable location can be negotiated with the department. Samples should be taken at least four feet from the bank or from the middle of the stream (whichever is less) and 6-inches below the surface. The upstream receiving water sample should be collected at a point upstream from any influence of the effluent, where the water is visibly flowing down stream.

2. When conducting in-stream monitoring, the permittee shall record observations that include: the time of day, weather conditions, unusual stream/lake characteristics (e.g., septic conditions, algae growth, etc.), the stream segment (e.g., riffle, pool or run) or the lake depth from where the sample was collected. These observations shall be submitted with the sample results.

3. Samples shall not be collected from areas with especially turbulent flow, still water or from the stream bank, unless these conditions are representative of the stream reach or no other areas are available for sample collection. Sampling should not be made when significant precipitation has occurred recently. The sampling event should be terminated and rescheduled if any of the following conditions occur:
- If turbidity in the stream increases notably; or
- If rainfall over the past two weeks exceeds 2.5 inches or exceeds 1 inch in the last 24 hours

SPECIAL CONDITIONS (continued)

4. Always use the correct sampling technique and handling procedure specified for the parameter of interest. Please refer to the latest edition of Standard Methods for the Examination of Water and Wastewater for further discussion of proper sampling techniques. All analyses must be conducted in accordance with an approved EPA method. Meters shall be calibrated immediately (within 1 hour) prior to the sampling event.

5. To obtain accurate measurements, D.O., temperature and pH analyses should be performed on-site in the receiving stream where possible. However, due to high flow conditions, access, etc., it may be necessary to collect a sample in a bucket or other container. When this is necessary, care must be taken not to aerate the sample upon collection. If for any reason samples must be collected from an alternate site from the one listed in the permit, the permittee shall report the location with the sample results.

6. Dissolved oxygen measurements are to be taken during the period from one hour prior to sunrise to one and one-half hour after sunrise.

7. Please contact the department if you need additional instructions or assistance.

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
Water Protection Program
Water Pollution Control Branch
NPDES PERMITS AND ENGINEERING SECTION

Water Quality Review Sheet
Determination of Effluent Limits

Facility Information

FACILITY NAME: Herculaneum Sewer District WWTP, Design Flow = 1.15 MGD. NPDES #: MO-0027111

FACILITY TYPE/DESCRIPTION: POTW/secondary treatment

ECOREGION: Ozark Highlands (Central Irregular Plains, Mississippi Alluvial Plains, Osage Plains, Ozark Highlands) 8- DIGIT HUC: 07140101 COUNTY: Jefferson

LEGAL DESCRIPTION: NW ¼, NW ¼, SE ¼, Sec. 29, T41N, R6E LATITUDE/LONGITUDE (DMS): +38 15 17.3/-090 22 37.6

Water Quality History: This is an updated version of the 2002 review sheet to reflect an increase in the facility's design flow. According to WQIS-screen 9, a stream survey was conducted on 08/31/1994 by JF. According to WQIS-screen 10, no unresolved enforcement cases present. According to WQIS-screen 11, the latest inspection occurred on 07/26/2001 and showed noncompliance for no construction permit and reporting (e.g. DMR) or other standard conditions not being met (taking grab samples instead of composites for effluent flow as required by permit). According to WQIS-screen 14, TSS violations occurred on 10/01, 5/02, 6/02 & 07/02, and BOD violations occurred on 5/02 & 6/02. *The violations referenced in WQIS screens 11 & 14 occurred before the City of Herculaneum took over operation of the treatment plant.*

Outfall Characteristics

OUTFALL	DESIGN FLOW (CFS)	TREATMENT TYPE	RECEIVING WATERBODY	OTHER
001	1.779	Extended aeration	Joachim Creek	N/A

Receiving Waterbody Information

WATERBODY	CLASS	7Q10(CFS)	*DESIGNATED USES	OTHER CHARACTERISTICS
Joachim Creek	P	0.8	LWW, AQL, BTG, WBC, IND	WB #1719

*Cool Water Fishery (CLF), Cold Water Fishery (CDF), Irrigation (IRR), Industrial (IND), Boating & Canoeing (BTG), Drinking Water Supply (DWS), Whole Body Contact Recreation (WBC), Protection of Warmwater Aquatic Life and Human Health (AQL), Livestock & Wildlife Watering (LWW)

