STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to:

Perryville Southeast WWTP 215 N. West Street Perryville, MO 63775

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo., and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources.

As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

October 5, 2021 Effective Date

Edward B. Galbraith, Director, Division of Environmental Quality

Chris Wieberg, Director, Water Protection Program

October 4, 2023 Expiration Date

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The purpose of the construction project is to expand the treatment capacity to meet anticipated growth through 2040 and to improve treatment capabilities to meet anticipated permitting requirements. Primary components of the new construction include the following:

- New influent pump station.
- New headworks with a manual bar rack, 2 rotating drum fine screens, and forced vortex grit removal.
- New 3-channel oxidation ditch.
- New 75-foot diameter clarifiers (2).
- New return activated sludge pump station.
- New tertiary disc filters (2).
- New ultraviolet disinfection system.
- New administration building and rehabilitation of existing laboratory/control building.
- Rehabilitation of existing biosolids equipment and piping.
- Relocation of the effluent outfall.

This project will also include general site work appropriate to the scope and purpose of the project and all necessary appurtenances to make a complete and usable wastewater treatment facility.

II. COST ANALYSIS FOR COMPLIANCE

Pursuant to Section 644.145, RSMo., when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

The Department is not required to determine Cost Analysis for Compliance because the permit contains no new conditions or requirements that convey a new cost to the facility.

III. CONSTRUCTION PERMIT CONDITIONS

The permittee is authorized to construct subject to the following conditions:

1. This construction permit does not authorize discharge.

- All construction shall be in accordance with the plans and specifications submitted by HDR Engineering, Inc. on September 13, 2021, and signed and sealed on September 2, 2021, by the engineers/architect listed below, and approved by the Department on October 5, 2021:
 - David G. Bunch, P.E.
 - Ronald B. Hardee, P.E.
 - David L. Wiseman, P.E.
 - Jeffrey A. Lewis, P.E.
 - Kaitlyn Rohloff, P.E.
 - Nathan W. Witte, P.E.
 - John S. Rickert, Architect
- 3. The Department must be contacted in writing prior to making any changes to the approved plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(11).
- 4. As per 10 CSR 20-4.040, all changes in contract price or time within the approved scope of work must be by change order in accordance with Section 19 of this rule.
- 5. State and federal law does not permit bypassing of raw wastewater; therefore, steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the Department's electronic Sanitary Sewer Overflow/Bypass Reporting system at https://dnr.mo.gov/mogem/ or the Southeast Regional Office per 10 CSR 20-7.015(9)(G).
- 6. In addition to the requirements for a construction permit, see 10 CSR 20-6.200 for land disturbance requirements to obtain a Missouri State Operating Permit to discharge stormwater. The permit requires Best Management Practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the Department's ePermitting system available online at www.dnr.mo.gov/env/wpp/epermit/help.htm. For more information, see www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm.
- 7. A United States (U.S.) Army Corps of Engineers (ACE) Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the Department or a §404 permit waiver may be required for the activities described in this construction permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S., then a §404 permit/§401 certification will be required. Since the USACE makes determinations on what is jurisdictional, you must contact the USACE Regulartoy Branch in your District to determine permitting requirements. You may call the Department's Water Protection Program at 573-751-1300 or see dnr.mo.gov/env/wpp/401/ for more information.

- 8. Upon completion of construction:
 - **A.** The City of Perryville will become the continuing authority for operation and maintenance of these facilities;
 - **B.** Submit an electronic copy of the as-builts if the project was not constructed in accordance with previously submitted plans and specifications; and
 - C. Submit the Statement of Work Completed (Form MO 780-2155, available at <u>https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155</u>) to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The purpose of the construction project is to expand the treatment capacity to meet anticipated growth through 2040 and to improve treatment capabilities to meet anticipated permitting requirements.

2. FACILITY DESCRIPTION

The existing treatment system includes a flow equalization basin, mechanical bar screen, aerated grit chamber, 2 primary clarifiers, 3 trickling filters, 3 secondary clarifiers (1 inactive), 2 tertieary sand filters (1 inactive), UV disinfection (recreational season) and an effluent pump station for flood conditions. Existing solids handling includes a gravity belt thickener, 2 sludge holding tanks, lime stabilization of sludge, and land application of sludge. The existing design flow is 1.8 MGD.

The facility description after construction includes flow equalization basin, influent pump station, bar screen, 2 fine screens (rotating drum), forced-vortex grit removal, oxidation ditch, 2 final clarifiers, 2 tertiary disc filters, UV disinfection (recreational season), gravity belt thickener, 3 sludge holding tanks, lime stabilization of sludge, and sludge is land applied. Provisions are included in the process for wet weather flow conditions. A schematic of the treatment process after construction is attached as **APPENDIX A** – **PROCESS SCHEMATIC**

The Perryville Southeast WWTP is located at 1131 Hidden Valley Lane, Perryville, Missouri, in Perry County. The modified facility will have a design average flow of 2.5 MGD and serves a population equivalent of approximately 28,400 people.

3. <u>COMPLIANCE PARAMETERS</u>

The proposed project will be required to meet final effluent limits as established in the Antidegradation review issued August 23, 2021, and identified in the Draft Operating Permit Modification for permit number MO-0051144, which was available for public comment August 27, 2021 through September 27, 2021.

Following the completion of construction, the applicable effluent limits will include the following:

Parameter	Units	Monthly average limit
Biochemical Oxygen Demand ₅	mg/L	
June 1 – Sept 30	_	10.8
Oct 1 – May 31		14.4
Total Suspended Solids	mg/L	14.4
E. Coli	#/100mL	206
Ammonia as N	mg/L	
January		3.1
February		2.4
March		2.4
April		2.2
May		1.8
June		1.3
July		1.0
August		1.0
September		1.2
October		1.5
November		2.3
December		2.7
pH	SU	6.0-9.0
Oil & Grease	mg/L	10
Aluminum, Total Recoverable	μg/L	375.7
Copper, Total Recoverable	μg/L	56.7
Cyanide, amenable to chlorination	μg/L	4.5
Lead, Total Recoverable	μg/L	6.9
Zinc, Total Recoverable	µg/L	125.1

In addition, monitoring will be required for the following parameters: Flow; Total Phosphorus; Total Kjeldhl Nitrogen; Nitrite + Nitrate; Arsenic, Total Recoverable; Boron, Total Recoverable; Chloride; Cobalt, Total Recoverable; Fluoride; Iron, Total Recoverable; Selenium, Total Recoverable; Sulfate; and Thallium, Total Recoverable.

4. ANTIDEGRADATION

The Department has reviewed the antidegradation report for this facility; the Water Quality and Antidegradation Review issued August 23, 2021, for the expansion of the WWTP to increase the average design flow from 1.8 to 2.5 million gallons per day

(MGD); and data from additional studies. See APPENDIX B – WATER QUALITY AND ANTIDEGRADATION REVIEW

5. <u>REVIEW OF MAJOR TREATMENT DESIGN CRITERIA</u>

Existing major components that will remain in use include the following:

- Influent Control Structure.
- Excess Flow Storage Basin (EFSB).
- The majority of the biosolids handling system, with modifications.
- Existing administration/control building, with modifications.

Construction will cover the following items:

- Components are designed for a design average daily flow rate of 2.5 MGD and a design peak daily flow rate of 9 MGD.
- Influent Diversion and Screening Structures New structures will be constructed. The manhole diversion structure will generally direct flow through the screening manhole to the influent pump station, but can direct excess flow to the existing influent control structure, diverting flow to the existing EFSB. The screening manhole includes a trash basket with 2-inch bar spacing, which can be lifted using guide rails and a davit crane for manually removing screened material.
- Influent Pump Station Construction of a influent pump station with 3 firm pumps and 1 standby pump. Each 70 HP non-clog submersible pump will be capable of operating at 2,083 gallons per minute (gpm) at 78 feet total dynamic head (TDH). Excess flows will be diverted to the existing excess flow storage basin via the existing influent control structure. An influent flow meter will be installed in a new vault structure following the influent pump station.
- Headworks Screening Installation of screening devices removes nuisance inorganic materials from raw wastewater.
 - Inclined Rotating Drum Screen Two fully automatic self-cleaning inchannel mounted rotating drum screens with integral washer/compactors will be installed, each in their own channel. For each rotating drum screen, the screen hydraulic capacity will be 4.5 mgd, the screen perforated opening size will be 6 mm diameter, the angle of screen installion will be 35 degrees from horizontal and the motor will be 2 HP.
 - Manual Bar Screen The manual bar screen is in a separate bypass channel from the fine screens, with a peak flow to the channel of 4.5 mgd. The manual bar screen will have 2-inch by 0.25-inch bars with 1.5-inch spacing on centers and will be positioned at an angle of 60 degrees from the horizontal to allow for manual raking of the screen.

- Headworks Grit Removal Installation of grit removal facilities removes grit and inert inorganics from raw wastewater. Grit removal prevents downstream abrasion and wear on mechanical components and accumulation at the bottom of basins or channels.
 - Vortex Grit Chamber Performance requirements include hydraulic flow rates of 9.0 MGD peak, 2.5 MGD average, and 1.5 MGD minimum and a maximum headloss across the grit chamber at peak flow of 0.25 inches. Grit removal requirements at all flows up to the peak flow rate include the following:

Particle Size (in microns)	Percent Removal
>297	95%
>210 and <297	85%
>149 and <210	65%

The mechanical drive will have a maximum output speed of 21 RPM, with a 1 HP gear motor.

