MEMORANDUM

EFIS Case No. SR-2014-0153
Peaceful Valley Service Company

TO: EFIS File No. SR-2014-0153

FROM: David Spratt, Utility Operations Technical Specialist II - Water & Sewer Unit

/s/ David A. Spratt
Water and Sewer Unit

/s/ Kevin Thompson
Staff Counsel

SUBJECT: Water and Sewer Unit Staff Report

DATE: August 15, 2014

Introduction

This report is the Water and Sewer Unit's findings regarding Peaceful Valley Service Company's (Peaceful Valley or Company) plan to comply with the Missouri Department of Natural Resources (DNR) regulations. It is being filed to comply with the Commission's Order of July 29, 2014.

Background of the Issue

Peaceful Valley provides waste water treatment to approximately 171 customers by using a single-cell lagoon. This facility has been operating properly and discharging treated waste water into a receiving stream nearby in accordance with its Missouri State Operating Permit, issued by DNR, permit no. MO-0041477. A copy of this permit is included as Attachment A. Sewer discharge permits are not perpetual. They normally expire and may be renewed every five years. Peaceful Valley's sewer operating permit was most recently renewed on January 1, 2014. Among its various provisions, the current permit contains a schedule to comply with ammonia discharge from the treatment facility. The ammonia limit will become effective, according to the permit, on January 1, 2018. Prior to the current permit the amount of ammonia discharge had no limit and ammonia had not been required to be monitored. These new ammonia limits that have been prescribed by DNR for Peaceful Valley's treatment facility to become effective on January 1, 2018 are established at 1.3 milligrams per liter (mg/L) from April 1 to September 30, and 2.9 mg/L from October 1 to March 31. Limits for ammonia are being included in discharge permits, generally, because revised water quality criteria were established by the United States Environmental Protection Agency on August 22, 2013. The new criteria required states to lower the allowable amount of ammonia released in treated waste water. Publication 2481, included as Attachment B, published by DNR, discusses the new ammonia criteria and the ability of certain

types of treatment facilities to meet those new limits. Lagoons, like the one presently treating waste water for Peaceful Valley, are deemed "unlikely to meet ammonia limitations" according to this document. The publication also states, "[m]any treatment facilities in Missouri are currently schedule to be upgraded to comply with the current water quality criteria." Water pollution protection is becoming increasingly stringent to protect waters of the state and certain wild life.

What Projects are Required by DNR?

Although operation of the present lagoon is permitted by DNR under the current operating permit issued by DNR, and the permit expires on December 31, 2018, the permit states the following on page 7:

> The facility shall attain compliance with the timeframe set for the permittee to upgrade the facility in effort to improve the receiving stream water quality, as soon as reasonably achievable or no later than 4 years of the effective date of this permit. The upgrade of the facility shall be technology that is capable of meeting the new effluent limits for Ammonia as N.[1]

In other words, the Company is required to build a new treatment facility to meet new limits for ammonia discharge as prescribed and required by DNR.

Documentation of What DNR Requires

Documentation of DNR's requirements simply consists of the operating permit that currently is in effect for Peaceful Valley's treatment facility included as Attachment A. Publication 2481 generally discussing compliance with ammonia discharge limits is included as Attachment B.

Records Showing Dates a compliance project must be completed, etc.

The operating permit, Attachment A, contains a Schedule of Compliance (SOC) on page 7. In that SOC, three dates were included by DNR, as follows:

- December 1, 2013 – Submit an engineering evaluation and plan for upgrading the facility. Alternatively, if the permittee choses to eliminate the discharge by connection to another facility, submit a closure plan and schedule for eliminating the discharge.

This was completed December 1, 2013. Peaceful Valley caused an engineering report to be prepared by Integrity Engineering, Inc (Integrity), a consulting engineer, in October 2013.

- July 1, 2014 – Submit an application for construction permit.

[1] N is the chemical symbol for the element Nitrogen. Ammonia is a chemical compound made up of Nitrogen and Hydrogen molecules.

This has not yet been completed. The reason for this date not being met is that the Company is continuing to evaluate its options and to look for funding mechanisms that would allow it to pay for the upgrades. The Company states to Staff that it is keeping DNR updated as to its progress, and DNR has informally extended this date by eighteen (18) months.

- January 1, 2018 – Complete construction and send certificate of work completed. Submit an application to modify the permit.

This is the firm date by which Peaceful Valley is required to meet the limits for ammonia as prescribed by the current permit.

Documentation showing detailed costs, etc.

The engineering report written by Integrity is included as Attachment C. Below is a more detailed analysis of the Company's options.

Company's Options

Integrity's report details the scope of the project, and offers a proposal as the best solution to meet the new permit criteria. The engineering report discusses five options available to the Company and the costs associated with each.

The first option is to upgrade the existing lagoon, either by following existing treatment with enhanced additional treatment, or by converting the facility to an aerated facility then follow with additional treatment. Because of the small size of the lagoon, the shallow depth, and the lack of land to expand, this option does not appear viable.

The second option involves land application of treated waste water, meaning treated sewage discharge would be distributed over a large area, would not flow into a water way (waters of the State), and would not require a discharge permit with ammonia and other limits. The engineering report has determined that the Company would need approximately 46 acres of land at an estimated cost of $5,000 per acre to properly perform land application. The slope of the hills within the Company's certificated area prohibits land application on presently owned property because of the risk of water flowing into the waterway. An adjacent land owner to the lagoon has told the Company that his land is not for sale. The apparent inability to acquire the needed suitable land, along with the cost of acquiring land, developing a discharge field, and constructing a holding facility that would be used during inclement weather when land discharge does not work well, has prevented study of this option from any further consideration.

The third and fourth options involve mechanical treatment plants, of either an extended aeration or biorotator configuration. Although these types of treatment facilities are commonly used elsewhere, mechanical facilities use more electricity and have higher operations and maintenance

costs than some of the other options available to Peaceful Valley, have blower motors that some consider loud, and can produce odors if not maintained properly.

The fifth option, deemed the most feasible option by Integrity, is a recirculating biofilter system. Integrity has a specific product in mind, manufactured by Orenco Systems, Inc., called the Advantex Ax-Max. The engineering report states that there is less maintenance, lower energy costs, no odors, and no noise associated with this process. It also states that the "operation and maintenance of an Advantex system is very simplistic."

Cost analyses of these alternatives are outlined in the engineering report.

In addition to these alternatives, the Company also explored an option of pumping wastewater to the city of Owensville to be treated on a wholesale basis. But this option is seen as cost prohibitive because it would require three miles of force main along with easement acquisition, and one or more electric-powered lift stations to not only transport the wastewater this distance but also to an elevation approximately 200 feet higher than Peaceful Valley's lagoon. Also, available treatment capacity of Owensville's system is questionable.

What Steps has the Company taken to determine available financing?

On November 20, 2013, the Missouri Public Service Commission ("PSC") received a letter from Peaceful Valley Service Company, which letter created the subject case, requesting an annual increase in operating revenue in the amount of $93,840 prior to beginning construction of the facility in attempt to finance the construction. This dollar amount divided evenly among the 180 sewer customers would increase rates by about $46 per month according to the Company's rate request. The current tariffed sewer rates are $33.53 per quarter. The agreed upon amount in the Company/Staff Disposition Agreement will provide the Company with an annual increase of $2,355, which does not include funding for future plant. Staff's normal policies are to only include plant that is in service and is "used and useful," and not include plant that may or may not be constructed at some future time, as the Company had requested.

Staff inquired of the Company about its efforts to secure financing for this project, or look at other options. The Company was unable to secure a loan from a bank that it normally does business with, because of the Company's current financial picture, which is a similar situation facing many small water and sewer utilities. The bank suggested that the Company apply for state or federal loans.

The Company reports to Staff that it obtained applications for DNR and the United States Department of Agriculture (USDA) loans only to discover that both agencies do not offer loans to "for profit" companies. Peaceful Valley Service Company is considering either transferring assets to the association, or a nonprofit water and sewer utility as provided for in Missouri Statutes, or converting the existing corporation to such a nonprofit utility. Any of these types of

nonprofit utilities would not be regulated by the Commission, and thus they could set rates as they choose including collecting funds for future plant from customers, as well as the possible eligibility for government grants and low interest loans that are not typically available to investor owned utilities.

To expand on the idea of collecting funds from customers for future plant, Staff also suggested that the Company could seek funding for future plant through the Peaceful Valley Property Owners Association, Inc., which presumably could assess members a charge for the purpose of funding future utility plant. Notably, all customers are members of the Association. Many of the Association's members do not have homes and are not utility customers, and presumably the Association would only attempt to impose such a special charge on those members who are Company customers in order to make such a proposal workable for all members. This option has been discussed but apparently has not yet been seriously considered, although Staff believes that if the utility customers wish to impose such a special charge on themselves for this purpose then they could likely do it in some manner through their association or some associated entity created for funding matters.

Finally, in the Company's request, it asked for future plant to be included in rates, based on a twenty-year payback. At this time, the future plant, as contemplated by the Company, is not a substitute for financing because the facility needs to be completed by the end of 2017 and the funds are to be collected over a twenty-year period. Therefore, the funds would not be available to pay the costs of construction as those costs occur.

Documentation detailing requests or inquiries regarding financing and results of those requests?

The Company does not have any documentation to provide in regards to the construction permit or financing. The Company states it is unable to issue an engineering contract until financing is available and is unable to apply for a construction permit from DNR until an engineering contract is issued. The Company did not receive documentation from the bank for the loan refusal because the request was verbal. The Company acquired applications for loans from DNR and USDA, but determined it did not qualify as both agencies only offer loans to not-for-profit entities.

Conclusion

Peaceful Valley has been given the task of removing ammonia from its waste water effluent to meet new discharge standards and it is unable to do so with its present means of waste water treatment. The Company is looking at options and costs for upgrades to comply with its new permitted effluent limits. The engineering firm has proposed a solution to the Company with an estimated capital cost of $1,114,880, and a twenty (20) year life cycle estimated cost of $46.12

per month per customer. The Company has thus far been unable to secure a loan from a bank, DNR or USDA to pay for the upgrades.

ATTACHMENT A

Missouri DNR Permit

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-0041467
Owner:	Peaceful Valley Property Owners
Address:	3408A Peaceful Valley Rd. Owensville, MO, 65066
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Peaceful Valley Service Co.
Facility Address:	North on E. Skyline Dr. Owensville, MO, 65066
Legal Description:	NE ¼, NE ¼, Sec. 25, T42N, R06W, Gasconade County
UTM Coordinates:	X= 627827, Y= 4246791
Receiving Stream:	Unnamed tributary to Cedar Branch (U)
First Classified Stream and ID:	Cedar Branch (C) (1552)
USGS Basin & Sub-watershed No.:	10290203-0305

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 –Lakefront Residential Estates – SIC #4952
The use or operation of this facility shall be by or under the supervision of a Certified "D" Operator
One cell facultative lagoon/sludge is retained in lagoon
Design population equivalent is 410.
Design flow is 40,750 gallons per day.
Actual flow is 48,356 gallons per day.
Design sludge production is 2.87 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 621.250 RSMo, Section 640.013 RSMo and Section 644.051.6 of the Law.