COMMENTS: 7Q10 for Joachim Creek at Hematite, Jefferson County (Station #07019050; 1961-65, 1967-71) is 0.8 cfs and was determined from *Stream and Springflow Characteristics* (1976).
WQIS-screen 7 stated a low flow survey occurred in 1999.
Outfall 001 is about 0.5 miles from the confluence of Joachim Creek and the Mississippi River, upstream from the Doe Run, Herculaneum Smelter.
On the proposed 2002 303(d) list, the Mississippi River is impaired from the confluence with Joachim Creek to 5 miles downstream due to the Herculaneum Smelter.
The metals listed in the permit limits and receiving water monitoring requirements sections were derived from the Mississippi River, Jefferson County TMDL Information Sheet as possible pollutants in the Joachim Creek (http://www.dnr.state.mo.us/wpscd/wpcp/tmdl/info/miss-r-info.pdf).

MIXING CONSIDERATIONS

Mixing Zone.
Volume of ¼ 7Q10 flow = (¼)*(0.8 cfs) = 0.2 cfs and length of ¼ mile per 10 CSR 20-7.031(4)(A)5.B.(II)(a).

Zone of Initial Dilution (Z.I.D.).
One-tenth mixing zone volume of flow is (0.1)*(0.2 cfs) = 0.02 cfs per 10 CSR 20-7.031(4)(A)5.B.(II)(b).

Permit Limits and Information

TMDL WATERSHED: (Y OR N) [N] W.L.A. STUDY CONDUCTED: (Y OR N) [N] DISINFECTION REQUIRED: (Y OR N) [Y] DISINFECTION WAIVER: (Y, N, NA) [N]

OUTFALL#001

WET TEST (Y OR N): [Y] FREQUENCY: ONCE/YEAR A.E.C. 99% LIMIT: 10 CSR 20-7.031(3)(I)

PARAMETER	MAXIMUM DAILY LIMIT	AVERAGE WEEKLY LIMIT	AVERAGE MONTHLY LIMIT	MONITORING FREQUENCY	SAMPLE TYPE
FLOW	* MGD		* MGD	once/day	24 HR. EST.
BIOCHEMICAL OXYGEN DEMAND		45 MG/L	30 MG/L	once/month	24 HR COMP.
TOTAL SUSPENDED SOLIDS		45 MG/L	30 MG/L	once/month	24 HR COMP.
PH	**		**	once/month	GRAB
FECAL COLIFORM***	1000 COL/100 ML		400 COL/100 ML	once/month	GRAB
TOTAL RESIDUAL CHLORINE	0.01 MG/L		0.01 MG/L	once/month	GRAB
AMMONIA AS N (SUMMER)****	1.9 MG/L		0.9 MG/L	once/month	GRAB
AMMONIA AS N (WINTER)****	3.4 MG/L		1.7 MG/L	once/month	GRAB
TOTAL KJELDAHL NITROGEN	* MG/L		* MG/L	once/month	GRAB
$NO_2 + NO_3$ AS N	* MG/L		* MG/L	once/month	GRAB
TOTAL PHOSPHOROUS	* MG/L		* MG/L	once/month	GRAB
TEMPERATURE (NOTE 2)	* °F		* °F	once/month	GRAB
DISSOLVED OXYGEN	* MG/L		* MG/L	once/month	GRAB
HARDNESS (AS $CaCO_3$)	* MG/L		* MG/L	once/quarter	GRAB
ARSENIC, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB
CADMIUM, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB
CHROMIUM, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB
COPPER, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB
LEAD, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB
MERCURY, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB
NICKEL, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB
ZINC, TOTAL RECOVERABLE	* µG/L		* µG/L	once/quarter	GRAB

*MONITORING REQUIREMENT ONLY
**PH SHALL BE MAINTAINED IN THE RANGE FROM SIX TO NINE (6-9) STANDARD UNITS AND IS NOT TO BE AVERAGED.
***FECAL COLIFORM IS TO BE TESTED FROM APRIL 1 TO OCTOBER 31.
****FOR AMMONIA NITROGEN CALCULATIONS, SEE NOTE 1
Please report the date, time, and location for each parameter sampled along with the average daily flow (actual flow measured or estimated, not design flow). All the parameters should be sampled on the same day and within no more than a 2-hour period. If dissolved oxygen (DO) is to be sampled, sampling should take place within 1 hour of sunrise. If discharge is contingent to storm events, rainfall should be measured every time there is a discharge.