- Grit Pump One constant speed grit pump will be installed and be capable of operating at 250 gpm at 16 feet TDH, with a maximum pump speed of 1,800 RPM and a 5 HP motor.
- Grit Classifier One grit classifier with a grit concentrator will be installed, with a 9-inch diameter, 15-foot long screw auger to transport grit from the classifier to the disposal unit with a 1 HP motor. The conveyor capacity will remove up to 2tons/hour of grit and the classified should be designed for 95 percent capture and removeal of 150 micron material.
- Oxidation Ditch The design SRT is 11.1 days with a design MLSS of 3,000 mg/L. The hydraulic retention time is 18.1 hrs at design flow of 2.5 MGD. The side water depth of the treatment train is 16.5 ft. The design criteria include Actual Oxygen Requirements (AOR) at Maximum Month Condition of 338 O2/HR and Standard Oxygen Requirements (SOR) at Maximum Month Condition of 403 O2/HR. Four rotors will have minimum rotor length of 17 feet clear span and maximum rotor RPM of 52. The design disc submersion is 21 inches and a maximum disc submersion of 24 inches. Drive motor horsepower will be 40 HP for the two exterior drive motors and 75 HP for the two interior drive motors.
- Final Clarifiers Two final clarifiers will be constructed to remove suspended solids for the mixed liquor using gravity settling. The dimensions for each final clarifier are 75-foot diameter; 14-foot, 2 inches side water depth; and 16-foot side wall depth. The surface area of each clarifier will be 4,418 sf. The total wier length for each clarifier will be 235 feet. Each clarifier is designed for an average daily flow of 1.25 MGD influent flow plus 0.625 MGD RAS flow resulting in 1.875 MGD total and peak daily flow of 3.75 MGD influent flow plus 1.875 MGD RAS flow resulting in 5.625 MGD total for peak flows. The drive motor will be a minimum of 1 HP and will have a maximum speed of 1,800 RPM.

The peak surface overflow rate is 849 gpd/sf, which meets the requirement of 10 CSR 20-8.160(3)(B)3 of less than 1,200 gpd/sf. The peak solids loading rate is 31.9 lbs/day/sf which meets the requirements of 10 CSR 20-8.160(3)(B)3 of less than 40 lbs/day/sf at peak flow. The peak weir loading rate is 15,957 gpd/sf, which meets the requirements of 10 CSR 20-8.160(3)(C)2 of being less than 30,000 gpd/sf.

- Return Activated Sludge (RAS)/Waste Activated Sludge (WAS) Pump Station The RAS/WAS non-clog submersible pumps will be installed in a wetwell. There will be 3 RAS pumps (2 firm, 1 standby) with VFDs to convey RAS to the Oxidation Ditch and each pump is designed for 1,305 gpm at 16 ft TDH with a 15 HP motor. The single WAS pump with a constant speed drive will convey the WAS to the sludge processing facilities and will be capable of pumping 72 gpm at 14 ft of TDH with a 5 HP motor.
- Tertiary Filtration Two microscreen media tertiary filters, such as a cloth or synthetic type media filtration in a disk configuration, will be installed. With both units in service, tertiary filters are designed to be capable of treating a peak flow of 9 MGD (with 7.5 MGD of secondary clarifier effluent and 1.5 MGD only screened and degritted); average influent total suspendend solids (TSS) to filter of 1.5 mg/L, and peak influent TSS to filter of 30 mg/L. The filter configuration includes 14 disks per filter, with the fabric having a nominal 10 micron pore opening. The drive mechanism motor shall be rated for 1.5 HP operation. The backwash system includes a minimum of 10 spray nozzles per disc, with a low-pressure immersible pump for each filter and a 15 HP motor. The maximum instantaneous backwash flow rate from each unit shall not exceed 175 gpm and the design backwash rate shall be 147 gpm. An inline magnetic flow meter will measure flow before it enters the tertiary filtration process, which will be the total flow going through filtration, disinfection (seasonally) and discharged as effluent.
- Disinfection Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms. An open channel, gravity flow, low pressure, high intensity UV disinfection system will be provided, capable of treating a peak flow of 9 MGD with a maximum anticipated total suspended solids concentration of 30 mg/L at peak flow. The single open channel UV system consists of two banks in series, with the channel suitable for adding a third bank in the future.

The minimum UV dose for the primary condition is $35,000 \,\mu\text{W-sec/cm}^2$ based on MS2Phage or $17,500 \,\mu\text{W-sec/cm}^2$ based on T1 dose at end of lamp life and fouling factors and at peak flow with a UV transmittance of 60 PCT at 253.7 nm with all banks in service. For a future condition with an additional future bank, the criteria would be the same but with a UV transmittance of 50 PCT.

• Relocated Outfall – The disinfected effluent will flow by gravity through a 36inch diameter pipe to the relocated outfall, designated at Outfall No. 003 in the Draft Operating Permit Modification. The new outfall location is approximately 2200 ft upstream (southwest) from the current outfall location, and the effluent continues to discharge into Cinque Hommes Creek.

- Biosolids Equipment—Rehabilitation of existing biosolids equipment and basins to allow for continued use of the existing lime stabilitzation and thickening system.
 - Sludge Storage Tank 1 (SST1) In this existing tank, mixing performance will be enhanced by reconfiguring piping/nozzles and new mixer piping. In addition, a new fine bubble diffuser grid used in conjunction with the existing aeration blower will provide some sludge stabilization.
 - Pre-thickened Sludge Pump Station Improvements include two new upgraded centrifugal pumps/piping/valves with VFDs with a pump capacity of 600 gpm at 33 feet TDH with a 10 HP motor; new ventilation to comply with NFPA 820; heating to maintain a temperature of 50°F; and additional valve floor stand operators.
 - Gravity Belt Thickening (GBT) Building The 2-meter GBT will be overhauled with new control panel, belt, rollers, motors and drives; replacement of some chicanes; and washwater splashguard. Other upgrades include a new polymer blending unit, drum scale, replacing thickened sludge pump 2 with a new double disc diaphragm positive displacement pump, VFDs for the two thickened sludge pumps, and new heating and ventilation equipment and ductwork throughout the building and in pump pit. A modification will be made to the existing floor drain to eliminate process flow backup onto the operating floor.
 - Sludge Storage Tank 3 (SST3) Upgrades include installation of a second propeller mixer with a capacity of 8,000 gpm with a 30 HP motor to increase mixing capacity.
 - Sludge Loadout Pump Station Sludge loadout pumps will be replaced with new rotary lobe pumps/piping/valves with VFDs, with each pump having a capacity of 400 gpm at 134 feet TDH with a 30 HP motor. Other upgrades include new ventilation to comply with NFPA 820, heating to maintain a 50°F temperature, and additional floor stand operators.
 - Sludge Storage Tank 4 (SST4) and Blower Building A new mixing system will include a nozzle that will combine sludge and compressed air to be installed near the conical bottom of SST4 with new sludge and air discharge piping/fittings. A new blower to introduce air into SST4 will have a capacity of 500 scfm at 12 psig with a 50 HP motor. The mixing pump is a screw type with a capacity of 4,800 gpm at 21 feet TDH with a 40 HP motor and will be housed in the sludge mixing pump station.
 - Drain Pump Station The Drain Pump Station conveys decant and process drainage from the solids treatment processes to the first manhole upstream of the Influent Pump Station. There will be 2 constant speed submersible pumps in a 1 + 1 configuration and each pump will be capable of pumping 1,000 gpm at 19 ft TDH with a 15 HP motor.

- Emergency Power A 1000 kW standby diesel generator and automatic transfer switch will be provided to operate the treatment facility in event of power failure.
- Building construction will include rehabilitation of the existing Laboratory/Control Building within the existing footprint, construction of a new Administration Building with built-out electrical and maintenance areas, and a pre-engineered metal canopy over the UV disinfection system.

6. **OPERATING PERMIT**

Operating permit MO-0051144 will require a modification to reflect the construction activities. The modified operating permit for Southeast WWTP, MO-0051144, was successfully public noticed for comment from August 27, 2021, to September 27, 2021, with no comments received. At construction completion, submit the Statement of Work Completed form to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

Ginny Bretzke, P.E. Financial Assistance Center Clean Water Engineering Unit ginny.bretzke@dnr.mo.gov 573-751-1302 C295832-01 Perryville WWTP Improvements Perryville Southeast WWTP, MO-0051144 Page 11

APPENDIX A – PROCESS SCHEMATIC



APPENDIX B – WATER QUALITY AND ANTIDEGRADATION REVIEW



May 14, 2021

David Carani 401 South 18th Street, Suite 300 St. Louis, MO, 63103

RE: Water Quality and Antidegradation Review for the Perryville WWTF, Outfall Relocation

Dear David Carani:

The Missouri Department of Natural Resources' Water Protection Program received your request to review the relocation of the outfall for the Perryville WWTF on May 6, 2021. The proposed relocation moves the outfall approximately 2,200 feet upstream in the same stream segment of Cinque Hommes Creek, a gaining stream. Staff reviewed the low flow stream statistics and found that stream flows upstream are expected to be identical. In addition, there are no other changes being sought with regard to effluent flow or concentrations. For these reasons there is no need to revisit the Water Quality Antidegradation Review completed in June of 2108.

If you have any questions concerning this matter, please contact Bern Johnson, of my staff, by phone at 573-751-1714, by email at <u>bern.johnson@dnr.mo.gov</u>, or by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102. Thank you.

Sincerely,

tye

John Rustige, P.E., Chief Wastewater Engineering Unit

JR:bjt



August 23, 2021

David Carani 401 South 18th Street, Suite 300 St. Louis, MO, 63103

RE: Water Quality and Antidegradation Review for the Perryville WWTF, Changes Regarding Chromium VI and Nickel

Dear David Carani:

The Missouri Department of Natural Resources' Water Protection Program received your request to review the Water Quality Antidegradation Review regarding Chromium VI and Nickel for the Perryville WWTF on August 11, 2021. During the original Antidegradation review period, the existing operating permit for the facility was renewed. The renewed operating permit did not require ongoing monitoring for Chromium VI and Nickel because an analysis of the effluent data showed the facility did not have reasonable potential to violate water quality standards for these pollutants.

In light of this, the Water Quality Antidegradation Review has been revised to eliminate the effluent limits and monitoring requirements for these pollutants. If there are additions or changes to the collection system in the future which indicate that there will be more loading of these metals, Perryville must follow the requirement in Part II – Special Conditions – Publicly Owned Treatment Works, paragraph 4, which states that the POTW must provide adequate notice if there is any substantial change of the volume or character of the pollutants being introduced into the POTW.