January 1, 2014
Effective Date

Sara Parker Pauley
Sara Parker Pauley, Director, Department of Natural Resources

December 31, 2018
Expiration Date

John Madras
John Madras, Director, Water Protection Program

OUTFALL #001	TABLE A-1. INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 2 of 7
		PERMIT NUMBER MO-0041467

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect through December 31, 2017. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*	-	*	once/week	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L	-	65	45	once/month	grab
Total Suspended Solids	mg/L	-	120	80	once/month	grab
pH – Units	SU	**	-	**	once/month	grab
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	* *	-	* *	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE FEBRUARY 28, 2014. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #19			once/year	grab
WET TEST REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE BY JANUARY 28, 2019.						

* Monitoring requirement only.

** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.

OUTFALL #001	TABLE A-2. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS	PAGE NUMBER 3 of 7
		PERMIT NUMBER MO-0041467

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 on January 1, 2018, and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/week	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		65	45	once/month	grab
Total Suspended Solids	mg/L		120	80	once/month	grab
pH – Units	SU	**		**	once/month	grab
Ammonia as N (April 1 – Sept 30) (Oct 1 – March 31)	mg/L	4.6 8.0		1.3 2.9	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE FEBRUARY 28, 2018. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #19			once/year	grab
WET TEST REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE; THE FIRST REPORT IS DUE BY JANUARY 28, 2019.						

* Monitoring requirement only.

** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.5 pH units.

B. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I & III standard conditions dated November 1, 2013, and August 15, 1994, and hereby incorporated as though fully set forth herein.

C. SPECIAL CONDITIONS

1. This permit establishes final ammonia limitations based on Missouri's current Water Quality Standard. On August 22, 2013, the U.S. Environmental Protection Agency (EPA) published a notice in the Federal Register announcing of the final national recommended ambient water quality criteria for protection of aquatic life from the effects of ammonia in freshwater. The EPA's guidance, Final Aquatic Life Ambient Water Quality Criteria for Ammonia – Fresh Water 2013, is not a rule, nor automatically part of a state's water quality standards. States must adopt new ammonia criteria consistent with EPA's published ammonia criteria into their water quality standards that protect the designated uses of the water bodies. The Department of Natural Resources intends to adopt the new ammonia criteria during the next water quality standards triennial review.

   Also, refer to Section VI of this permit's factsheet for further information including estimated future effluent limits for this facility. It is recommended the permittee view the Department's 2013 EPA criteria Factsheet located at http://dnr.mo.gov/pubs/pub2481.pdf .

2. 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. SPECIAL CONDITIONS (continued)

(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.

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

4. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.

5. Water Quality Standards

(a) To the extent required by law, 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. 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 by the Director in accordance with 40 CFR 122.44(f).
(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.

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

8. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).

9. Bypasses are not authorized at this facility and are subject to 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3)(i), and with Standard Condition Part I, Section B, subsection 2.b. Bypasses are to be reported to the St. Louis Regional Office.

10. The facility must be sufficiently secured to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.

C. SPECIAL CONDITIONS (continued)

11. A least one gate must be provided to access the wastewater treatment facility and provide for maintenance and mowing. The gate shall remain locked except when opened by the permittee to perform operational monitoring, sampling, maintenance, mowing, or for inspections by the Department.

12. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. There shall also be one (1) sign placed for every five hundred feet (500') (150 m) of the perimeter fence. A sign shall also be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.

13. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.

14. An all-weather access road shall be provided to the treatment facility.

15. The discharge from the wastewater treatment facility shall be conveyed to the receiving stream via a closed pipe or a paved or rip-rapped open channel. Sheet or meandering drainage is not acceptable. The outfall sewer shall be protected against the effects of floodwater, ice or other hazards as to reasonably insure its structural stability and freedom from stoppage. The outfall shall be maintained so that a sample of the effluent can be obtained at a point after the final treatment process and before the discharge mixes with the receiving waters.

16. A minimum of two (2) feet freeboard must be maintained in the lagoon cell.

17. The berms of the lagoons shall be mowed and kept free of any deep-rooted vegetation, animal dens, or other potential sources of damage to the berms.

18. The facility shall ensure that adequate provisions are provided to prevent surface water intrusion into the lagoon and to divert stormwater runoff around the lagoon and protect embankments from erosion.

19. Whole Effluent Toxicity (WET) Test shall be conducted as follows:

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT				
OUTFALL	AEC	FREQUENCY	SAMPLE TYPE	MONTH
001	100%	once/Permit cycle	grab	Any

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

(a) Test Schedule and Follow-Up Requirements

(1) Perform a MULTIPLE-dilution acute WET test in the months and at the frequency specified above. For tests which are successfully passed, submit test results using the Department's WET test report form #MO-780-1899 along with complete copies of the test reports as received from the laboratory, including copies of chain-of-custody forms within 30 calendar days of availability to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102. If the effluent passes the test, do not repeat the test until the next test period.

(i) 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.

(ii) 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 analysis performed upon any other effluent concentration.

(iii) All chemical analyses included in the Missouri Department of Natural Resources WET test report form

C. SPECIAL CONDITIONS (continued)

#MO-780-1899 shall be performed and results shall be recorded in the appropriate field of the report form.

(2) The WET test will be considered a failure if mortality observed in effluent concentrations for either specie, equal to or less than the AEC, is 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, synthetic laboratory control water may be used.

(3) 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.

(4) If the effluent fails the test for BOTH test species, a multiple dilution test shall be performed for BOTH test species within 30 calendar days and biweekly thereafter (for storm water, tests shall be performed on the next and subsequent storm water discharges as they occur, but not less than 7 days apart) until one of the following conditions are met: Note: Written request regarding single species multiple dilution accelerated testing will be address by THE WATER PROTECTION PROGRAM on a case by case basis.

(i) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.

(ii) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.

(5) Follow-up tests do not negate an initial failed test.

(6) 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.

(7) Additionally, the following shall apply upon failure of the third follow up MULTIPLE DILUTION test The permittee should 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. If the permittee does not contact THE WATER PROTECTION PROGRAM upon the third follow up test failure, a toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. 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 the automatic trigger or 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.

(8) 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.

(9) 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.

(10) 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.

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

(b) Test Conditions

(1) Test Type: Acute Static non-renewal

(2) All tests, including repeat tests for previous failures, shall include both test species listed below unless approved by the department on a case by case basis.

(3) Test species: Ceriodaphnia dubia and Pimephales promelas (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.

(4) Test period: 48 hours at the "Allowable Effluent Concentration" (AEC) specified above.

(5) Upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.

(6) Tests will be run with 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent, and reconstituted water.

(7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.

(8) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.

(9) Whole-effluent-toxicity test 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

D. SCHEDULE OF COMPLIANCE

The facility shall attain compliance with the timeframe set for the permittee to upgrade the facility in effort to improve the receiving stream water quality, as soon as reasonably achievable or no later than **4 years** of the effective date of this permit. The upgrade of the facility shall be technology that is capable of meeting the new effluent limits for Ammonia as N.

1. By **December 1, 2013,** submit an engineering evaluation and plan for upgrading the facility. Alternatively, if the permittee choses to eliminate the discharge by connection to another facility, submit a closure plan and schedule for eliminating the discharge. (completed December 1, 2013)

2. By **July 1, 2014,** submit an application for construction permit.

3. By **January 1, 2018,** complete construction and send a certificate of work completed. Submit an application to modify the permit.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL
OF
MO-0041467
PEACEFUL VALLEY SERVICE COMPANY

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of storm water from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

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

This Factsheet is for a Minor ☒

Part I – Facility Information

Facility Type: NON-POTW –Homeowners Association- 6611

Facility Description:
One cell facultative lagoon/ sludge is retained in lagoon.
Design population equivalent is 410.
Design flow is 40,750 gallons per day.
Actual flow is 48,356 gallons per day
Design sludge production is 2.87 dry tons/year.

Have any changes occurred at this facility or in the receiving water body that effects effluent limit derivation?

☒ - No.

Application Date: 03/29/2012
Expiration Date: 02/22/2012

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
#001	0.06	Equivalent to Secondary	Domestic

Facility Performance History:
This facility was last inspected on 11/15/2011. The inspection showed the following unsatisfactory features; Facility not meeting effluent limits.

Comments: Due to consistent exceedance in design flow, the upgrade to the facility must address the actual flow from the facility.

Part II – Operator Certification Requirements

Applicable ☒; This facility is required to have a certified operator.

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.020(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200) and/or fifty (50) or more service connections.

This facility currently requires an operator with a D Certification Level. Please see **Appendix - Classification** Modifications made to the wastewater treatment facility may cause the classification to be modified.

Operator's Name: Richard Pierce
Certification Number: 10993
Certification Level: D

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

Part III– Operational Monitoring

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

Part IV – Receiving Stream Information

10 CSR 20-7.031 Missouri Water Quality Standards, the Department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1st classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

RECEIVING STREAM(S) TABLE: OUTFALL #001

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Unnamed tributary to Cedar Branch	U	--	General Criteria	10290203 - 0305	3.82
Cedar Branch	C	1552	LWW, AQL, WBC (B)		

* - Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery(CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM (U, C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Unnamed tributary to Cedar Branch	0	0	0

MIXING CONSIDERATIONS
Mixing Zone: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].
Zone of Initial Dilution: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(b)].

Receiving Water Body's Water Quality
The analysis from the 5/25/2012 stream survey stated that the lagoon contained thick sludge, poor invert community, and odor. The lagoon gets little to no aeration due to 100% duckweed coverage and duckweed at outfall. The stream survey 0.1 mile downstream of the unnamed tributary to Cedar Branch stated that sludge was still present with no odor or duckweed, and a poor invert community. The stream survey 0.1 mile upstream of the outfall stated that the stream bed was dry.

Cedar Branch is not currently on the 2012 EPA approved 303(d) list.

Comments: Due to the findings of impairment of the receiving stream during the low flow survey, the Schedule of Compliance includes a timeframe for the permittee to upgrade the facility.

Part V – Rationale and Derivation of Effluent Limitations & Permit Conditions

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:
As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

Not Applicable ☒; The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(l)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - All limits in this operating permit are at least as protective as those previously established; therefore, backsliding does not apply.

ANTIDEGRADATION:
In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - No degradation proposed and no further review necessary. Facility did not apply for authorization to increase pollutant loading or to add additional pollutants to their discharge.

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

BIOSOLIDS & SEWAGE SLUDGE:
Biosolids are solid materials resulting from domestic wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address: http://dnr.mo.gov/env/wpp/pub/index.html, items WQ422 through WQ449.

☒ - Permittee is not authorized to land apply biosolids. Sludge/biosolids are removed by contract hauler, incinerated, stored in the lagoon, etc.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

Not Applicable ☒; The permittee/facility is not currently under Water Protection Program enforcement action.

PRETREATMENT PROGRAM:
The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)].

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

REASONABLE POTENTIAL ANALYSIS (RPA):
Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

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

Applicable ☒; A RPA was conducted on appropriate parameters. Please see **APPENDIX – RPA RESULTS.**

REMOVAL EFFICIENCY:
Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD_5) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

Not Applicable ☒; Influent monitoring is not being required to determine percent removal.

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

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

☒ - Not applicable. This facility is not required to develop or implement a program for maintenance and repair of the collection system; however, it is a violation of Missouri State Environmental Laws and Regulations to allow untreated wastewater to discharge to waters of the state.

SCHEDULE OF COMPLIANCE (SOC):
A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit.