Receiving Water Monitoring Requirements

Site US1. Upstream of Outfall 001 in Joachim Creek

Parameter(s)	Sampling Frequency	Sample Type	Location
Flow	Once/Quarter	Grab	Upstream of Outfall 001* LatDMS: +38 15 15.0 LongDMS: -090 22 33.2
Biochemical Oxygen Demand			
pH			
Fecal Coliform			
Total residual Chlorine			
Total Kjeldahl Nitrogen			
$NO_2 + NO_3$ as N			
Total Phosphorous			
Ammonia as N			
Temperature			
Dissolved Oxygen			
Hardness			
Arsenic, Total Recoverable			
Cadmium, Total Recoverable			
Chromium, Total Recoverable			
Copper, Total Recoverable			
Lead, Total Recoverable			
Mercury, Total Recoverable			
Nickel, Total Recoverable			
Zinc, Total Recoverable			

*See map at end of WQRS.

Site DS2. Downstream of Outfall 001 in Joachim Creek

Parameter(s)	Sampling Frequency	Sample Type	Location
Flow	Once/Quarter	Grab	½ mile downstream of Outfall 001* LatDMS: +38 15 30.1 Long DMS: -090 22 31.3
Biochemical Oxygen Demand			
pH			
Fecal Coliform			
Total residual Chlorine			
Total Kjeldahl Nitrogen			
$NO_2 + NO_3$ as N			
Total Phosphorous			
Ammonia as N			
Temperature			
Dissolved Oxygen			
Hardness			
Arsenic, Total Recoverable			
Cadmium, Total Recoverable			
Chromium, Total Recoverable			
Copper, Total Recoverable			
Lead, Total Recoverable			
Mercury, Total Recoverable			
Nickel, Total Recoverable			
Zinc, Total Recoverable			

*See map at end of WQRS.

Derivation and Discussion of Limits

Outfall 001

- **Biochemical Oxygen Demand (BOD_5).** Criterion: equal to or less than 30 mg/L monthly average, 45 mg/L weekly average per 10 CSR 20-7.015(8)(B)1 and as stated in existing permit.

- **Total Suspended Solids.** Criterion: equal to or less than 30 mg/L monthly average, 45 mg/L weekly average per 10 CSR 20-7.015(8)(B)1 and as stated in existing permit.

- **pH.** Criterion: between 6 – 9 standard units per 10 CSR 20-7.015(8)(B)2 and as stated in the existing permit.

- **Fecal Coliform.** Criterion: shall not contain more than 400 colonies/100 mL monthly average, 1000 colonies/100 mL daily maximum per 10 CSR 20-7.015(8)(B)4.

- **Total Residual Chlorine.** Criterion: no more than 0.010 mg/L monthly average, 0.010 mg/L maximum daily per 10 CSR 20-7, Table A (page 17) warm-water chronic criteria. Dechlorination is required per 10 CSR 20-7.015(8)(B)4.B.

- **Oil & Grease.** Criterion: 10 mg/L monthly average per 10 CSR 20-7.031, Table A (for protection of aquatic life). Maximum daily value is 1.5 times average monthly value.

Note 1. Ammonia-Nitrogen limits were calculated according to *Technical Support Document for Water Quality-based Toxics Control*, page 86 & 102-3 (EPA document #505/2-90-001, March 1991).

Note 2. Temperature per 10 CSR 20-7.031(4)(D)1.
Beyond the mixing zone, water contaminant sources and physical alteration of the water shall not raise or lower the temperature of a stream more than five degrees Fahrenheit (5°F). Water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90°F).

Outfall 001: Summer Ammonia Nitrogen, May 1-Oct 31
10 CSR 20-7 Table B, Chronic criteria for Total Ammonia: General Warm-water Fishery @ 26°C, pH 7.8
WLA = 1.2 mg/l
LTA = 0.6
CV = 0.6
MDL = 1.9 mg/L
AML = 0.9 mg/L (where n = 4)

Outfall 001: Winter Ammonia Nitrogen, Nov 1-Apr 30
10 CSR 20-7 Table B, Chronic criteria for Total Ammonia: General Warm-water Fishery @ 6°C, pH 7.8
WLA = 2.1 mg/l
LTA = 1.1
CV = 0.6
MDL = 3.4 mg/L
AML = 1.7 mg/L (where n = 4)

Reviewer: Alan Moreau
Date: November 22, 2004
Unit Chief: Richard Laux

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

Receiving Water Monitoring Locations