If you have any questions concerning this matter, please contact me, by phone at 573-751-7298, by email at john.rustige@dnr.mo.gov, or by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102. Thank you.

Sincerely,

John Rustige, P.E., Chief Wastewater Engineering Unit

JR:tw

Enclosures

c: Dean Willis, P.E., Allgeier, Martin, & Associates

Missouri Department of Natural Resources Water Protection Program Water Pollution Control Branch Engineering Section

Water Quality and Antidegradation Review

For the Protection of Water Quality and Determination of Effluent Limits for Discharge to

> Cinque Hommes Creek by Perryville Wastewater Treatment Plant



Updated August, 2021

Perryville Southeast WWTF August 2021 Page 2 Table of Contents 1. 2. 3. 4 5. A.

 Table 1. Pollutants of Concern and Tier Determination
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 6. 7. 8. 9. Table 8: Comparison of Ammonia NDEL & WQBEL......15

1. Purpose of Antidegradation Review Report

In 2015, the City of Perryville recognized a need for improvements to the Perryville Southeast Wastewater Treatment Facility (WWTF). In addition to anticipated future growth in residential, commercial, and industrial wastewater flows, there were concerns about metal concentrations in Cinque Hommes Creek, the WWTF's receiving stream, during periods when the flow from the WWTF accounted for virtually the entire flow of Cinque Hommes Creek. The draft operating permit has a schedule of compliance for metal effluent limits.

The City retained the services of Donohue & Associates, Inc., of Chesterfield, MO, to develop a facility plan for the project. The initial recommendation was to move the outfall to the Mississippi River, where the vastly greater volume and mixing would result in metal concentrations well below standards. At the same time, the City conducted several environmental studies to obtain more accurate data about metal discharges into and out of the WWTF. The results of these studies, according to the Donohue report, "could...change the recommended alternative of [the] Facility Plan."

The Water Effects Ratio study and a Wastewater Metals Translator Evaluation were completed, with the result that the Missouri Department of Natural Resources' Water Protection Program approved new translator values for copper and zinc.

The revised recommendation, known as the Engineering Supplement to Wastewater Treatment Facilities Plan (Supplement) submitted by Allgeier, Martin & Associates in October 2019, includes keeping the current outfalls and constructing a new activated sludge-type wastewater treatment facility with improved biosolids handling. The expanded facility will be built on the current site. The anticipated average flow will increase from 1.8 to 2.5 million gallons per day (MGD) and a peak flow of 9.0 MGD.

The applicant determined that all Pollutants of Concern (POCs) except metals and cyanide were nondegrading. It also elected to consider that several metals significantly degrade the receiving stream in the absence of existing water quality data. An alternatives analysis was conducted to fulfill the requirements of the Antidegradation Implementation Policy (AIP). New data determined that Chromium VI and Nickel no longer had a reasonable potential to exceed and were removed from the POC list.

2. General Assumptions of the Water Quality and Antidegradation Review

- A. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(2) Continuing Authorities and 10 CSR 20-6.010(5)(A)5B, consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
- B. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
- C. Changes to Federal and State Regulations (FSR) made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
- D. Effluent limitations derived from FSR may be WQBEL or Effluent Limit Guidelines (ELG).
- E. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
- F. A WQAR does not allow discharges to waters of the State, and shall not be construed as a National Pollution Discharge Elimination System (NPDES) or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
- G. Limitations and other requirements in a WQAR may change as Water Quality Standards (WQS), Methodology, and Implementation procedures change.

- H. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
- I. If the proposed treatment technology is not covered in 10 CSR 20-8 Minimum Design Standards, the treatment process may be considered a new technology. As a new technology, the permittee will need to work with the review engineer to ensure equipment is sized properly. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

3. Facility Information

Facility Name:	Perryville Southeast WWTF
NPDES#:	MO-0051144
County:	Perry
Facility Type:	POTW
UTM Coordinates:	X = 251277 ; Y = 4178728
12- Digit HUC:	07140105-0305
Legal Description:	Sec. 21, T35N, R11E
Ecological Drainage Unit:	Ozark/Apple/Joachim
Ecoregion:	River Hills

4. Facility History

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(3)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the Department developed a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review, which documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, and revised July 13, 2016, a facility is required to use Missouri's AIP for new and expanded wastewater discharges.

A. FACILITY PERFORMANCE HISTORY

The facility is currently in compliance with all requirements of its operating permit. There are concerns about metal concentrations in Cinque Hommes Creek during low flow periods when the WWTF's discharge accounts for a majority of the creek's flow, which are addressed in the current proposal, but there are no current limits for metals. The facility's operating permit renewal application is currently under review and additional parameters for monitoring may be identified with requirements in the operating permit.

B. <u>Receiving Waterbody Information</u>

Cinque Hommes Creek is gaining on the segment of discharge. There is no losing segment between the outfalls and the Mississippi River.

Outfall	Design Flow (cfs)	Treatment Level	Receiving Waterbody	Distance to Classified Segment (mi)
1&2	3.9	Secondary	Cinque Hommes Creek	0.0

Outfalls 1 and 2 are at the same location on Cinque Hommes Creek; the only difference being Outfall #2 is higher on the bank and only used to prevent back up when Outfall #1 is submerged by flooding in the creek.

Waterbody Name	Class	WBID	Low-Flow Values (cfs) [¥]			Designated Uses*	
			1Q10	7Q10	30Q10	Designated over	
Cinque Hommes Creek	Р	1781	0.579	0.754	0.969	AQL, IRR, LWP, SCR, WBC(B), HHP	

** Irrigation (IRR), Livestock & Wildlife Protection (LWP), Protection of Warm Water Aquatic Life (AQL), Human Health Protection (HHP), Cool Water Fishery (CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation – Category A (WBC-A), Whole Body Contact Recreation – Category B (WBC-B), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

¥ Low-flow values obtained from USGS StreamStats. <u>https://streamstats.usgs.gov/ss/</u>. See 2020 draft operating permit renewal Appendix: Receiving Stream Low-Flow Values.

Receiving Water Body Segment Outfall #1 and #2:				
Upper end segment (Outfall #1): X =251277 ; Y = 41778728				
Lower end segment: X = 780156 ; Y = 4180290				
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*Segment is the portion of the stream where discharge occurs. Segment is used to track changes in assimilative capacity and is bound at a minimum by existing sources and confluences with other significant water bodies.

A geohydrologic evaluation was not submitted as part of the Supplement. Based on the previous permit, the receiving stream is gaining for discharge purposes.

5. Antidegradation Review Information

The AIP specifies that if the proposed activity results in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required.

A. TIER DETERMINATION

Waterbodies are assigned Tier 1, 2, or 3 protection levels. Most POCs were assumed to be Tier 2.

Tier 2 level protection is assigned to the waterbody on a pollutant by pollutant basis where existing water quality is better than the water quality standards. Waterbodies with a Tier 2 protection level have an assimilative capacity for the pollutants being evaluated.

Below is a list of POCs reasonably expected to be in the effluent discharge. Pollutants of concern are

defined as those pollutants "proposed for discharge that affects beneficial use(s) in waters of the state. They include pollutants that create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge" (AIP, Page 7).

Pollutants of Concern	Tier*	Degradation	Comment
CBOD ₅ (6/1 - 9/30)	2	Non-Degrading	
CBOD ₅ (10/1 - 5/31)	2	Non-Degrading	
TSS	**	Non-Degrading	
E. coli	1	Non-Degrading	
pH	***	Non-Degrading	
Oil & Grease	2	Non-Degrading	
Ammonia as N	2	Non-Degrading	
Aluminum	2	Significant	No current limit
Copper	2	Significant	No current limit
Chromium VI	2	Significant	No current limit
Lead	2	Significant	No current limit
Nickel	2	Significant	No current limit
Zinc	2	Significant	No current limit
Cyanide	2	Significant	No current limit

Table 1. Pollutants of Concern and Tier Determination

* Tier assumed. ** No in-stream standards for these parameters. *** Standards for these parameters are ranges

B. EXISTING WATER QUALITY

No existing water quality data was submitted. Most POCs were considered to be Tier 2 with metals and cyanide significantly degrading in the absence of existing water quality. The facility discharges to Cinque Hommes Creek, which drains to the Mississippi River. Cinque Hommes Creek is on the 303(d) list of impaired waters for *E. coli*, therefore this waterbody is Tier 1 for bacteria. The Mississippi River is on the 303(d) list for chlordane. However, chlordane is not an expected pollutant discharged by the facility.

C. NECESSITY OF DEGRADATION

The AIP specifies that if the proposed activity does result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. Part of that analysis as shown below is the evaluation of non-degrading alternatives, such as regionalization or no discharge systems. The applicant has the option of assuming discharge will be significant and proceeding directly to the alternatives analysis, thereby avoiding the determination of the assimilative capacity of the receiving water. The Perryville WWTF has elected this option.

Regionalization

The Perryville WWTF is the largest treatment facility in the region. Small nearby facilities do not have the capacity to accept any increase in flow. The nearest WWTF with the capacity to accept the 1.0 MGD flow from Perryville is the Mississippi Lime facility near Ste. Genevieve, which is almost twenty miles north. Therefore, connection to a regional treatment facility is not available.

No Discharge Evaluation

The Supplement includes a short discussion of no discharge options. Recycling and subsurface application were determined to be unaffordable. Surface application was also determined to be unaffordable with capital costs estimated at \$41 million and O&M at \$630,000/year.

• Alternatives to No discharge

The October 2019 Supplement included analysis of two alternatives: a new activated sludge treatment system and enhanced treatment for removal of metals.

The Supplement discussed four different options for the disposal of sludge; however, these options all occur after treatment of the effluent and are not considered as alternatives to no discharge. The base case presented in the Supplement is for an activated sludge treatment to replace the existing trickling filter process, with increased capacity to account for future growth. The activated sludge process offers increased removal of metals from the wastewater. The alternative case is the addition of lime for enhanced metals removal in the sludge.

The results of the Water Effects Ratio (WER) study and Wastewater Metals Translator Evaluation (Translator) demonstrated that while metal concentrations were somewhat lower with the addition of lime, both cases were well below EPA limits of metals for land application.