Applicable ☒; The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(10)]. The facility shall attain compliance with the timeframe set for the permittee to upgrade the facility in effort to improve the receiving stream water quality, as soon as reasonably achievable or no later than 4 years of the effective date of this permit. The upgrade of the facility shall be technology that is capable of meeting the new effluent limits for Ammonia as N as well as upgrade the facility in order to meet the actual flows of the facility. A 4 year schedule of compliance was determined based on the engineering report received on 12/2/2013. The facility has provided the department with the correct information documenting the financial hardship the permittee must endure to upgrade the facility to meet the new ammonia requirements. Therefore, a 4 year schedule of compliance will be adequate for the permittee to secure appropriate funding and upgrade the facility.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP):
In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities: (2) Authorized under section 402(p) of the CWA for the control of storm water discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

Not Applicable ☒; At this time, the permittee is not required to develop and implement a SWPPP.

VARIANCE:
As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

Not Applicable ☒; This operating permit is not drafted under premises of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

Applicable ☒; Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

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

Where C = downstream concentration
Cs = upstream concentration
Qs = upstream flow
Ce = effluent concentration
Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) 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).

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

WLA MODELING:
There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

Not Applicable ☒; A WLA study was either not submitted or determined not applicable by Department staff.

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

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

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

☐ Facility is a designated Major.
☐ Facility continuously or routinely exceeds its design flow.
☐ Facility (industrial) that alters its production process throughout the year.
☐ Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
☐ Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH_3)
☒ Facility is a municipality or domestic discharger with a Design Flow ≥ 22,500 gpd.
☐ Other – please justify.

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

Not Applicable ☒; This facility does not anticipate bypassing.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

Not Applicable ☒; This facility does not discharge to a 303(d) listed stream.

Part VI –2013 Water Quality Criteria for Ammonia

Upcoming changes to the Water Quality Standard for ammonia may require significant upgrades to wastewater treatment facilities.

On August 22, 2013, the U.S. Environmental Protection Agency (EPA) finalized new water quality criteria for ammonia, based on toxicity studies of mussels. Missouri's current ammonia criteria are based on toxicity testing of several species, but did not include data from mussels. Missouri is home to 65 of North America's mussel species, which are spread across the state. According to the Missouri Department of Conservation nearly two-thirds of the mussel species in Missouri are considered to be "of conservation concern". Nine species are listed as federally endangered, with an additional species currently proposed as endangered and another species proposed as threatened.

The adult forms of mussels that are seen in rivers, lakes, and streams are sensitive to pollutants because they are sedentary filter feeders. They vacuum up many pollutants with the food they bring in and cannot escape to new habitats, so they can accumulate toxins in their bodies and die. But very young mussels, called glochidia, are exceptionally sensitive to ammonia in water. As a result of a citizen suit, the EPA was compelled to conduct toxicity testing and develop ammonia water quality criteria that would be protective if young mussels may be present in a waterbody. These new criteria will apply to any discharge with ammonia levels that may pose a reasonable potential to violate the standards. Nearly all discharging domestic wastewater treatment facilities (cities, subdivisions, mobile home parks, etc.), as well as certain industrial and stormwater dischargers with ammonia in their effluent, will be affected by this change in the regulations.

When new water quality criteria are established by the EPA, states must adopt them into their regulations in order to keep their authorization to issue permits under the National Pollutant Discharge Elimination System (NPDES). States are required to review their water quality standards every three years, and if new criteria have been developed they must be adopted. States may be more protective than the Federal requirements, but not less protective. Missouri does not have the resources to conduct the studies necessary for developing new water quality standards, and therefore our standards mirror those developed by the EPA; however, we will utilize any available flexibility based on actual species of mussels that are native to Missouri and their sensitivity to ammonia.

Many treatment facilities in Missouri are currently scheduled to be upgraded to comply with the current water quality standards. But these new ammonia standards may require a different treatment technology than the one being considered by the permittee. It is important that permittees discuss any new and upcoming requirements with their consulting engineers to ensure that their treatment systems are capable of complying with the new requirements. The Department encourages permittees to construct treatment technologies that can attain effluent quality that supports the EPA ammonia criteria.

Ammonia toxicity varies by temperature and by pH of the water. Assuming a stable pH value, but taking into account winter and summer temperatures, Missouri includes two seasons of ammonia effluent limitations. Current effluent limitations in this permit are:

Summer – 4.6 mg/L daily maximum, 1.3 mg/L monthly average.
Winter – 8.0 mg/L daily maximum, 2.9 mg/L monthly average.

Under the new EPA criteria, where mussels of the family Unionidae are present or expected to be present, your estimated effluent limitations will be:

Summer – 1.7 mg/L daily maximum, 0.6 mg/L monthly average.
Winter – 5.6 mg/L daily maximum, 2.1 mg/L monthly average.

Actual effluent limits will depend in part on the actual performance of the facility.

Operating permits for facilities in Missouri must be written based on current statutes and regulations. It is expected that the new WQS will be adopted in the next review of our standards. Therefore permits will be written with the existing effluent limitations until the new standards are adopted. To aid permittees in decision making, an advisory will be added to permit Fact Sheets notifying permittees of the expected effluent limitations for ammonia. When setting schedules of compliance for ammonia effluent limitations, consideration will be given to facilities that have recently constructed upgraded facilities to meet the current ammonia limitations.

For more information on this topic feel free to contact the Missouri Department of Natural Resources, Water Protection Program, Water Pollution Control Branch, Operating Permits Section at (573) 751-1300.

Part VII – Effluent Limits Determination

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

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

OUTFALL #001 – MAIN FACILITY OUTFALL
Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Modified	Previous Permit Limitations
Flow	MGD	1	*	-	*	No	*/*
BOD_5	mg/L	1, 4	-	65	45	No	65/45
TSS	mg/L	1, 4	-	120	80	No	120/80
pH	SU	1, 4	≥ 6.5	-	≥ 6.5	Yes	6.0 – 9.0
Ammonia as N (April 1 – Sept 30)	mg/L	2, 3, 5	4.6	-	1.3	Yes	*/*
Ammonia as N (Oct 1 – March 31)	mg/L	2, 3, 5	8.0	-	2.9	Yes	*/*
Whole Effluent Toxicity (WET) Test	% Survival	11	Please see WET Test in the Derivation and Discussion Section below.				

* - Monitoring requirement only.

Basis for Limitations Codes:
1. State or Federal Regulation/Law
2. Water Quality Standard (includes RPA)
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Review
7. Antidegradation Policy
8. Water Quality Model
9. Best Professional Judgment
10. TMDL or Permit in lieu of TMDL
11. WET Test Policy

Please note that the final effluent limits for BOD and TSS contained in the permit are Equivalent to Secondary limits as per 10 CSR 20-7.015. Any changes made to the lagoon system that modifies it such that it no longer functions as a typical lagoon will result in the facility no longer qualifying for Equivalent to Secondary limitations.

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- Flow. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.

- Biochemical Oxygen Demand (BOD_5).

  ☒ – Effluent limitations have been retained from previous state operating permit, please see the APPLICABLE DESIGNATION OF WATERS OF THE STATE sub-section of the Receiving Stream Information.

- Total Suspended Solids (TSS).

  ☒ – Effluent limitations have been retained from previous state operating permit, please see the APPLICABLE DESIGNATION OF WATERS OF THE STATE sub-section of the Receiving Stream Information.

- pH. Effluent limitation range is ≥ 6.5 Standard pH Units (SU), as per the applicable section of 10 CSR 20-7.015. pH is not to be averaged.

- Total Ammonia Nitrogen. Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3] default pH 7.8 SU Background total ammonia nitrogen = 0.01 mg/L

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

Summer: April 1 – September 30
Chronic WLA: $C_e = ((0.06 + 0.0)1.5 - (0.0 * 0.01))/0.06$
$C_e = 1.5$ mg/L

Acute WLA: $C_e = ((0.06 + 0.0)12.1 - (0.0 * 0.01))/0.06$
$C_e = 12.1$ mg/L

$LTA_c = 1.5$ mg/L (0.701) = 1.05 mg/L [CV = 0.9, 99th Percentile, 30 day avg.]
$LTA_a = 12.1$ mg/L (0.231) = 2.80 mg/L [CV = 0.9, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 1.05 mg/L (4.34) = 4.6 mg/L [CV = 0.9, 99th Percentile]
AML = 1.05 mg/L (1.28) = 1.3 mg/L [CV = 0.9, 95th Percentile, n =30]

Winter: October 1 – March 31
Chronic WLA: $C_e = ((0.06 + 0.0)3.1 - (0.0 * 0.01))/0.06$
$C_e = 3.1$ mg/L

Acute WLA: $C_e = ((0.06 + 0.0)12.1 - (0.0 * 0.01))/0.06$
$C_e = 12.1$ mg/L

$LTA_c = 3.1$ mg/L (0.761) = 2.36 mg/L [CV = 0.7, 99th Percentile, 30 day avg.]
$LTA_a = 12.1$ mg/L (0.295) = 3.57 mg/L [CV = 0.7, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 2.36 mg/L (3.39) = 8.0 mg/L [CV = 0.7, 99th Percentile]
AML = 2.36 mg/L (1.21) = 2.9 mg/L [CV = 0.7, 95th Percentile, n =30]

- WET Test. WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring.* It is recommended that WET testing be conducted during the period of lowest stream flow.

  ☒ Acute

  ☒ No less than ONCE/PERMIT CYCLE:
  ☒ Municipality or domestic facility with a design flow ≥ 22,500 gpd, but less than 1.0 MGD.
  ☐ Other, please justify.

  Acute and/or Chronic Allowable Effluent Concentrations (AECs) for facilities that discharge to unclassified, Class C, Class P (with default Mixing Considerations), or Lakes [10 CSR 20-7.031(4)(A)4.B.(IV)(b)] are 100%, 50%, 25%, 12.5%, & 6.25%.

Minimum Sampling and Reporting Frequency Requirements.

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
Flow	once/week	once/month
BOD_5	once/month	once/month
TSS	once/month	once/month
pH	once/month	once/month
Ammonia as N	once/month	once/month

Sampling Frequency Justification:
Due to size, age and inconsistency with the facility's flow values the sampling frequency for flow has been changed to once per week. The sampling frequency for BOD_5, TSS, pH, and Ammonia as N was retained at once per month.

Sampling Type Justification
As per 10 CSR 20-7.015, BOD_5, TSS and WET test samples collected for lagoons may be grab samples. Grab samples must be collected for pH and Ammonia as N. This is due to the volatility of and the fact that pH cannot be preserved and must be sampled in the field. As Ammonia samples must be immediately preserved with acid, therefore these samples are to be collected as a grab. For further information on sampling and testing methods please review 10 CSR 20-7.015(9)(A) 2.

Part VIII – Finding of Affordability

Pursuant to Section 644.145, RSMo., the Department is required to determine whether a permit or decision is affordable and makes a finding of affordability for certain permitting and enforcement decisions. This requirement applies to discharges from combined or separate sanitary sewer systems or publically-owned treatment works.

☒ Not Applicable;
The Department is not required to determine findings of affordability because the facility is not a combined or separate sanitary sewer system for a publically-owned treatment works.

Part IX – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:
The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the department to explore a watershed based permitting effort at some point in the future.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ - The Public Notice period for this operating permit was from 08/09/2013 to 09/09/2013. Comments received were explained to permittee in a private letter. No further changes to the permit.