A previous alternative explored was moving the outfall to the Mississippi River. Barr Engineering prepared, on behalf of the City of Perryville and Donohue & Associates, Inc., *Mississippi River Mixing Zone Analysis* dated April 4, 2017. The modeling results indicate that a surface discharge to the Mississispi River would not yield adequate mixing in the near-field region. However, the use of a single port diffuser with a 12-inch diameter port would adequately increase near-field mixing and allow an expanded zone of initial dilution. The proposed scenario would allow a zone of initial dilution of 1,310 cubic feet per second and a mixing zone of 13,100 cubic feet per second. While the mixing zone with a diffuser was an option considered, it was not pursued due to the nine-mile distance to the Mississippi River.

	Alternative 1 (Base	Alternative 2
	Case)	Activated Sludge + enhanced metals
	Activated Sludge	removal
Aluminum	340.6 μg/l	245.2 μg/l
Copper	65 μg/l	47 μg/l
(Translator & WER)		
Chromium VI	8.2 μg/l	61.3 μg/l
Lead	5.8 μg/l	4.2 μg/l
Nickel	85.2 μg/l	61.3 μg/l
Zinc (Translator)	134 µg/l	96 µg/1
Cyanide ATC	$\leq 10~\mu g/l$	$\leq 10~\mu { m g/l}$
Life Cycle Cost**	\$23,678,000	\$38,678,000
Ratio	100%	163%

Table 2: Alternatives Analysis Comparison

* monitoring requirement; **Life cycle cost at 20 year design life and 3% interest

D. SOCIAL AND ECONOMIC IMPORTANCE

The affected community consists of the City of Perryville and connected outlying areas, population currently 8,440 persons. The projected increase is to 10,243 persons by 2040. In addition, there are commercial and industrial contributors. Commercial growth is expected to match the 21.2% population increase. The major industry, Toyoda-Gosei, has a planned expansion. Otherwise, industrial growth is unknown, but the facility plan allocates a portion of the increased WWTF capacity for industrial growth.

Without the proposed improvements, the facility would likely find itself in noncompliance with anticipated future tightening of ammonia limits, which could curtail future development.

E. NATURAL HERITAGE REVIEW

A Missouri Department of Conservation Natural Heritage Review was obtained by the applicant in 2017. Three species of bats are indicated as hibernating within two miles of the project locations: Indiana bats (*Myotis Sodalis*, federal- and state-listed endangered), Northern long-eared bats (*Myotis septentrionalis*, federal-listed threatened), and Gray bats (*Myotis grisescens*, federal- and state-listed endangered). The applicant should follow recommendations given in the Natural Heritage Review Report of September 27, 2017 and if any trees need to be removed should contact the U.S. Fish and Wildlife Service for further coordination under the Endangered Species Act.

6. Mixing Considerations

RECEIVING STREAM(S) LOW-FLOW VALUES:

DECENTRIC CEDE (A)	LOW-FLOW VALUES (CFS)*					
RECEIVING STREAM	IG STREAM 1Q10		30Q10			
Cinque Hommes Creek (P)	0.579	0.754	0.969			
	the second se		a	î		

* Low-flow values obtained from USGS StreamStats. <u>https://streamstats.usgs.gov/ss/</u>. See 2020 draft operating permit renewal Appendix: Receiving Stream Low-Flow Values.

MIXING CONSIDERATIONS TABLE:

MIXING ZONE (CFS) [10 CSR 20-7 031(5)(A)/ B (II)(2)]			ZONE OF INITIAL DILUTION (CFS)			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			1Q10	7Q10	30Q10	
0.14475 0.1885 0.24475			0.014475	0.01885	N/A	

7. Permit Limits and Monitoring Information

Table 3. Proposed Monitoring Parameters and Effluent Limits

Parameter	Units	Daily Maximum	Weekly Average	Monthly Average	Basis for Limit (note 1)	Monitoring Frequency
Flow	MGD	*		*	FSR	twice/week
CBOD ₅ (6/1 - 9/30)	mg/L		14.4	10.8	NDEL	once/week
CBOD ₅ (10/1 - 5/31)	mg/L		18.0	14.4	NDEL	once/week
TSS	mg/L		21.6	14.4	NDEL	once/week
E. coli	CFU/100ml		1,030	206	FSR	once/week
pH	SU			6.0 - 9.0	FSR	once/week
Oil & Grease	mg/L	15		10	FSR	once/quarter
Total Phosphorus	mg/L	*		*	FSR	once/month
Total Kjeldhal Nitrogen	mg/L	*		*	FSR	once/month
Nitrate + Nitrite	mg/L	*		*	FSR	once/month
Aluminum	μg/l	753.7		375.7	WQBEL	once/quarter
Copper (Translator & WER)	μg/l	113.7		56.7	WQBEL	once/quarter
Lead	μg/l	13.8		6.9	WQBEL	once/quarter
Zinc (Translator)	μg/l	250.9		125.1	WQBEL	once/quarter
Cyanide – Amenable to Chlorination	μg/l	9.0		4.5	WQBEL	once/quarter
Ammonia - January	mg/L	12.2		3.1	WQBEL/NDEL	once/week
Ammonia - February	mg/L	8.8		2.4	NDEL/NDEL	once/week
Ammonia - March	mg/L	8.8		2.4	NDEL/NDEL	once/week
Ammonia - April	mg/L	8.4		2.2	WQBEL/NDEL	once/week
Ammonia - May	mg/L	10.4		1.8	NDEL/NDEL	once/week
Ammonia - June	mg/L	8.8		1.3	NDEL/NDEL	once/week
Ammonia - July	mg/L	8.4		1.0	WQBEL/NDEL	once/week
Ammonia - August	mg/L	8.4		1.0	WQBEL/NDEL	once/week
Ammonia - September	mg/L	8.4		1.2	WQBEL/NDEL	once/week
Ammonia - October	mg/L	8.4		1.5	WQBEL/NDEL	once/week
Ammonia - November	mg/L	8.4		2.3	WQBEL/NDEL	once/week
Ammonia - December	mg/L	10.2		2.7	WQBEL/NDEL	once/week

 mg/L
 10.2
 2.7
 WQBEL/NDEL
 once/w

 Note 1 – Water Quality-based Effluent Limitation – WQBEL; or Minimally Degrading Effluent Limit – MDEL; or Preferred Alternative Effluent
 once/w

 Limit – PEL; or Technology-based Effluent Limit – TBEL; or No Degradation effluent Limit – NDEL; or Federal/State Regulation – FSR; or Not
 Applicable – N/A. Also, please see the General Assumptions of the WQAR D & E.

 ** - Monitoring requirements only.
 **

8. Receiving Water Monitoring Requirements

The draft operating permit recommends downstream monitoring.

9. Derivation and Discussion of Parameters and Limits

Wasteload allocations and limits were calculated using the following method:

1) Water quality-based – Using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(C_s \times Q_s) + (C_e \times Q_e)}{(Q_e + Q_s)}$$
(EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration

 $C_s = upstream$ concentration

 $Q_s = upstream$ flow

 $C_e = effluent concentration$

 $Q_e = effluent flow$

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID). Water quality-based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Outfall #001 - Main Facility Outfall

- <u>Flow.</u> Though not limited itself, the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations [40 CFR Part 122.44(i)(1)(ii)]. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification. Influent monitoring has been and will be required for this facility in its Missouri State Operating Permit.
- <u>Carbonaceous Biochemical Oxygen Demand (CBOD₅).</u> The proposed draft operating permit establishes a weekly average limit for CBOD₅ for both seasons, which had previously been identified as a daily maximum effluent limit. However 40 CFR 122.45(d)(2) requires average weekly and average monthly discharge limitations for POTWs that are continuous dischargers. To be considered non-degrading, the loading of CBOD₅ in the discharge for summer (June 1 September 30) and for winter (October 1 May 31) had to remain the same. The loading was calculated at the existing permitted design flow and the new seasonal effluent limits were determined at the proposed design flow of 2.5 mgd, as seen in Table 4.

Table 4: Non-degrading CBOD Effluent Limits

					Current and		
	Limit	Current Limit (mg/L)	conversion factor	Current Flow (MGD)	Proposed Load (lbs/day)	Expected Flow (MGD)	New Limit (mg/L)
(6/1 0/20)	monthly	15.00	8.34	1.80	225.18	2.50	10.8
(0/1 - 9/30)	weekly	20.00	8.34	1.80	300.24	2.50	14.4
(10/1 5/21)	monthly	20.00	8.34	1.80	300.24	2.50	14.4
(10/1 - 3/31)	weekly	25.00	8.34	1.80	375.30	2.50	18.0

• <u>Total Suspended Solids (TSS)</u>. The proposed draft operating permit establishes a weekly average limit for TSS, which had previously been identified as a daily maximum effluent limit. However 40 CFR 122.45(d)(2) requires average weekly and average monthly discharge limitations for POTWs that are continuous dischargers. To be considered non-degrading, the loading of TSS in the discharge had to remain the same. The loading was calculated at the existing permitted design flow and the new seasonal effluent limits were determined at the proposed design flow of 2.5 mgd, as seen in Table 5.

Table 5: Non-degrading TSS limits

				Current and		
	Current		Current	Proposed	Expected	
	Limit	conversion	Flow	Load	Flow	New Limit
Limit	(mg/L)	factor	(MGD)	(lbs/day)	(MGD)	(mg/L)
Monthly	20.00	8.34	1.80	300.24	2.50	14.4
Weekly	30.00	8.34	1.80	450.36	2.50	21.6

- pH. 6.0-9.0 SU. Proposed limit is protective of the water quality standard [10 CSR 20-7.031(5)(E)].
- <u>Oil & Grease</u>. Conventional pollutant, [10 CSR 20-7.031(4)(B)]. Waters shall be free from oil, scum, and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses.
- <u>E. coli.</u> Monthly average of 206 CFU/100 mL during the recreation season (April 1 October 31) and weekly geometric mean of 1,030 CFU/ 100 mL were proposed [10 CSR 20-7.031(5)(C)]. Cinque Hommes Creek is on the 303(d) list of impaired waters for *E. coli*, therefore this waterbody is Tier 1 for bacteria. Because the proposed facility will be disinfecting, the effluent is not expected to "cause or contribute" to the impairment.
- <u>Total Ammonia Nitrogen</u>. For the non-degrading option, the pollutant load remains the same with the increased design flow. Below are the non-degrading loads based on the effluent limits in the existing operating permit, issued November 1, 2020 and the water quality based effluent limits using the Department's 2007 Ammonia Guidance and the 2020 Ecoregional Ammonia Policy. The non-degrading limits and water quality based effluent limits are compared to verify that the non-degrading effluent limits are protective of the water quality standard at 2.5 MGD.

Table 6: Non-degrading Ammonia Effluent Limits

		2020		Existing		New	
		Effluent		Design	Permitted	Design	
		Limit	conversion	Flow	Load	Flow	New Limit
		(mg/L)	factor	(MGD)	(lbs/day)	(MGD)	(mg/L)
January	Daily	17.1	8.34	1.8	256.71	2.5	12.3
	Monthly	4.3	8.34	1.8	64.55	2.5	3.1
February	Daily	12.2	8.34	1.8	183.15	2.5	8.8
	Monthly	3.4	8.34	1.8	51.04	2.5	2.4
March	Daily	12.2	8.34	1.8	183.15	2.5	8.8
	Monthly	3.3	8.34	1.8	49.54	2.5	2.4
April	Daily	14.5	8.34	1.8	217.67	2.5	10.4
_	Monthly	3.1	8.34	1.8	46.54	2.5	2.2
May	Daily	14.5	8.34	1.8	217.67	2.5	10.4
	Monthly	2.5	8.34	1.8	37.53	2.5	1.8
June	Daily	12.2	8.34	1.8	183.15	2.5	8.8
	Monthly	1.8	8.34	1.8	27.02	2.5	1.3
July	Daily	12.2	8.34	1.8	183.15	2.5	8.8
	Monthly	1.6	8.34	1.8	24.02	2.5	1.2
August	Daily	12.2	8.34	1.8	183.15	2.5	8.8
	Monthly	1.7	8.34	1.8	25.52	2.5	1.2
September	Daily	12.2	8.34	1.8	183.15	2.5	8.8
	Monthly	1.7	8.34	1.8	25.52	2.5	1.2
October	Daily	12.2	8.34	1.8	183.15	2.5	8.8
	Monthly	2.1	8.34	1.8	31.53	2.5	1.5
November	Daily	14.5	8.34	1.8	217.67	2.5	10.4
	Monthly	3.2	8.34	1.8	48.04	2.5	2.3
December	Daily	14.5	8.34	1.8	217.67	2.5	10.4
	Monthly	3.8	8.34	1.8	57.05	2.5	2.7

2020 WQBEL Calculation

The Department previously followed the 2007 Ammonia Guidance method for derivation of ammonia limits. However, the EPA's Technical Support Document for Water Quality-based Toxic Controls (TSD) establishes other alternatives to limit derivation. The Department has determined that the approach established in Section 5.4.2 of the TSD, which allows for direct application of both the acute and chronic wasteload allocations (WLA) as permit limits for toxic pollutants, is more appropriate limit derivation approach. Using this method for a discharge to a waterbody where mixing is not allowed, the criterion continuous concentration (CCC) and the criterion maximum concentration (CMC) will equal the chronic and acute WLA respectively. The WLAs are then applied as effluent limits, per Section 5.4.2 of the TSD, where the CMC is the Daily Maximum and the CCC is the Monthly Average. The direct application of both acute and chronic criteria as WLA is also applicable for facilities that discharge into receiving waterbodies with mixing considerations. The CCC and CMC will need to be calculated into WLA with mixing considerations using the mass-balance equation. In the event that mixing considerations derive an AML less stringent than the MDL, the AML and MDL will be equal and based on the MDL.

10010 11 11				000		
	Month	$T_{om} = \langle QC \rangle *$	"II (SID*	CCC	CMC	
	Innuary	27	рн (SU)* 7 8	(mg/L)	(mg/L) 12.1	
	February	<u> </u>	7.8	3.1	12.1	
	March	4.5	7.8	27	12.1	
	April	16.1	8.0	2.1	84	
	May	21.1	7.8	2.1	12.1	
	Iune	26.0	7.9	13	10.1	
	July	29.4	8.0	0.9	8.4	
	August	29.3	8.0	0.9	8.4	
	September	25.6	8.0	1.2	8.4	
	October	19.1	8.0	1.8	8.4	
	November	12.0	8.0	2.4	8.4	
	December	6.9	7.9	2.7	10.1	
hronic WLA: cute WLA: ML = WLAc IDL = WLAa ebruary	Ce = ((3.875 + Ce) = ((3.875 + Ce) = ((3.875 + Ce) = 3.3 mg/L) = 12.2 mg/L	0.24225)3.1 – (0.24 0.014475)12.1 – (0.	4225 * 0.01)) / 3. 014475 * 0.01)) /	875 / 3.875		Ce = 3 Ce = 12
hronic WLA: cute WLA: ML = WLAc IDL = WLAa ebruary hronic WLA: cute WLA: ML = WLAc IDL = WLAa Iarch hronic WLA: cute WLA: ML = WLAc IDL = WLAa	Ce = ((3.875 + Ce) = (0.2 mg/L) = 10.2 mg/L = 10.2 mg/L	0.24225) $3.1 - (0.24225)$ $3.1 - (0.24225)$ $3.1 - (0.24225)$ $3.1 - (0.24225)$ $3.1 - (0.24225)$ $12.1 - (0.24225)$ $12.1 - (0.24225)$ $12.7 - (0.24225)$ $12.7 - (0.24225)$ $10.1 - (0.2425)$ $10.1 - (0.2425)$ $10.1 -$	4225 * 0.01)) / 3. 014475 * 0.01)) / 4225 * 0.01)) / 3. 014475 * 0.01)) / 4225 * 0.01)) / 3. 014475 * 0.01)) / 3. 014475 * 0.01)) /	875 / 3.875 875 / 3.875 / 3.875 875 / 3.875		Ce = 3.2 Ce = 12 Ce = 12 Ce = 12 Ce = 12 Ce = 10
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Perryville Southeast WWTF August 2021 Page 14	
June Chronic WLA: Ce = $((3.875 + 0.24225)1.3 - (0.24225 * 0.01)) / 3.875$ Acute WLA: Ce = $((3.875 + 0.014475)10.1 - (0.014475 * 0.01)) / 3.875$ AML = WLAc = 1.4 mg/L MDL = WLAa = 10.2 mg/L	Ce = 1.4 Ce = 10.2
July Chronic WLA: Ce = ((3.875 + 0.24225)0.9 - (0.24225 * 0.01)) / 3.875 Acute WLA: Ce = ((3.875 + 0.014475)8.4 - (0.014475 * 0.01)) / 3.875 AML = WLAe = 1.0 mg/L MDL = WLAa = 8.4 mg/L	Ce = 1.0 $Ce = 8.4$
August Chronic WLA: Ce = ((3.875 + 0.24225)0.9 - (0.24225 * 0.01)) / 3.875 Acute WLA: Ce = ((3.875 + 0.014475)8.4 - (0.014475 * 0.01)) / 3.875 AML = WLAc = 1.0 mg/L MDL = WLAa = 8.4 mg/L	Ce = 1.0 $Ce = 8.4$
September Chronic WLA: $Ce = ((3.875 + 0.24225)1.2 - (0.24225 * 0.01)) / 3.875$ Acute WLA: $Ce = ((3.875 + 0.014475)8.4 - (0.014475 * 0.01)) / 3.875$ AML = WLAc = 1.2 mg/L MDL = WLAa = 8.4 mg/L	Ce = 1.2 Ce = 8.4
October Chronic WLA: $Ce = ((3.875 + 0.24225)1.8 - (0.24225 * 0.01)) / 3.875$ Acute WLA: $Ce = ((3.875 + 0.014475)8.4 - (0.014475 * 0.01)) / 3.875$ AMIL = WLAc = 1.9 mg/L MDL = WLAa = 8.4 mg/L	Ce = 1.9 Ce = 8.4
November Chronic WLA: $Ce = ((3.875 + 0.24225)2.4 - (0.24225 * 0.01)) / 3.875$ Acute WLA: $Ce = ((3.875 + 0.014475)8.4 - (0.014475 * 0.01)) / 3.875$ AML = WLAc = 2.5 mg/L MDL = WLAa = 8.4 mg/L	Ce = 2.5 Ce = 8.4
December Chronic WLA: $Ce = ((3.875 + 0.24225)2.7 - (0.24225 * 0.01)) / 3.875$ Acute WLA: $Ce = ((3.875 + 0.014475)10.1 - (0.014475 * 0.01)) / 3.875$ AML = WLAc = 2.9 mg/L MDL = WLAa = 10.2 mg/L	Ce = 2.9 Ce = 10.2

For each month, a Water Quality Based Effluent Limit and a Non-Degrading Effluent limit were calculated, and the final limits applied will be the limit that is most protective.

Table 8:	Compariso	n of Amn	10nia NDEI	& W	VOBEL

	Daily Maxim	um (mg/L)	Monthly Avera	ige (mg/L)
	WQBEL	NDEL	WQBEL	NDEL
January	12.2	12.3	12.2	3.1
February	12.2	8.8	12.2	2.4
March	10.2	8.8	10.2	2.4
April	8.4	10.4	8.4	2.2
May	12.2	10.4	12.2	1.8
June	10.2	8.8	10.2	1.3
July	8.4	8.8	8.4	1.2
August	8.4	8.8	8.4	1.2
September	8.4	8.8	8.4	1.2
October	8.4	8.8	8.4	1.5
November	8.4	10.4	8.4	2.3
December	10.2	10.4	10.2	2.7

<u>Cvanide</u>. Protection of Aquatic Life CCC = 5.2 μg/L, CMC = 22 μg/L, Background CN = 0 μg/L. The Department has determined the current acceptable ML of Cyanide Amenable to Chlorination to be 10 μg/L when using SM 4500-CN-G.