DATE OF FACT SHEET: (03/15/2013)

COMPLETED BY:

LACEY HIRSCHVOGEL, ENVIRONMENTAL SPECIALIST
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
OPERATING PERMITS SECTION - DOMESTIC WASTEWATER UNIT
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Appendices

APPENDIX - CLASSIFICATION WORKSHEET:

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

APPENDIX - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)		
Variation do not exceed those normally or typically expected	0	
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	
Raw wastes subject to toxic waste discharge	6	
SECONDARY TREATMENT		
Trickling filter and other fixed film media with secondary clarifiers	10	
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	
Stabilization ponds without aeration	5	5
Aerated lagoon	8	
Advanced Waste Treatment Polishing Pond	2	
Chemical/physical – without secondary	15	
Chemical/physical – following secondary	10	
Biological or chemical/biological	12	
Carbon regeneration	4	
DISINFECTION		
Chlorination or comparable	5	
Dechlorination	2	
On-site generation of disinfectant (except UV light)	5	
UV light	4	
SOLIDS HANDLING - SLUDGE		
Solids Handling Thickening	5	
Anaerobic digestion	10	
Aerobic digestion	6	
Evaporative sludge drying	2	
Mechanical dewatering	8	
Solids reduction (incineration, wet oxidation)	12	
Land application	6	
Total from page TWO (2)	---	4
Total from page ONE (1)	---	5
Grand Total	---	9

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

APPENDIX – RPA RESULTS:

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range max/min	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.1	40.74	1.5	40.74	29.00	15.6/0.193	0.87	2.61	YES
Total Ammonia as Nitrogen (Winter) mg/L	12.1	41.75	3.1	41.75	31.00	19.8/0.096	0.66	2.11	YES

* - Units are (mg/L) unless otherwise noted.

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

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

RWC – Receiving Water Concentration. It is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (if applicable).

n – Is the number of samples.

MF – Multiplying Factor. 99% Confidence Level and 99% Probability Basis.

RP – Reasonable Potential. It is where an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).

Reasonable Potential Analysis is conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2). A more detailed version including calculations of this RPA is available upon request.

STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
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MISSOURI CLEAN WATER COMMISSION
REVISED
NOVEMBER 1, 2013

These Standard Conditions incorporate permit conditions as required by 40 CFR 122.41 or other applicable state statutes or regulations. These minimum conditions apply unless superseded by requirements specified in the permit.

Part I – General Conditions
Section A – Sampling, Monitoring, and Recording

1. **Sampling Requirements.**
   a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
   b. All samples shall be taken at the outfall(s) or Missouri Department of Natural Resources (Department) approved sampling location(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.

2. **Monitoring Requirements.**
   a. Records of monitoring information shall include:
      i. The date, exact place, and time of sampling or measurements;
      ii. The individual(s) who performed the sampling or measurements;
      iii. The date(s) analyses were performed;
      iv. The individual(s) who performed the analyses;
      v. The analytical techniques or methods used; and
      vi. The results of such analyses.
   b. If the permittee monitors any pollutant more frequently than required by the permit at the location specified in the permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring shall be included in the calculation and reported to the Department with the discharge monitoring report data (DMR) submitted to the Department pursuant to Section B, paragraph 7.

3. **Sample and Monitoring Calculations.** Calculations for all sample and monitoring results which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in the permit.

4. **Test Procedures.** The analytical and sampling methods used shall conform to the reference methods listed in 10 CSR 20-7.015 unless alternates are approved by the Department. The facility shall use sufficiently sensitive analytical methods for detecting, identifying, and measuring the concentrations of pollutants. The facility shall ensure that the selected methods are able to quantify the presence of pollutants in a given discharge at concentrations that are low enough to determine compliance with Water Quality Standards in 10 CSR 20-7.031 or effluent limitations unless provisions in the permit allow for other alternatives. A method is "sufficiently sensitive" when; 1) the method minimum level is at or below the level of the applicable water quality criterion for the pollutant or, 2) the method minimum level is above the applicable water quality criterion, but the amount of pollutant in a facility's discharge is high enough that the method detects and quantifies the level of pollutant in the discharge, or 3) the method has the lowest minimum level of the analytical methods approved under 10 CSR 20-7.015. These methods are also required for parameters that are listed as monitoring only, as the data collected may be used to determine if limitations need to be established. A permittee is responsible for working with their contractors to ensure that the analysis performed is sufficiently sensitive.

5. **Record Retention.** Except for records of monitoring information required by the permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

6. **Illegal Activities.**
   a. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under the permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two (2) years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or both.
   b. The Missouri Clean Water Law provides that any person or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than six (6) months, or by both. Second and successive convictions for violation under this paragraph by any person shall be punished by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.

Section B – Reporting Requirements

1. **Planned Changes.**
   a. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility when:
      i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
      ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1);
      iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;
      iv. Any facility expansions, production increases, or process modifications which will result in a new or substantially different discharge or sludge characteristics must be reported to the Department 60 days before the facility or process modification begins. Notification may be accomplished by application for a new permit. If the discharge does not violate effluent limitations specified in the permit, the facility is to submit a notice to the Department of the changed discharge at least 30 days before such changes. The Department may require a construction permit and/or permit modification as a result of the proposed changes at the facility.

2. **Twenty-Four Hour Reporting.**
   a. The permittee shall report any noncompliance which may endanger health or the environment. Relevant information shall be provided orally or via the current electronic method approved by the Department, within 24 hours from the time the permittee becomes aware of the circumstances, and shall be reported to the appropriate Regional Office during normal business hours or the Environmental Emergency Response hotline at 573-634-2436 outside of normal business hours. A written submission shall also be provided within five (5) business days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

b. The following shall be included as information which must be reported within 24 hours under this paragraph.
   i. Any unanticipated bypass which exceeds any effluent limitation in the permit.
   ii. Any upset which exceeds any effluent limitation in the permit.
   iii. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit required to be reported within 24 hours.

c. The Department may waive the written report on a case-by-case basis for reports under paragraph 2. b. of this section if the oral report has been received within 24 hours.

3. **Sanitary Sewer Overflow Reporting.** The following requirements solely reflect reporting obligations, and reporting does not necessarily reflect noncompliance, which may depend on the circumstances of the incident reported.
   a. Twenty-Four Hour (24-Hour) Reporting. The permittee or owner shall report any incident in which wastewater escapes the collection system such that it reaches waters of the state or it may pose an imminent or substantial endangerment to the health or welfare of persons. Relevant information shall be provided orally or via the current electronic method approved by the Department within 24 hours from the time the permittee becomes aware of the incident. A written submission shall also be provided within five (5) business days of the time the permittee or owner becomes aware of the incident. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours. The five (5) day reports may be provided via the current electronic method approved by the Department.
   b. Incidents Reported via Discharge Monitoring Reports (DMRs). The permittee or owner shall report any event in which wastewater escapes the collection system, which does not enter waters of the state and is not expected to pose an imminent or substantial endangerment to the health or welfare of persons, which occur typically during wet weather events. Relevant information shall be provided with the permittee's or owner's DMRs.

4. **Anticipated Noncompliance.** The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The notice shall be submitted to the Department 60 days prior to such changes or activity.

5. **Compliance Schedules.** Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date. The report shall provide an explanation for the instance of noncompliance and a proposed schedule or anticipated date, for achieving compliance with the compliance schedule requirement.

6. **Other Noncompliance.** The permittee shall report all instances of noncompliance not reported under paragraphs 2, 3, 4, and 7 of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph 2. a. of this section.

7. **Other Information.** Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

8. **Discharge Monitoring Reports.**
   a. Monitoring results shall be reported at the intervals specified in the permit.
   b. Monitoring results must be reported to the Department via the current method approved by the Department, unless the permittee has been granted a waiver from using the method. If the permittee has been granted a waiver, the permittee must use forms provided by the Department.
   c. Monitoring results shall be reported to the Department no later than the 28th day of the month following the end of the reporting period.

Section C – Bypass/Upset Requirements

1. **Definitions.**
   a. *Bypass*: the intentional diversion of waste streams from any portion of a treatment facility.
   b. *Severe Property Damage*: substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
   c. *Upset*: an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2. **Bypass Requirements.**
   a. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2. b. and 2. c. of this section.
   b. Notice.
      i. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.
      ii. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section B – Reporting Requirements, paragraph 5 (24-hour notice).
   c. Prohibition of bypass.
      i. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless:
         1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
         2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
         3. The permittee submitted notices as required under paragraph 2. b. of this section.
      ii. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three (3) conditions listed above in paragraph 2. c. i. of this section.

3. **Upset Requirements.**
   a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph 3. b. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
   b. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
      i. An upset occurred and that the permittee can identify the cause(s) of the upset;
      ii. The permitted facility was at the time being properly operated; and
      iii. The permittee submitted notice of the upset as required in Section B – Reporting Requirements, paragraph 2. b. ii. (24-hour notice).
      iv. The permittee complied with any remedial measures required under Section D – Administrative Requirements, paragraph 4.
   c. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

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REVISED
NOVEMBER 1, 2013

Section D – Administrative Requirements

1. **Duty to Comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Missouri Clean Water Law and Federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.
   a. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
   b. The Federal Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The Federal Clean Water Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than one (1) year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than two (2) years, or both. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than three (3) years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than six (6) years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
   c. Any person may be assessed an administrative penalty by the EPA Director for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.
   d. It is unlawful for any person to cause or permit any discharge of water contaminants from any water contaminant or point source located in Missouri in violation of sections 644.006 to 644.141 of the Missouri Clean Water Law, or any standard, rule or regulation promulgated by the commission. In the event the commission or the director determines that any provision of sections 644.006 to 644.141 of the Missouri Clean Water Law or standard, rules, limitations or regulations promulgated pursuant thereto, or permits issued by, or any final abatement order, other order, or determination made by the commission or the director, or any filing requirement pursuant to sections 644.006 to 644.141 of the Missouri Clean Water Law or any other provision which this state is required to enforce pursuant to any federal water pollution control act, is being, was, or is in imminent danger of being violated, the commission or director may cause to have instituted a civil action in any court of competent jurisdiction for the injunctive relief to prevent any such violation or further violation or for the assessment of a penalty not to exceed $10,000 per day for each day, or part thereof, the violation occurred and continues to occur, or both, as the court deems proper. Any person who willfully or negligently commits any violation in this paragraph shall, upon conviction, be punished by a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both. Second and successive convictions for violation of the same provision of this paragraph by any person shall be punished by a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.

2. **Duty to Reapply.**
   a. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.
   b. A permittee with a currently effective site-specific permit shall submit an application for renewal at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Department. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)
   c. A permittees with currently effective general permit shall submit an application for renewal at least 30 days before the existing permit expires, unless the permittee has been notified by the Department that an earlier application must be made. The Department may grant permission for a later submission date. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

3. **Need to Halt or Reduce Activity Not a Defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

4. **Duty to Mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

5. **Proper Operation and Maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

6. **Permit Actions.**
   a. Subject to compliance with statutory requirements of the Law and Regulations and applicable Court Order, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
      i. Violations of any terms or conditions of this permit or the law;
      ii. Having obtained this permit by misrepresentation or failure to disclose fully any relevant facts;
      iii. A change in any circumstances or conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge; or
      iv. Any reason set forth in the Law or Regulations.
   b. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

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MISSOURI CLEAN WATER COMMISSION
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7. **Permit Transfer.**
   a. Subject to 10 CSR 20-6.010, an operating permit may be transferred upon submission to the Department of an application to transfer signed by the existing owner and the new owner, unless prohibited by the terms of the permit. Until such time the permit is officially transferred, the original permittee remains responsible for complying with the terms and conditions of the existing permit.
   b. The Department may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Missouri Clean Water Law or the Federal Clean Water Act.
   c. The Department, within 30 days of receipt of the application, shall notify the new permittee of its intent to revoke or reissue or transfer the permit.

8. **Toxic Pollutants.** The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the Federal Clean Water Act within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

9. **Property Rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.

10. **Duty to Provide Information.** The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Department upon request, copies of records required to be kept by this permit.

11. **Inspection and Entry.** The permittee shall allow the Department, or an authorized representative (including an authorized contractor acting as a representative of the Department), upon presentation of credentials and other documents as may be required by law, to:
   a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
   c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
   d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Federal Clean Water Act or Missouri Clean Water Law, any substances or parameters at any location.

12. **Closure of Treatment Facilities.**
   a. Persons who cease operation or plan to cease operation of waste, wastewater, and sludge handling and treatment facilities shall close the facilities in accordance with a closure plan approved by the Department.
   b. Operating Permits under 10 CSR 20-6.010 or under 10 CSR 20-6.015 are required until all waste, wastewater, and sludges have been disposed of in accordance with the closure plan approved by the Department and any disturbed areas have been properly stabilized. Disturbed areas will be considered stabilized when perennial vegetation, pavement, or structures using permanent materials cover all areas that have been disturbed. Vegetative cover, if used, shall be at least 70% plant density over 100% of the disturbed area.

13. **Signatory Requirement.**
   a. All permit applications, reports required by the permit, or information requested by the Department shall be signed and certified. (See 40 CFR 122.22 and 10 CSR 20-6.010)
   b. The Federal Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six (6) months per violation, or by both.
   c. The Missouri Clean Water Law provides that any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than ten thousand dollars, or by imprisonment for not more than six months, or by both.

14. **Severability.** The provisions of the permit are severable, and if any provision of the permit, or the application of any provision of the permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of the permit, shall not be affected thereby.

STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION
AUGUST 15, 1994

PART III – SLUDGE & BIOSOLIDS FROM DOMESTIC WASTEWATER TREATMENT FACILITIES

SECTION A – GENERAL REQUIREMENTS

1. This permit pertains to sludge requirements under the Missouri Clean Water Law and regulation and incorporates applicable federal sludge disposal requirements under 40 CFR 503. The Environmental Protection Agency (EPA) has principal authority for permitting and enforcement of the federal sludge regulations under 40 CFS 503 until such time as Missouri is delegated the new EPA sludge program. EPA has reviewed and accepted these standard sludge conditions. EPA may choose to issue a separate sludge addendum to this permit or a separate federal sludge permit at their discretion to further address federal requirements.
2. These PART III Standard Conditions apply only to sludge and biosolids generated at domestic wastewater treatment facilities, including public owned treatment works (POTW) and privately owned facilities.
3. Sludge and Biosolids Use and Disposal Practices.
   a. Permittee is authorized to operate the sludge and biosolids treatment, storage, use, and disposal facilities listed in the facility description of this permit.
   b. Permittee shall not exceed the design sludge volume listed in the facility description and shall not use sludge disposal methods that are not listed in the facility description, without prior approval of the permitting authority.
   c. Permittee is authorized to operate the storage, treatment or generating sites listed in the Facility Description section of this permit.
   d. A separate operating permit is required for each operating location where sludge or biosolids are generated, stored, treated, or disposed, unless specifically exempted in this permit or in 10 CSR 20, Chapter 6 regulations. For land application, see section H, subsection 3 of these standard conditions.
4. Sludge Received From Other Facilities
   a. Permitees may accept domestic wastewater sludge from other facilities including septic tank pumpings from residential sources as long as the design sludge volume is not exceeded and the treatment facility performance is not impaired.
   b. The permittee shall obtain a signed statement from the sludge generator or hauler that certifies the type and source of the sludge.
   c. Sludge received from out-of-state generators shall receive prior approval of the permitting authority and shall be listed in the facility description or special conditions section of the permit.
5. These permit requirements do not supersede nor remove liability for compliance with county and other local ordinances.
6. These permit requirements do not supersede nor remove liability for compliance with other environmental regulations such as odor emissions under the Missouri Air Pollution Control Law and regulations.
7. This permit may (after du process) be modified, or alternatively revoked and reissued, to comply with any applicable sludge disposal standard or limitation issued or approved under Section 405(d) of the Clean Water Act or under Chapter 644 RsMo.
8. In addition to the STANDARD CONDITIONS, the department may include sludge limitations in the special conditions portion or other sections of this permit.
9. Alternate Limits in Site Specific Permit.
   Where deemed appropriate, the department may require an individual site specific permit in order to authorize alternate limitations:
   a. An individual permit must be obtained for each operating location, including application sites.
   b. To request a site specific permit, an individual permit application, permit fees, and supporting documents shall be submitted for each operating location. This shall include a detailed sludge/biosolids management plan or engineering report.
10. Exceptions to these Standard Conditions may be authorized on a case-by-case basis by the department, as follows:
    a. The department will prepare a permit modification and follow permit public notice provisions as applicable under 10 CSR 20-6.020, 40 CFR 124.10, and 40 CFR 501.15(a)(2)(ix)(E). This includes notification of the owners of property located adjacent to each land application site, where appropriate.
    b. Exceptions cannot be grated where prohibited by the federal sludge regulations under 40 CFR 503.
11. Compliance Period
    Compliance shall be achieved as expeditiously as possible but no later than the compliance dates under 40 CFR 503.2.

SECTION B – DEFINITIONS

1. Biosolids means an organic fertilizer or soil amendment produced by the treatment of domestic wastewater sludge. Untreated sludge or sludge that does not conform to the pollutants and pathogen treatment requirements in this permit is not considered biosolids.
2. Biosolids land application facility is a facility where biosolids are spread onto the land at agronomic rates for production of food or fiber. The facility includes any structures necessary to store the biosolids until soil, weather, and crop conditions are favorable for land application.
3. Class A biosolids means a material that has met the Class A pathogen reduction requirements or equivalent treatment by a Process to Further Reduce Pathogens (PFRP) in accordance with 40 CFR 503.
4. Class B biosolids means a material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PFRP) in accordance with 40 CFR 503.
5. Domestic wastewater means wastewater originating from the sanitary conveniences of residences, commercial buildings, factories and institutions; or co-mingled sanitary and industrial wastewater processed by a public owned treatment works (POTW) or privately owned facility.
6. Mechanical treatment plants are wastewater treatment facilities that use mechanical devices to treat wastewater, including septic tanks, extended aeration, activated sludge, contact stabilization, trickling filters, rotating biological discs, and other similar facilities. It does not include unaerated wastewater treatment lagoons and constructed wetlands for wastewater treatment.
7. Operating location as defined in 10 CSR 20-2.010 is all contiguous lands owned, operated or controlled by one (1) person or by two (2) or more persons jointly or as tenants in common.
8. Plant Available Nitrogen (PAN) is the nitrogen that will be available to plants during the next growing season after biosolids application.
9. Sinkhole is a depression in the land surface into which surface water flows to join an underground drainage system.
10. Site Specific Permit is a permit that has alternate limits developed to address specific site conditions for each land application site or storage site.
11. Sludge is the solid, semisolid, or liquid residue removed during the treatment of wastewater. Sludge includes septage removed from septic tanks.
12. Sludge lagoon is an earthen basin that receives sludge that has been removed from a wastewater treatment facility. It does not include a wastewater treatment lagoon or sludge treatment units that are not a part of a mechanical wastewater treatment facility.
13. Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamp, marshes, bogs, and similar areas. Wetlands do not include constructed wetlands used for wastewater treatment.

SECTION C – MECHANICAL WASTEWATER TREATMENT FACILITIES

1. Sludge shall be routinely removed from the wastewater treatment facilities and handled according to the permit facility description and sludge conditions in this permit.
2. The permittee shall operate the facility so that there is no sludge loss into the discharged effluent in excess of permit limits, no sludge bypassing, and no discharge of sludge to waters of the state.
3. Mechanical treatment plants shall have separate sludge storage compartments in accordance with 10 CSR 20, Chapter 8. Failure to remove sludge from these storage compartments on the required design schedule is a violation of this permit.

SECTION D – SLUDGE DISPOSED AT OTHER TREATMENT FACILITY OR CONTRACT HAULER

1. This section applies to permittees that haul sludge to another treatment facility for disposal or use contract haulers to remove and dispose of sludge.
2. Permittees that use contract haulers are responsible for compliance with all the terms of this permit including final disposal, unless the hauler has a separate permit for sludge or biosolids disposal issued by the department; or the hauler transports the sludge to another permitted treatment facility.
3. The permittee shall require documentation from the contractor of the disposal methods used and permits obtained by the contractor.
4. Testing of sludge, other than total solids content, is not required if sludge is hauled to a municipal wastewater treatment facility or other permitted wastewater treatment facility.

SECTION E – WASTEWATER TREATMENT LAGOONS AND STORMWATER RETENTION BASINS

1. Sludge that is retained within a wastewater treatment lagoon is subject to sludge disposal requirements when the sludge is removed from the lagoon or when the lagoon ceases to receive and treat wastewater.
2. If sludge is removed during the year, an annual sludge report must be submitted.
3. Storm water retention basins or other earthen basins, which have been used as sludge storage for a mechanical treatment system is considered a sludge lagoon and must comply with Section G of this permit.

SECTION F – INCINERATION OF SLUDGE

1. Sludge incineration facilities shall comply with the requirements of 40 CFR 503 Subpart E; air pollution control regulations under 10 CSR 10; and solid waste management regulations under 10 CSR 80.
2. Permittee may be authorized under the facility description of this permit to store incineration ash in lagoons or ash ponds. This permit does not authorize the disposal of incineration ash. Incineration ash shall be disposed in accordance with 10 CSR 80; or if the ash is determined to be hazardous waste, shall be disposed in accordance with 10 CSR 25.
3. In addition to normal sludge monitoring, incineration facilities shall report the following as part of the annual report, quantity of sludge incinerated, quantity of ash generated, quantity of ash stored; and ash use or disposal method, quantity, and location. Permittee shall also provide the name of the disposal facility and the applicable permit number.
4. Additional limitations, monitoring, and reporting requirements may be addressed in the Special Conditions sections of this permit.

SECTION G – SURFACE DISPOSAL SITES AND SLUDGE LAGOONS

1. Surface disposal sites shall comply with the requirements in 40 CFR 503 Subpart C, and solid waste disposal regulations under 10 CSR 80.
2. Additional limitations, monitoring, and reporting requirements may be addressed in the Special Conditions section of this permit.
3. Effective February 19, 1995, a sludge lagoon that has been in use for more than two years without removal of accumulated sludge, or that has not been properly closed shall comply with one of the following options:
   a. Permittee shall obtain a site specific permit to address surface disposal requirements under 40 CFR 503, ground water quality regulations under 10 CSR 20, Chapter 7 and 8, and solid waste management regulations under 10 CSR 80;
   b. Permittee shall clean out the sludge lagoon to remove any sludge over two years old and shall continue to remove accumulated sludge at least every two years or an alternate schedule approved under 40 CFR 503.20(b). In order to avoid damage to the lagoon seal during cleaning, the permittee may leave a layer of sludge on the bottom of the lagoon, upon prior approval of the department; or
   c. Permittee shall close the lagoon in accordance with Section I.