Acute AQL: 22 ug/L Chronic AQL: 5.2 ug/L

Acute WLA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 22 - (0.019 cfsZID * 0 background)) / 3.868 cfsDF = 22.107

Chronic WLA: Ce = ((3.868 cfsDF + 0.1885 cfsMZ) * 5.2 – (0.189 cfsMZ * 0 background)) / 3.868 cfsDF = 5.453

LTAa: WLAa * LTAa multiplier = 22.107 * 0.321 = 7.098 LTAc: WLAc * LTAc multiplier = 5.453 * 0.527 = **2.876** use most protective LTA: **2.876**

[CV: 0.6, 99th %ile] [CV: 0.6, 99th %ile]

 $\begin{array}{l} \mbox{Daily Maximum: MDL = LTA * MDL multiplier = 2.876 * 3.114 = 9 ug/L [CV: 0.6, 99th %ile] \\ \mbox{Monthly Average: AML = LTA * AML multiplier = 2.876 * 1.552 = 4.5 ug/L [CV: 0.6, 95th %ile, n=4] \\ \end{array}$

This effluent limit is below the accepted minimum quantification level (ML). The Department has determined the current acceptable ML of Cyanide Amenable to Chlorination to be 10 μ g/L when using SM 4500-CN⁻G. <u>Cyanides Amenable to Chlorination after Distillation</u> in *Standard Methods for the Examination of Water and Wastewater*, 22nd Edition. The permittee will conduct analyses in accordance with this method, or equivalent, and report actual analytical values. Measured values greater than or equal to the minimum quantification level of 10 μ g/L will be considered to be in compliance with the permit limitation. The minimum quantification level does not authorize the discharge of Cyanide in excess of the effluent limits stated in the permit.

Metals. Effluent limitations for total recoverable metals were developed using methods and procedures
outlined in the "Technical Support Document for Water Quality-based Toxic Controls" (EPA/505/2-90001) and "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit from a
Dissolved Criterion" (EPA 823-B-96-007). General warm-water fishery criteria apply. A Water Effects
Ratio and Dissolved Metals Translator Study was conducted for the site, determining a water hardness
of 207 mg/L used in the calculations below. The Water Effects Ratio and Dissolved Metals Translator
study were submitted to the Department and approved for use in August 2019. Perryville WWTF
receives industrial wastewater that contains metals from at least two sources.

METAI	CONVERSION FACTORS				
IVIETAL	Acute	Chronic			
Copper	0.542	0.542			
Lead	0.685	0.685			
Zine	0.871	0.871			

Conversion factors for Cu, Pb, Ni and Zn are hardness dependent. Values calculated using equation found in Section 1.3 of EPA 823-B-96-007 and from the 2019 Metal Translator study for copper and zinc. Hardness = 207 mg/L from the 2019 Metal Translator Study.

<u>Aluminum, Total Recoverable</u>. Protection of Aquatic Life Acute Criteria = 750 μg/L The hardness value of <u>207 mg/L</u> from the 2019 Metal Translator Study was utilized.

Acute AQL: 750 μ g/L TR Conversion: AQL/Translator = 750 / 1 = 750

Acute WLA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 750 - (0.019 cfsZID * 0 background)) / 3.868 cfsDF = 753.655

LTAa: WLAa * LTAa multiplier = 753.655 * 0.321 = 241.986 MDL = LTA * MDL multiplier = 241.986 * 3.114 = 753.7 μ g/L AML = LTA * AML multiplier = 241.986 * 1.552 = 375.7 μ g/L

[CV: 0.6, 99th %ile] [CV: 0.6, 99th %ile] [CV: 0.6, 95th %ile, n=4]

• <u>Copper, Total Recoverable</u>. Protection of Aquatic Life Acute Criteria = 26.665 µg/L and Chronic Criteria = 16.676 µg/L. The hardness value of <u>207 mg/L</u> from the 2019 Metal Translator Study was utilized. The total recoverable translator was set through the 2019 translator study and the 2.3 multiplying factor through the 2018 Water Effects Ratio.

Acute AQL: e^(0.9422 * ln207 – 1.700300) * (0.960)*2.3 = 61.33 $\mu g/L$ Chronic AQL: e^(0.78545 * ln207 – 1.702) * (0.960)*2.3 = 38.355 $\mu g/L$

[at hardness 207] [at hardness 207]

TR Conversion: AQL/Translator = 61.33 / 0.542 = 113.156 TR Conversion: AQL/Translator = 38.355 / 0.542 = 70.766 [at hardness 207] [at hardness 207]

 $\begin{array}{l} \mbox{Acute WLA: } Ce = ((3.868 \mbox{ cfsDF} + 0.01885 \mbox{ cfsZID}) * 113.156 - (0.019 \mbox{ cfsZID} * 0 \mbox{ background})) / 3.868 \mbox{ cfsDF} = 113.707 \\ \mbox{Chronic WLA: } Ce = ((3.868 \mbox{ cfsDF} + 0.1885 \mbox{ cfsMZ}) * 70.766 - (0.189 \mbox{ cfsMZ} * 0 \mbox{ background})) / 3.868 \mbox{ cfsDF} = 74.215 \\ \end{array}$

LTAa: WLAa * LTAa multiplier = 113.707 * 0.321 = **36.509** LTAc: WLAc * LTAc multiplier = 74.215 * 0.527 = 39.143 use most protective LTA: **36.509** MDL = LTA * MDL multiplier = 36.509 * 3.114 = **113.7 µg/L** AML = LTA * AML multiplier = 36.509 * 1.552 = **56.7 µg/L**

[CV: 0.6, 99th %ile] [CV: 0.6, 99th %ile]

[CV: 0.6, 99th %ile] [CV: 0.6, 95th %ile, n=4]

Criteria utilized	<u>Fotal Recoverable</u> . Protection of Aquatic Life Acute = $5.504 \ \mu g/L$. The hardness value of $207 \ m g/L$ from .	Criteria = $141.14 \mu g/L$ and Chronic the 2019 Metal Translator Study was	1
Acute AC Chronic . TR Conv TR Conv	QL: e^(1.273 * ln207 - 1.460448) * (1.46203 - ln207 * 0.145712) AQL: e^(1.273 * ln207 - 4.704797) * (1.46203 - ln207 * 0.14571) ersion: AQL/Translator = 141.14 / 0.685 = 206.047 ersion: AQL/Translator = 5.504 / 0.685 = 8.035	2) = 141.14 μg/L [at hardness 207] 12) = 5.504 μg/L [at hardness 207] [at hardness 207] [at hardness 207]	
Acute W Chronic	LA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 206.047 - (0.019 cf WLA: Ce = ((3.868 cfsDF + 0.1885 cfsMZ) * 8.035 - (0.189 cfsM	fsZID * 0 background)) / 3.868 cfsDF = 207.0 MZ * 0 background)) / 3.868 cfsDF = 8.426	51
LTAa: W LTAc: W	LAa * LTAa multiplier = 207.051 * 0.321 = 66.481 LAc * LTAc multiplier = 8.426 * 0.527 = 4.444	[CV: 0.6, 99th %ile] [CV: 0.6, 99th %ile]	
MDL = I AML = I	TA * MDL multiplier = 4.444 * 3.114 = 13.8 µg/L TA * MDL multiplier = 4.444 * 1.552 = 6.9 µg/L	[CV: 0.6, 99th %ile] [CV: 0.6, 95th %ile, n=4]	1
utilized. study. Acute AC Chronic	The total recoverable translator was set through the V QL: $e^{(0.8473 * ln207 + 0.884) * 0.98} = 217.502 \ \mu g/L$ AQL: $e^{(0.8473 * ln207 + 0.884) * 0.98} = 217.502 \ \mu g/L$	[at hardness 207] [at hardness 207] [at hardness 207]	slat
utilized. study. Acute AC Chronic . TR Conv TR Conv	The total recoverable translator was set through the V QL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ AQL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ ersion: AQL/Translator = 217.502 / 0.871 = 249.716 ersion: AQL/Translator = 217.502 / 0.871 = 249.716	[at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207]	slat
utilized. study. Acute AC Chronic J TR Conv TR Conv Acute W Chronic '	The total recoverable translator was set through the V QL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ AQL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ ersion: AQL/Translator = 217.502 / 0.871 = 249.716 ersion: AQL/Translator = 217.502 / 0.871 = 249.716 LA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 249.716 - (0.019 cf WLA: Ce = ((3.868 cfsDF + 0.1885 cfsZID) * 249.716 - (0.189 cfsZID) * 249.716 - (0.180 cfsZID) * (0.180 cfsZID) * (0.180 cfsZID) * (0.180 cfsZ	[at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [st hardness	slat 33 85
utilized. study. Acute A(Chronic . TR Conv TR Conv Acute W Chronic ' LTAa: W LTAa: W	The total recoverable translator was set through the V QL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \ \mu g/L}$ AQL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \ \mu g/L}$ ersion: AQL/Translator = 217.502 / 0.871 = 249.716 ersion: AQL/Translator = 217.502 / 0.871 = 249.716 LA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 249.716 - (0.019 cf WLA: Ce = ((3.868 cfsDF + 0.1885 cfsZID) * 249.716 - (0.189 cfsZIC) * 249.716 - (0.189 cfsZIC) * 249.716 - (0.189 cfsZIC) * 249.716 - (0.188 cfsZIC) * 249.716 - (0.188 cfsZIC) * 249.716 - (0.189 cfsZIC) * 249.716 - (0.1	[at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] fsZID * 0 background)) / 3.868 cfsDF = 250.9 fsMZ * 0 background)) / 3.868 cfsDF = 261.8 [CV: 0.6, 99th %ile] [CV: 0.6, 99th %ile]	slat 33 85
utilized. study. Acute AC Chronic J TR Conv TR Conv Acute W Chronic V LTAa: W LTAa: W UTAA: W use MDL = 1 AML = 1	The total recoverable translator was set through the V QL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ AQL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ ersion: AQL/Translator = 217.502 / 0.871 = 249.716 ersion: AQL/Translator = 217.502 / 0.871 = 249.716 LA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 249.716 - (0.019 cf WLA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 249.716 - (0.189 cfsZID) * (0.180 cfsZID)	[at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [st hardness 207] [st hardness 207] [st hardness 207] [st hardness 207] [cV: 0.6, 90] [st hardness 207] [cV: 0.6, 90] [cV: 0.6, 90]	33 85
utilized. study. Acute A(Chronic . TR Conv TR Conv Acute W Chronic ' LTAa: W LTAc: W USA MDL = 1 AML = 1 AML = 1 Potenti is no re in the r	The total recoverable translator was set through the V QL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ AQL: $e^{(0.8473 * ln207 + 0.884) * 0.98 = 217.502 \mu g/L}$ ersion: AQL/Translator = 217.502 / 0.871 = 249.716 ersion: AQL/Translator = 217.502 / 0.871 = 249.716 LA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 249.716 - (0.019 cf WLA: Ce = ((3.868 cfsDF + 0.01885 cfsZID) * 249.716 - (0.189 cfsZID) * (0.189 cfsZID) * 249.716 - (0.189 cfsZID) * (0.189	The 2019 Notal Halisator Study was Water Effects Ratio study and the trans [at hardness 207] [at hardness 207] [at hardness 207] [at hardness 207] [stild hardness 207] [at hardness 20, 90t % hitel [at hardness 20, 90t % hitel [at hardness 20, 90t % h	33 33 85] ble here ants