SECTION H – LAND APPLICATION

1. The permittee shall not land apply sludge or biosolids unless land application is authorized in the Facility Description or special conditions section of the permit.
2. This permit replaces and terminates all previous sludge management plan approvals by the department for land application of sludge or biosolids.
3. Land application sites within a 20 mile radius of the wastewater treatment facility are authorized under this permit when biosolids are applied for beneficial use in accordance with these standard conditions unless a site specific permit is required under Section A, Subsection 9.
4. Biosolids shall not be applied unless authorized in this permit or exempted under 10 CSR 20, Chapter 6.
   a. This permit does not authorize the land application of sludge except when sludge meets the definition of biosolids.
   b. This permit authorizes "Class A or B" biosolids derived from domestic wastewater sludges to be land applied onto grass land, crop land, timber land or other similar agricultural or silviculture lands at rates suitable for beneficial use as organic fertilizer and soil conditioner.
5. Public Contact Sites.
   Permittees who wish to apply Class A biosolids to public contact sites must obtain approval from the department. Applications for approval shall be in the form of an engineering report and shall address priority pollutants and dioxin concentrations. Authorization for land applications must be provided in the special conditions section of this permit or in a separate site-specific permit.

6. Agricultural and Silvicultural Sites.
In addition to specified conditions herein, this permit is subject to the attached Water Quality Guides numbers WQ 422 through 426 published by the University of Missouri, and herby incorporated as though fully set forth herein. The guide topics are as follows:

WQ 422	Land Application of Septage
WQ 423	Monitoring Requirements for Biosolids Land Application
WQ 424	Biosolids Standards for Pathogens and Vectors
WQ 425	Biosolids Standards for Metals and Other Trace Substances
WQ 426	Best Management Practices for Biosolids Land Applications

SECTION I – CLOSURE REQUIREMENTS

1. This section applies to all wastewater treatment facilities (mechanical and lagoons) and sludge or biosolids storage and treatment facilities and incineration ash ponds. It does not apply to land application sites.
2. Permittees who plan to cease operation must obtain department approval of a closure plan which addresses proper removal and disposal of all residues, including sludge, biosolids, and ash. Permittee must maintain this permit until the facility is properly closed per 10 CSR 20-6.010 and 10 CSR 20-6.015.
3. Residuals that are left in place during closure of a lagoon or earthen structure shall not exceed the agricultural loading rates as follows:
   a. Residuals shall meet the monitoring and land application limits for agricultural rates as referenced in Section H of these standard conditions.
   b. If a wastewater treatment lagoon has been in operation for 15 years or more, the sludge in the lagoon qualifies for Class B with respect to pathogens (see WQ 424, Table 3), and testing for fecal coliform is not required. For other lagoons, testing for fecal coliform is required to show compliance with Class B limitations. Se WQ 423 and 424.
   c. The allowable nitrogen loading that may be left in the lagoon shall be based on the plant available nitrogen (PAN) loading. See WQ 426 for calculation procedures. For a grass cover crop, the allowable PAN is 300 pounds/acre.
4. When closing a wastewater treatment lagoon with a design treatment capacity equal or less than 150 persons, the residuals are considered "septage" under the similar treatment works" definition. See WQ 422. Under the septage category, residuals may be left in place as follows:
   a. Testing for metals or fecal coliform is not required.
   b. If the wastewater treatment lagoon has been in use for less than 15 years, mix lime with the sludge at the rate of 50 pounds of hydrated lime per 1000 gallons (134 cubic feet) of sludge.
   c. The amount of sludge that may be left in the lagoon shall be based on the plan available nitrogen (PAN) loading. 100 dry tons/acre of sludge may be left in the basin without testing for nitrogen. If more than 100 dry tons/acre will be left in the lagoon, test for nitrogen and determine the PAN in accordance with WQ 426. Allowable PAN loading is 300 pounds/acre.
5. Residuals left within the lagoon shall be mixed with soil on at least a 1 to 1 ratio, the lagoon berms shall be demolished, and the site shall be graded and vegetated so as to avoid ponding of storm water and provide adequate surface water drainage without creating erosion.
6. Lagoon closure activities shall obtain a storm water permit for land disturbance activities that equal or exceed five acres in accordance with 10 CSR 20-6.200.
7. If sludge exceeds agricultural loading rates under Section H or I, a landfill permit or solid waste disposal permit shall be obtained to authorize on-site sludge disposal under the Missouri Solid Waste Management Law and regulations per 10 CSR 80, and the permittee must comply with the surface disposal requirements under 40 CFR 503, Subpart C.

SECTION J – MONITORING FREQUENCY

1. At a minimum, sludge or biosolids shall be tested for volume and percent total solids on a frequency that will accurately respresent sludge quantities produced and disposed.
2. Testing for land application is listed under Section H, Subsection 6 of these standard conditions (see WQ 423). Once per year is the minimum test frequency. Additional testing shall be performed for each 100 dry tons of sludge generated or stored during the year.
3. Additional testing may be required in the special conditions or other sections of the permit. Permittees receiving industrial wastewater may be required to conduct additional testing upon request from the department.
4. Monitoring requirements shall be performed in accordance with, "POTW Sludge Sampling and Analysis Guidance Document", United States Environmental Protection Agency, August 1989, and subsequent revisions.

SECTION K – RECORD KEEPING AND REPORTING REQUIREMENTS

1. The permittee shall maintain records on file at the facility for at least five years for the items listed in these Standard Conditions and any additional items in the Special Conditions section of this permit. This shall include dates when the sludge facility is checked for proper operation, records of maintenance and repairs and other relevant information.
2. Reporting Period
   a. By January 28th of each year, an annual report shall be submitted for the previous calendar year period for all mechanical wastewater treatment facilities, sludge lagoons, and sludge or biosolids disposal facilities.
   b. Permittees with wastewater treatment lagoons shall submit the above annual report only when sludge or biosolids are removed from the lagoon during the report period or when the lagoon is closed.
3. Report Forms. The annual report shall be submitted on report forms provided by the department or equivalent forms approved by the department.
4. Report shall be submitted as follows:
   Major facilities (those serving 10,000 persons or 1 million gallons per day) shall report to both the department and EPA. Other facilities need to report only to the department. Reports shall be submitted to the addresses listed as follows:

   DNR regional office listed in your permit
   (See cover letter of permit)

   EPA Region VII
   Water Compliance Branch (WACM)
   Sludge Coordinator
   901 N 5th Street
   Kansas City, KS 66101

5. Annual Report Contents. The annual report shall include the following:
   a. Sludge/biosolids testing performed. Include a copy or summary of all test results, even if not required by this permit.
   b. Sludge or Biosolids quantity shall be reported as dry tons for quantity generated by the wastewater treatment facility, the quantity stored on site at end of year, and the quantity used or disposed.
   c. Gallons and % solids data used to calculate the dry ton amounts.
   d. Description of any unusual operating conditions.
   e. Final disposal method, dates, and location, and person responsible for hauling and disposal.
      (1) This must include the name, address and permit number for the hauler and the sludge facility. If hauled to a municipal wastewater treatment facility, sanitary landfill, or other approved treatment facility, give the name and permit number of that facility.
      (2) Include a description of the type of hauling equipment used and the capacity in tons, gallons, or cubic feet.
   f. Contract Hauler Activities.
      If contract hauler, provide a copy of a signed contract or billing receipts from the contractor. Permittee shall require the contractor to supply information required under this permit for which the contractor is responsible. The permittee shall submit a signed statement from the contractor that he has complied with the standards contained in this permit, unless the contract hauler has a separate sludge disposal or biosolids use permit.
   g. Land Application Sites.
      (1) Report the location of each application site, the annual and cumulative dry tons/acre for each site, and the landowners name and address. The location for each spreading site shall be given as legal description for nearest ¼, ¼, Section, Township, Range, and County, or as latitude and longitude.
      (2) If biosolids application exceeds 2 dry tons/acre/year, report biosolids nitrogen results. Plant Available Nitrogen (PAN) in pounds/acre, crop nitrogen requirement, available nitrogen in the soil prior to biosolids application, and PAN calculations for each site.
      (3) If the "Low Metals" criteria is exceeded, report the annual and cumulative pollutant loading rates in pounds per acre for each applicable pollutant, and report the percent of cumulative loading which has been reached at each site.
      (4) Report the method used for compliance with pathogen and vector attraction requirements.
      (5) Report soil test results for pH, CEC, and phosphorus. If none was tested during the year, report the last date when tested and results.

AP11021

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION BRANCH
FORM B – APPLICATION FOR CONSTRUCTION OR OPERATING PERMIT FOR FACILITIES WHICH RECEIVE PRIMARILY DOMESTIC WASTE (≤100,000 gallons per day) UNDER MISSOURI CLEAN WATER LAW

MAR 29 2012

FOR AGENCY USE ONLY	
CHECK NUMBER: NO FEE Required	
DATE RECEIVED: 3/29/12	FEE SUBMITTED: Ø

NOTE: PLEASE READ THE ACCOMPANYING INSTRUCTIONS BEFORE COMPLETING THIS FORM

1. This application is for:
- ☐ An operating permit and antidegradation review public notice.
- ☐ A construction permit following an appropriate operating permit and antidegradation review public notice.
- ☐ A construction permit and a concurrent operating permit and antidegradation review public notice.
- ☐ A construction permit (submitted before Aug. 30, 2008 or antidegradation review is not required).
- ☐ An operating permit for a new or ~~unpermitted facility~~.
- ☒ An operating permit renewal: Permit #MO- 0041467 — Construction Permit # ____ — Expiration Date 2-22-2012
- ☐ An operating permit modification: Permit #MO- ____ — Reason: ____

1.1 Is this a Federal/State Funded Project? ☐ YES ☒ NO Funding Agency/Project #: ____

1.2 Is the appropriate fee included with the application (See instructions for appropriate fee)? ☐ YES ☐ NO

2. FACILITY (Outfall of)

NAME	TELEPHONE WITH AREA CODE
PEACEFUL VALLEY SERVICE Co	573-437-7808
ADDRESS (PHYSICAL)	**CITY** / **STATE** / **ZIP CODE**
3408B PEACEFUL VALLEY RD	OWENSVILLE / MO / 65066

2.1 LEGAL DESCRIPTION: SE ¼, NE ¼, NE ¼, Sec. 25, T 42N, R 6W County GASCONADE

2.2 UTM Coordinates Easting (X): ____ Northing (Y): ____
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

2.3 Name of receiving stream: TRIBUTARY TO CEDAR BRANCH

3. OWNER

NAME	E-MAIL ADDRESS	TELEPHONE WITH AREA CODE
PEACEFUL VALLEY PROPERTY OWNERS		573-437-2605
ADDRESS	**CITY** / **STATE** / **ZIP CODE**	
3408A PEACEFUL VALLEY RD	OWENSVILLE / MO / 65066	

3.1 Request review of draft permit prior to Public Notice? ☐ YES ☐ NO

4. CONTINUING AUTHORITY: Permanent organization which will serve as the continuing authority for the operation, maintenance and modernization of the facility

NAME	TELEPHONE WITH AREA CODE
PEACEFUL VALLEY SERVICE CO.	
ADDRESS	**CITY** / **STATE** / **ZIP CODE**

5. OPERATOR

NAME	CERTIFICATE NUMBER	TELEPHONE WITH AREA CODE
RICHARD PIERCE	10993	573-437-4227

6. FACILITY CONTACT

NAME	TITLE	TELEPHONE WITH AREA CODE
RICHARD PIERCE	OPERATOR	573-437-4227

7. ADDITIONAL FACILITY INFORMATION

7.1 Description of facilities (Attach additional sheet if required). Attach a 1" = 2,000' scale U.S. Geological Survey topographic map showing location of all outfalls and downstream landowners. (See item 9.)

7.2 Facility SIC code: ____; Discharge SIC code: ____; Facility NAICS code: ____; Discharge NAICS code: ____.

7.3 Number of people presently connected or population equivalent (P.E.) ____ Design P.E. ____
Number of units presently connected: Homes 167 Trailers N/A Apartments N/A Other N/A
Design flow for this outfall: ____ Total design flow for the facility: ____ Actual flow for this outfall: ____
Commercial Establishment: Daily number of employees working ____ Daily number of customers/guests ____.

7.4 Length of pipe in the sewer collection system? ____ feet/miles (Please denote which unit is appropriate.)

7.5 Does any bypassing occur in the collection system or at the treatment facility? ☐ Yes ☒ No (If yes, attach explanation.)

7.6 Does significant infiltration occur in the collection system? ☐ Yes ☒ No (If yes, attach explanation and proposed repair.)

7.7 Is industrial waste discharged to the facility identified in Item 2? ☐ Yes ☒ No (If yes, see instructions.)

7.8 Will the discharge be continuous through the year? ☒ Yes ☐ No
a. Discharge will occur during the following months: All
b. How many days of the week will the discharge occur? 7

7.9 Is wastewater land applied? ☐ Yes ☒ No (If yes, attach Form I.)

7.10 Will chlorine be added to the effluent? ☐ Yes ☒ No
a. If chlorine is added, what is the resulting residual? ____ µg/l (micrograms per liter)

7.11 Does this facility discharge to a losing stream or sinkhole? ☒ Yes ☐ No

7.12 Attach a flow chart showing all influents, treatment facilities and outfalls.

7.13 Has a waste load allocation study been completed for this facility? ☐ Yes ☒ No

7.14 List all permit violations, including effluent limit exceedances in the last five years. Attach a separate sheet if necessary. If none, write none. ____

FAXED
MAR 23 2012
BY: JH
Tom Siegel DNR

MO 780-1512 (09-08)

8. SLUDGE HANDLING, USE AND DISPOSAL

8.1 Is the sludge a hazardous waste as defined by 10 CSR 25? ☐ Yes ☐ No

8.2 Sludge Production, including sludge received from others: _____ Design Dry Tons/Year _____ Actual Dry Tons/Year

8.3 Capacity of sludge holding structures:
Sludge storage provided: _____ cubic feet; _____ days of storage; _____ average percent solids of sludge;
☒ No sludge storage is provided.

8.4 Type of Storage:
☐ Holding tank ☐ Building
☐ Basin ☐ Other (Please describe) _____
☐ Concrete Pad

8.5 Sludge Treatment:
☐ Anaerobic Digester ☐ Lagoon ☐ Composting
☐ Storage Tank ☐ Aerobic Digester ☐ Other (Attach description)
☐ Lime Stabilization ☐ Air or Heat Drying

8.6 Sludge Use or Disposal:
☐ Land Application ☐ Surface Disposal (Sludge Disposal Lagoon, Sludge held for more than two years)
☐ Contract Hauler ☐ Incineration
☐ Hauled to Another Treatment Facility ☐ Sludge Retained in Wastewater treatment lagoon
☐ Other _____ Attach explanation sheet.
☐ Solid Waste Landfill

8.7 PERSON RESPONSIBLE FOR HAULING SLUDGE TO DISPOSAL FACILITY
☐ By Applicant ☐ By Others (complete below)

NAME			
ADDRESS	CITY	STATE	ZIP CODE
CONTACT PERSON	TELEPHONE WITH AREA CODE	PERMIT NO. MO-	

8.8 SLUDGE USE OR DISPOSAL FACILITY
☐ By Applicant ☐ By Others (Please complete below.)

NAME			
ADDRESS	CITY	STATE	ZIP CODE
CONTACT PERSON	TELEPHONE WITH AREA CODE	PERMIT NO. MO-	

8.9 Does the sludge or biosolids disposal comply with federal sludge regulations under 40 CFR 503?
☐ Yes ☐ No (Please attach explanation)

9. DOWNSTREAM LANDOWNER (S) (ATTACH ADDITIONAL SHEETS AS NECESSARY. SEE INSTRUCTIONS)

NAME			
ADDRESS	CITY	STATE	ZIP CODE

10. DRINKING WATER SUPPLY INFORMATION

10.1 WHAT IS THE SOURCE OF YOUR DRINKING WATER SUPPLY:
A. Public supply (municipal or water district water) _____
If public, please give name of the public supply _____
B. Private well X
C. Surface water (lake, pond or stream) _____

10.2 Does your drinking water source serve at least 25 people at least 60 days per year (not necessarily consecutive days)?
☒ Yes ☐ No

10.3 Does your supply serve housing which is occupied year round by the same people? This does not include housing which is occupied seasonally? ☒ Yes ☐ No

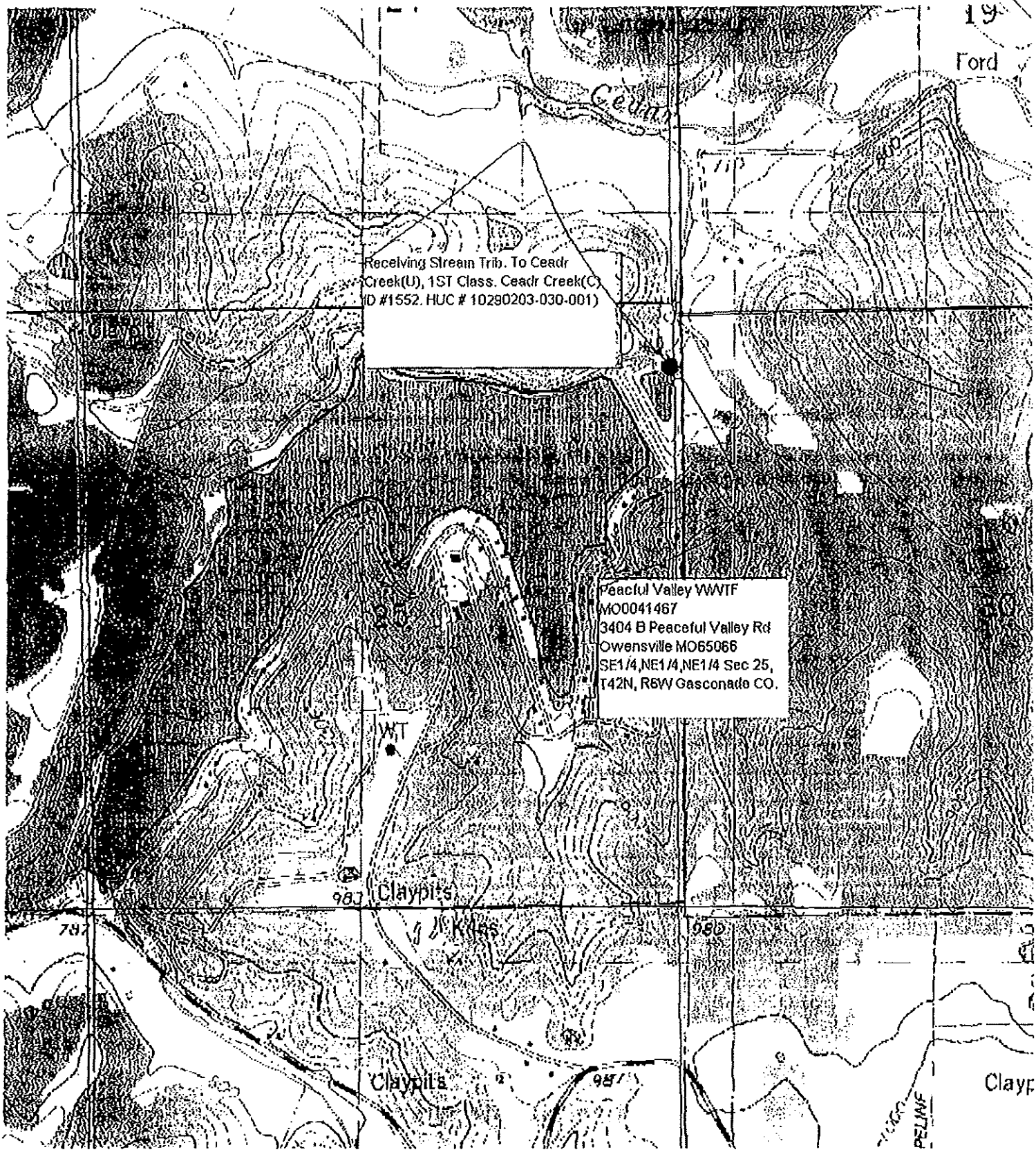
11. I certify that I am familiar with the information contained in the application, that to the best of my knowledge and belief such information is true, complete and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders and decisions, subject to any legitimate appeal available to applicant under the Missouri Clean Water Law.

NAME AND OFFICIAL TITLE (TYPE OR PRINT)	TELEPHONE WITH AREA CODE
RICHARD PIERCE OPER. MANG.	574-437-4227
SIGNATURE	DATE SIGNED
Richard Pierce	3-23-12

MO 780-1512 (09-08)

FAXED
MAR 23 2012
BY:

Jon Siegel DNR



MAP

FAXED
MAR 2012
BY:

Don Siegel DNR

ATTACHMENT B

Missouri DNR Publication 2481

Missouri Department of Natural Resources

Ammonia Criteria: New EPA Recommended Criteria

Water Protection Program fact sheet 02/2014
Division of Environmental Quality Director: Leanne Tippett Mosby PUB2481

On Aug. 22, 2013, the U.S. Environmental Protection Agency finalized new water quality criteria for ammonia based on toxicity to mussels and gill-bearing snails. Missouri's current ammonia criteria do not take these species into account.

The adult forms of mussels seen in rivers, lakes, and streams are sensitive to pollutants because they are sedentary filter feeders. They vacuum up many pollutants with the food they bring in and cannot escape to new habitats, so they can accumulate these pollutants in their bodies to a level that may ultimately prove fatal. Very young mussels, called glochidia, are exceptionally sensitive to ammonia in water.

EPA conducted toxicity testing and, using this data, developed ammonia water quality criteria that protect young mussels. These new criteria will apply to any discharge of ammonia that may pose a reasonable potential to violate the standards. The new criteria have implications for nearly all discharging domestic wastewater treatment facilities (cities, subdivisions, mobile home parks, etc.), as well as certain industrial and stormwater dischargers with ammonia in their effluent.

When new water quality criteria are established by EPA, states must update their regulations to reflect the new criteria in order to keep their authorization to issue permits under the National Pollutant Discharge Elimination System. States may develop their own criteria, taking into account specific circumstances unique to the state, but any criteria developed by the state must be as protective as the federal recommended criteria. Ultimately, EPA must approve any water quality criteria developed by the state. The department has initiated stakeholder discussions on this topic and at this time, there is no firm target date for starting the rulemaking to adopt new standards. Part of the consideration during these discussions will include an evaluation of actual species of mussels native to Missouri and their sensitivity to ammonia.

Many treatment facilities in Missouri are currently scheduled to be upgraded to comply with the current water quality criteria. Because these new standards may require a different treatment technology than the one being considered by the permit holder to meet the existing standard, the department strongly recommends permit holders discuss the new standards with their consulting engineers. Permit holders can also contact the department to discuss upcoming requirements. An evaluation of the capabilities of various treatment technologies is included in this fact sheet along with contact information for the department.