The Water Effects Ratio study and a Wastewater Metals Translator Evaluation were completed, with the result that the Missouri Department of Natural Resources' Water Protection Program approved new translator values for copper and zinc in 2019.

Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to attain the highest statutory and regulatory requirements. The Department has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Bern Johnson & Leasue Meyers & John Rustige Updated: August, 2021 Unit Chief: John Rustige, P.E.

Appendix A: Map of Discharge Location



	· · · REC	EIVED	0		
(c**	·····]	H	T	6+1	
MISSOURI DEPARTMENT OF	NATURAL RESOURCES	2 5 2019 FO	NO.	RTMENT USE ONLY	
WATER PROTECTION PROGR	RAM, WATER POLLUTION CONTROL VIEW SUMMARY / REQUEST	BRANCH	RECEIVE	DO LIZUCOCO	
C B		DAT	RECEIV	10-25-19 OB	7
1. FACILITY		10	OUNTY		
Perryville Wastewater Treatment Plant	City	P	erry	20,000	
1131 Hidden Valley Lane	Perryville	N	10	63775	
MO-0051144	2.5 MGD	4952	CODE		
2. OWNER					
City of Perryville	T AND			1. 100 0000	
215 N West Street	Perryville	s N	IO IO	63775	
EMAIL ADDRESS brentbuerck@cityofperryville.com		1	ELEPHON 73-547	E NUMBER WITH AREA CODE -2594	
3. CONTINUING AUTHORITY The regulatory	requirement regarding continuing authority is	found in 10 CSR 20	-6.010(2).	
Same As Owner	SECRETARY OF STATE CHARTER	NUMBER			
ADDRESS	CITY	s	TATE	ZIP CODE	
ÉMAIL ADDRESS		Т	ELEPHON	ENUMBER WITH AREA CODE	
4. CONSULTANT		-			
PREPARER NAME Dean A. Willis	COMPANY NAME Allgeier, Martin and Asso	ciates, Inc.			
ADDRESS 7231 East 24th Street	Joplin	M	O O	21P CODE 64804	
EMAIL ADDRESS dean.willis@amce.com		4	1.680-	ENUMBER WITH AREA CODE 7200	
5. RECEIVING WATER BODY SEGMENT #	1				
Cinque Hommes Creek (1781)					
5.1 Upper end of segment - Location of discl	harge	Lana			
5.2 Lower end of segment -		, cong			
UTM: X= 793358 , Y= 418369 Per the Missouri Antidegradation Implementation Procedure	59 OR Lat re (AIP), the definition of a segment, "a segment is a	, Long	bound,	at a minimum, by significant	
existing sources and confluences with other significant wat 6. WATER BODY SEGMENT #2 (IF APPLIC.	er bodies." ABLE. Use another form if a third seo	ment is needed)			
NAME		inche lo nococaj			
6.1 Upper end of segment - End of Segment	#1				
UTM: X=, Y=	OR Lat	, Long			
UTM: X=, Y=	OR Lat	, Long			
7. DECHLORINATION					
If chlorination and dechlorination is the existin to or less than the Water Quality Standards fo Yes Z No – What is the propose	g or proposed method of disinfection tre r Total Residual Chlorine stated in Table d method of disinfection? Ultraviolet	atment, will the ef A1 of 10 CSR 20	luent d -7.031	lischarged be equal ?	
Based on the disinfection treatment system be	eing designed for total removal of Total I	Residual Chlorine, quality based efflu	minim ent lim	al degradation for its. These compliance	

8. SUMMARIZE THE FEASIBILITY OF C	ONSTRUCT	NG A NO	DISCHARGE TREAT	MENT WASTEWATER	FACILITY
According to the Antidegradation impleme must be considered. No-discharge alterna subsurface land application, and recycle o	tives may inc r reuse.	dure Sec dude conn	ection to a regional tre	atment facility, surface la	rge alternatives ind application,
Regional treatment facility is not available. Subsurface land application is not practica Recycle or reuse are not feasible. Surface land application is not affordable.	l or affordable Capital cost f	e. or installa	tion of land application	facilities are estimated a	1 \$41 000 000
Operation and maintenance costs for the la	and application	on system	are estimated at \$630,	000 per year.	
9. ADDITIONAL REQUIREMENTS					
Complete and submit the following with	this submit	tal:			
Copy of the Geohydrologic Evaluati	on - Submit	request th	rough the Missouri Geo	ological Survey website	
Copy of the Missouri Natural Herita	ge from the M	Aissouri D	epartment of Conserva	tion website	
Attach your Antidegradation Review	Report and	all suppor	ting documentation as	these forms are only a s	ummary.
[] If applicable, submit a copy of any E	Existino Wate	r Quality o	data used in this proces	s. Include the date rarge	e of the data
source(s) of the data, and location of	of data collect	tion relativ	to the outfall. If using	your own collected usta	e or ure oasa,
sector(o) of the date, and reducer a			The second se	WINDER STREET CARDINESS STREET	er citizenny ciarse.
submit a copy of the Quality Assura	nce Project P	lan (QAP	P) approved by the dep	partment's Watershed Pr	otection Section.
submit a copy of the Quality Assura For more detailed information, see t	nce Project P he Missouri /	Plan (QAP Antidegrad	P) approved by the dep dation Implementation F	partment's Watershed Pr Procedure (AIP), Section	otection Section. ILA.1.
submit a copy of the Quality Assura For more detailed information, see t	nce Project F he Missouri /	Plan (QAP Antidegrad	P) approved by the dep dation Implementation F	partment's Watershed Pr Procedure (AIP), Section	otection Section. II.A.1.
submit a copy of the Quality Assura For more detailed information, see t	nce Project F the Missouri / S ENCLOSE	Plan (QAP Antidegrad	P) approved by the dep dation Implementation F	partment's Watershed Pr Procedure (AIP), Section	otection Section. II.A.1.
submit a copy of the Quality Assura For more detailed information, see t 10. PATH / TIER REVIEW ATTACHMENT Path A: Tier 2 – Non-Degradation Mass	nce Project F the Missouri / S ENCLOSE Balance	Plan (QAP Antidegrad ED	P) approved by the dep dation Implementation F	artment's Watershed Pr Procedure (AIP), Section	otection Section. ILA.1.
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submit a copy of the Quality Assura For more detailed information, see t 10. PATH / TIER REVIEW ATTACHMENT Path A: Tier 2 – Non-Degradation Mass Path B: Tier 2 – Minima Degradation Path C: Tier 2 – Significant Degradation	nce Project F the Missouri / 'S ENCLOSE Balance	Plan (QAP Antidegrad D D D	P) approved by the dep lation Implementation f Yes No Yes No Yes No	your own concleto water partment's Watershed Pr Procedure (AIP), Section	r quainy data, otection Section. II.A.1.
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The proposed project includes the construction of facilities at the existing WWTP site to increase the plant capacity and improve level of treatment. New activated sludge facilities are planned, with discharge to Cinque Hommes Creek near the present point of discharge. Eallities includes plants and aeration/mking equipment clarification tertiary filtration, ultraviolet disinfection, and discharge. Sludge management will utilize lime stabilization, storage, and land application. Treatment capacity will increase from 1.8 MGD to 2.5 MGD, with a peak flow capacity through the plant of 9.0 MGD. Applicants choosing to use a new wastewater technology that are considered an 'unproven technology' in Missouri must comply with the requirements set forth in the New Technology Definitions and Requirements fact sheet. 3. 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New activated skulge facilities are planned, with discharge to Cinque Hormes Creek near the present point of discharge. Facilities includes upmping, corrempt, grit removal, activitated sludge basins and aeration/mixing equipment, clarification, terilary filtration, ultraviolet disinfection, and discharge. Sludge management will ultilize line stabilization, storage, and and application. Treatment capacity will increase from 1.8 MGD to 2.5 MGD, with a peak flow capacity through the plant of 9.0 MGD. Application. Treatment capacity will increase from 1.8 MGD to 2.5 MGD, with a peak flow capacity through the plant of 9.0 MGD. Application the New Technology that are considered an "unproven technology" in Missouri must comply with the requirements set forth in the New Technology Definitions and Requirements fact sheet. 13. 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MISSOURI DEPARTMENT OF NATURAL RESOURCES	FOR DEPA	RTMENT USE ONLY
WATER PROTECTION PROGRAM	APP NO.	CP NO.
WASTEWATER TREATMENT FACILITY	FEE RECEIVED	CHECK NO.
	DATE RECEIVED	
APPLICATION OVERVIEW		
The Application for Construction Permit – Wastewater Treatment Facility form has be of Part A and B. All applicants must complete Part A. Part B should be completed wastewater or propose land application for wastewater treatment. Please read the a completing this form. Submittal of an incomplete application may result in the	en developed in a modu d for applicants who curr accompanying instruct application being retur	ilar format and consists ently land-apply ions before rned.
PART A – BASIC INFORMATION		
 APPLICATION INFORMATION (Note – If any of the questions in this section are considered incomplete and returned.) 	e answered NO, this app	olication may be
1.1 Is this a Federal/State funded project? X YES IN/A Funding Agency:	EPA Project	#:
1.2 Has the Missouri Department of Natural Resources approved the proposed proje	ct's antidegradation revi	iew?
1.3 Has the department approved the proposed project's facility plan*? ↓ YES Date of Approval: NO (If No, complete No. 1.4.)		
 1.4 [Complete only if answered No on No. 1.3.] Is a copy of the facility plan* for was application? ☐ YES ☐ NO ☐ Exempt because 	tewater treatment faciliti	es included with this
1.5 Is a copy of the appropriate plans* and specifications* included with this applicati	on? ee instructions.) 🗌 NO	C
1.6 Is a summary of design* included with this application? 🖾 YES 🔲 NO		
 1.7 Has the appropriate operating permit application (A, B, or B2) been submitted to X YES Date of submittal: <u>Included</u> with this submittal Enclosed is the appropriate operating permit application and fee submittal. De N/A: However, In the event the department believes that my operating permit changing equivalent to secondary limits to secondary limits or adding total residue to public notice? <u>YES</u> NO 	the department? enote which form: A requires revision to perm al chlorine limits, please	A B 3 B2 nit limitation such as share a draft copy prior
1.8 Is the facility currently under enforcement with the department or the Environment	tal Protection Agency?	YES 🔽 NO
1.9 Is the appropriate fee or JetPay confirmation included with this application? X See Section 7.0	YES 🗌 NO	*
* Must be affixed with a Missouri registered professional engineer's seal, signature a	nd date.	
2.0 PROJECT INFORMATION		
Perryville WWTP Improvements	\$ 29.5M	TRUCTION COST
Expansion of plant ADF design capacity from 1.8 mgd to 2.5 mgd via the c headworks, oxidation ditch, effluent filters, and UV disinfection (seasonal)	onstruction of an influ	ent pump station,
Sludge process includes thickening and lime stabilization prior to land appl	ication	
2.5 DESIGN INFORMATION		
A. Current population: <u>13,540;</u> Design population: <u>25,000</u>		200
B. Actual Flow: <u>1.48 M</u> gpd; Design Average Flow: <u>2.5 M</u> gpd; Actual Peak Daily Flow: <u>11 M</u> gpd; Design Maximum Daily Flow: <u>9.0 M</u> gpd	l; Design Wet Weathe	r Event: <u>11.0 M</u>
2.6 ADDITIONAL INFORMATION		
A. Is a topographic map attached? 🕱 YES 🗌 NO		
B. Is a process flow diagram attached? X YES NO		

MO 780-2189 (02-19)

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Page 1 of 3

3.0 WASTEWATER TREATMENT FACILIT	Y				
NAME Perryville Southeast WWTP	TELEPHONE NUMBER (573) 547-269		ITH AREA CODE	E-MAIL ADDRESS	
address (PHYSICAL) 1131 Hidden Valley Lane	Perryville		STATE MO	ZIP CODE 63775	Perry
Wastewater Treatment Facility: Mo- 005114	4 (Outfall	1 Of 1)	I		
3.1 Legal Description: <u>14</u> , <u>NW</u> 1/4 (Use additional pages if construction of more	, <u>SE</u> ; than one ou	4, Sec. <u>21</u> , T Itfall is proposed.)	35N, R 11E	_	
3.2 UTM Coordinates Easting (X): 780044 For Universal Transverse Mercator (UTM), Zo	Northing	g (Y): <u>41799</u> 57 a referenced to North .	American Datum 19	983 (NAD83)	
3.3 Name of receiving streams: Cinque	Homme	s Creek			
4.0 PROJECT OWNER					
City of Perryville		telephone number with area code (573) 547-2594		E-MAIL ADDRESS	
ADDRESS 215 N. West Street	Perr	yville	STATE MO	ZIP CODE 63775	
5.0 CONTINUING AUTHORITY: A continuit and/or ensuring compliance with the permit r	ng authori equiremer	ty is a company, bu its.	siness, entity or p	person(s) that will be	e operating the facility
City of Perryville		TELEPHONE NUMBER V (573) 547-	11TH AREA CODE 2594	E-MAIL ADDRESS	
ADDRESS 215 N. West Street	сітч Ре	rryville	STATE MO	ZIP CODE 63775	5
5.1 A letter from the continuing authority if c	lifferent th	an the owner is inc	luded with this ar	polication TYES	
2 COMPLETE THE FOLLOWING IE THE CONTINUING AUTHOR	RITY IS A MIS	SOURI PUBLIC SERVICE C			
A. Is a copy of the certificate of convenience	and nece	ssity included with	this application?		
5.3 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHO	DRITY IS A PRO	OPERTY OWNERS ASSOCI			
 B. Is a copy of the as-filed warranty deed, qu 	uitclaim de	ed or other legal in	strument which tr	ansfers ownership	of the land for the
wastewater treatment facility to the assoc	iation inclu	uded with this applic	ation?	5 🔲 NO	
C. Is a copy of the as-filed legal instrument ((typically t	ne plat) that provide	s the association	with valid easemer	its for all sewers
D. Is a copy of the Missouri Secretary of Sta	ite's nonpr	ofit corporation cer	ificate included w	ith this application?	YES NO
6.0 ENGINEER					
ENGINEER AME / COMPANY NAME		TELEPHONE NUMBER WITH AREA CODE		E-MAIL ADDRESS	
David Bunch / HDR Engineering Inc	;	(314) 425-8323		david.bunch@hdrinc.com	
ADDRESS	CITY		STATE	ZIP CODE	2
401 S. 18th Street, Suite 300	St	. Louis	MO	6310	3
7.0 APPLICATION FEE					
CHECK NUMBER		JETPAY CONFIRMATION	NUMBER		
B.0 PROJECT OWNER: I certify under pen	alty of law	that this document	and all attachme	nts were prepared u	under my direction or
supervision in accordance with a system des	signed to a	ssure that qualified	personnel prope	rly gather and evalu	ate the information
submitted. Based on my inquiry of the person	n or perso	ns who manage the	system, or those	e persons directly re	sponsible for
gathering the information, the information su	bmitted is,	to the best of my k	nowledge and be	lief, true, accurate,	and complete. I am
aware that there are significant penalties for	submitting	raise information, i	ncluaing the pos	solity of the and th	iprisonment for
PROJECT OWNER SIGNATURE					
Red T Rul					
PRINTED NAME				DATE	
Print 7 River K				302/202	21
TITLE OR CORPORATE POSITION		TELEPHONE NUMBER V	VITH AREA CODE	E-MAIL ADDRESS	
City Administrator		573-547	-2594	brand buerd	@ city of
Mail completed copy to: MISSOUR		MENT OF NATUR	AL RESOURCES		Pernyville.
	RUIECII 176	JN PROGRAM			
JEFFERS	ON CITY,	MO 65102-0176			
		END OF PART	۹.	and the second second	
REFER TO THE APPLICATION O	VERVIEW	TO DETERMINE	WHETHER PAR	B NEEDS TO BE	COMPLETE.

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PART B – LAND APPLICATION ONLY (Submit only if the proposed construction project includes land application of wastewater.)				
8.0 FACILITY INFORMATION				
8.1 Type of wastewater to be irrigated: Domestic State/National Park Seasonal business Municipal Municipal with a pretreatment program or significant industrial users Other (explain)				
8.2 Months when the business or enterprise will operate or generate wastewater:				
 8.3 This system is designed for: No-discharge. Partial irrigation when feasible and discharge rest of time. Irrigation during recreational season, April – October, and discharge during November – March. Other (explain) 				
9.0 STORAGE BASINS				
9.1 Number of storage basins: (Use additional pages if greater than three basins.)				
9.2 Type of basins: Steel Concrete Fiberglass Earthen Earthen with membrane liner				
9.3 Storage basin dimensions at inside top of berm (feet). Report freeboard as feet from top of berm to emergency spillway or				
Basin #1: Length Width Depth Freeboard Depth Safety % Slope				
Basin #2: Length Width Depth Freeboard Depth Safety % Slope				
Basin #3: Length Width Depth Freeboard Depth Safety % Slope				
9.4 Storage Basin operating levels (report as leet below emergency overnow level). Basin #1: Maximum operating water levelft Basin #2: Maximum operating water levelft Basin #3: Maximum operating water levelft Minimum operating water levelft Minimum operating water levelft 9.5 Design depth of sludge in storage basins. Basin #1: ft Basin #1: ft Basin #3:				
9.6 Existing sludge depth, if the basins are currently in operation. Basin #1: ft Basin #2: ft Basin #3: ft				
9.7 Total design sludge storage: dry tons and cubic feet				
10.0 LAND APPLICATION SYSTEM				
10.1 Number of irrigation sites Total Acres Maximum % field slopes Location:14,14,14,SecTRCountyAcres Location:14,14,14,SecTRCountyAcres Location:14,14,14,SecTRCountyAcres Location:14,14,14,SecTRCountyAcres Location:14,14,14,SecTRCountyAcres (Use additional pages if greater than three irrigation sites.)				
10.2 Type of vegetation: Grass hay Pasture Timber Row crops				
10.3 Wastewater flow (dry weather) gallons per day: Average annual Seasonal Off-season				
10.4 Land application rate (design flow including 1-in-10 year storm water flows): Design:				
10.5 Total irrigation per year (gallons): Design: gal Actual: gal				
10.6 Actual months used for irrigation (check all that apply): ☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec				
10.7 Land application rate is based on: ☐ Hydraulic Loading ☐ Other (describe) ☐ Nutrient Management Plan (N&P) If N&P is selected, is the plan included? ☐ YES ☐ NO MO 780-2189 (02-19) Page 3 of 3				