Ammonia toxicity varies by temperature and by pH of the water. Assuming a stable pH value, but taking into account winter and summer temperatures, Missouri includes two seasons of ammonia effluent limitations. Typical ammonia effluent limitations for a facility discharging to a stream with no dilution allowances, under the current water quality standard, are:

Summer – 3.6 mg/L daily maximum, 1.4 mg/L monthly average

Winter – 7.5 mg/L daily maximum, 2.9 mg/L monthly average

Under the new EPA criteria, where mussels are present or expected to be present, typical effluent limitations for a facility discharging to a stream with no dilution allowance would be:

Summer – 1.7 mg/L daily maximum, 0.6 mg/L monthly average

Winter – 5.6 mg/L daily maximum, 2.1 mg/L monthly average

Operating permits for facilities in Missouri must be written based on current statutes and regulations. Therefore permits will be written with the existing effluent limitations until the new standards are adopted. To aid permit holders in decision-making and alert them to upcoming changes, the department is including advisory language regarding the new federal criteria in permits and permit fact sheets. When setting schedules of compliance for ammonia effluent limitations, the department will take into consideration recently constructed upgrades to meet the current ammonia limitations and any other relevant factors.

For more information about this topic, contact the Missouri Department of Natural Resources, Water Protection Program at 573-751-1300. Additional guidance is available from the U.S. Environmental Protection Agency at water.epa.gov/scitech/swguidance/standards/criteria/aqlife/ammonia/index.cfm.

Disclosure required by Section 640.026, RSMo: Nothing in this document may be used to implement any enforcement action or levy any penalty unless promulgated by rule under chapter 536 or authorized by statute.

The attached chart is not a comprehensive list of technologies. It is intended as a guide to assist permit holders in evaluating technologies and assumes facilities are designed, constructed, operated and maintained to effectively remove ammonia. Permit holders should not rely solely on this document when making treatment technology decisions. It is important to consult closely with an experienced professional engineer in selecting a treatment technology.

Wastewater Treatment Technologies

Key

A – Preferred when feasible
B – Has demonstrated capability in meeting ammonia when designed appropriately
C – Shows potential for meeting ammonia limitations.
D – Unlikely to meet ammonia limitations, or data inconclusive

Wastewater Technology	**Ammonia Effluent Limit (mg/L)**			
	< 0.7	**0.7 - 1.4**	**1.5 - 2.5**	**2.5 - 5.0**
Land Application	A	A	A	A
Wetland	D	D	D	D
Facultative Lagoon	D	D	D	C

Aerated, Partial Mix Lagoon	D	D	D	C
Lagoons with Approved Retrofits	C	C	C	B
Recirculating Sand Filter	C	C	C	B
Trickling Filter	D	D	C	B
Oxidation Ditch	B	B	B	B
Extended Aeration Package Plant	D	C	B	B
Sequencing Batch Reactor	B	B	B	B
Biological Nutrient Removal	B	B	B	B
Enhanced Biological Nutrient Removal	B	B	B	B
Membrane Bioreactors	B	B	B	B
Breakpoint Chlorination	D	D	C	C
Moving Bed Biofilm Reactor	B	B	B	B
Integrated Fix Film Activated Sludge	B	B	B	B
Side Stream Nutrient Removal	B	B	B	B

Nothing in this document may be used to implement any enforcement action or levy any penalty unless promulgated by rule under chapter 536 or authorized by statute.

For more information

Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, MO 65102-0176
800-361-4827 or 573-751-1300
http://www.dnr.mo.gov/env/wpp

ATTACHMENT C

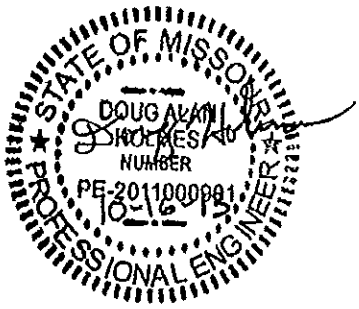
Engineering Report

FACILITY PLAN
FOR THE
WWTP FACILITY IMPROVEMENTS

SERVING

PEACEFUL VALLEY SERVICE COMPANY

OCTOBER 2013



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APPENDIX

I. INTRODUCTION

The 177 acre Peaceful Valley Lake is located within a rugged, picturesque area of Gasconade County slightly west of Owensville, MO. Much like the rest of the scenic Ozarks, the land surrounding the lake is characterized by lofty hills, deep valleys, and streams. Peaceful Valley Lake was formed in 1965 when a dam was constructed to impound a tributary to Cedar Branch. The following year, 1966, saw the birth of a planned, private development surrounding the lake. That same year, a wastewater collection system and a treatment lagoon were constructed to serve the development. Fast forward to 2013 and the Peaceful Valley Service Company now reports 171 homes and a total of 720 dues paying lots within its boundaries.

The primary subject of this facility plan is the wastewater treatment lagoon. The 2.28 acre facultative lagoon is located adjacent to the downstream toe of the dam and has a water surface elevation of approximately 725 feet AMSL. The lagoon site is located in the NE ¼, NE ¼, Sec. 25, T42N, R06W, Gasconade County with UTM coordinates: X= 627827, Y= 4246791. The outfall discharges to an unnamed tributary to Cedar Creek, which is unclassified. The first classified stream is 3.82 miles downstream of the outfall at Cedar Branch. The lagoon's discharge is regulated by Missouri State Operating Permit (MSOP) number MO-0041467.

The Missouri Department of Natural Resources (DNR) conducted a stream survey on May 25, 2012. The stream survey reported sludge, a poor invertebrate community, and odor at the lagoon outfall. It also reported sludge and a poor invertebrate community 0.1 miles downstream of the outfall. The stream survey is included in the Appendix.

During renewal of the lagoon's MSOP, DNR issued a draft permit containing a new effluent limit for ammonia as nitrogen (NH3-N). Due to the findings of impairment of the receiving stream during the low flow survey, the draft MSOP also includes a Schedule of Compliance (SOC) with a timeframe for the permittee to upgrade the facility. The permittee is required to upgrade the facility in an effort to improve the receiving stream water quality. The facility upgrade must include technology that is capable of meeting the new effluent limits for ammonia as nitrogen.

The Schedule of Compliance in the draft permit is as follows:

1. By **December 1, 2013**, submit an engineering evaluation and plan for upgrading the facility. Alternatively, if the permittee chooses to eliminate the discharge by

connection to another facility, submit a closure plan and schedule for eliminating the discharge.

2. By **July 1, 2014**, submit an application for construction permit.

3. By **May 1, 2016**, complete construction and send a certificate of work completed. Submit an application to modify the permit.

The new NH3-N limit is 1.3 mg/L in the summer months and 2.9 mg/L in the winter months. These effluent ammonia values are typically not achievable with a facultative lagoon. The Discharge Monitoring Report (DMR) data for the period from May 2012 to August 2013 records an average NH3-N value of 5.8 mg/L, a maximum value of 12.2 mg/L, and a minimum value of 1.4 mg/L.

The Peaceful Valley Service Company will need to make significant and costly wastewater treatment improvements to achieve compliance with the new ammonia draft permit limits.

At the time of this report, we have received verbal notification from DNR that effluent ammonia limits will be reduced even further in order to protect the waters of the state. DNR anticipates publication of the new ammonia criteria within the next couple of months; however, the current projection of revised ammonia limits is 0.6 mg/L in the summer months and 2.1 mg/L in the winter months. The alternatives considered in this report will be evaluated based on meeting these new limits.

II. BACKGROUND

1.) HISTORY

Peaceful Valley Lake is located in south-central Gasconade County, which is in the east-central part of the State. Gasconade County covers a total land area of 526 square miles. Peaceful Valley Lake is a 177 acre reservoir located just 2.5 miles west of Owensville, Missouri in Gasconade County. The reservoir has a drainage area of 3,140 acres and is impounded by the Peaceful Valley Lake Dam, which was constructed in 1965 and is regulated by the Missouri Department of Natural Resources. The dam has a length of 1,100 feet and a height of 64 feet. The dam's ID number is MO30196, the permit number is R-179, and its location is in S25, T42N, R06W. The Peaceful Valley Lake Dam is in hazard class #1.

The dam was built in 1965 and in 1966 the original wastewater infrastructure was installed for the private development. Approximately a decade later, the Peaceful

Valley Property Owners Association incorporated and took ownership of the development. The original incorporators were: Gwynn Jost, Wanda Kahle, William S. Thompson, Armin Landwehr, and Drue E. Anderson. These individuals comprised the first Board of Directors of the Association. The Association is governed by Restrictions on file with the Gasconade County Recorder of Deeds, By-Laws, and Rules & Regulations. There are 9 Directors of the Board, three of which are elected by mail secret ballot every year. All members in good standing with the Association can vote in secret ballot, as well as at any Annual or Special Membership Meeting.

The Peaceful Valley Service Company (PVSC) is a separate corporate entity from the Peaceful Valley Property Owners Association (PVPOA). The PVPOA owns all the stock in PVSC and PVSC is the legal owner of all the water and sewer assets within the subdivision. The PVSC is responsible for operation and maintenance of these assets and will be responsible for all contracts and construction.

The original sanitary sewer collection system and wastewater treatment lagoon were constructed in 1966. The collection system was expanded as more homes were built, but the original lagoon has not been upgraded.

According to the November 1997 USDA Soil Survey, Gasconade County's average temperature in the summer is 70° F and 41° F in the winter. The average annual precipitation is 39.24 inches with 58% occurring in April through September. On average, there are 66 days per year that have at least 0.1 inches of precipitation. The average seasonal snowfall is 15.5 inches.

2.) TOPOGRAPHY & GEOLOGY

Peaceful Valley Lake is the dominant feature within the lagoon service area. Most of the population resides on lake front property or very near the lake. The development is mostly composed of steep hillsides transitioning into hilltops and ridges as you move away from the lake. Within the Peaceful Valley development, elevations change by over 200 feet, which makes providing sewers to this area very difficult and expensive. The lagoon water surface is approximately 725 feet AMSL, the lake is 773 feet AMSL, and the highest elevation within the development is approximately 980 feet AMSL.

The pertinent areas for potential upgrade are as follows: the existing lagoon site, the area just south of the existing lagoon, the hillside north of the lagoon, the hilltop north of the lagoon, and the valley downstream of the dam. The soils in these areas are classified as follows (there are 2 soil types present on the hilltop and 3 in the valley):

TABLE 1
SOILS IN POTENTIAL PROJECT SITES

Location	Symbol	Description
Lagoon Site	49A	Gladden loam, 0 to 3% slopes, frequently flooded
S. of Lagoon	01D2	Union silt loam, 9 to 14% slopes, eroded
Hillside	10F	Gasconade-Rock outcrop complex, 14 to 35% slopes
Hilltop	26D	Beemont gravelly silt loam, 5 to 14% slopes
Hilltop	26F	Beemont gravelly silt loam, 14 to 35% slopes
Valley	49A	Gladden loam, 0 to 3% slopes, frequently flooded
Valley	39	Nolin silt loam, frequently flooded
Valley	05B	Harlville silt loam, 2 to 5% slopes

The existing lagoon site is challenging because the site is very constrained. The west side of the lagoon is bounded by the dam, to the north is a very steep hillside, and the east side is constrained by the property line. The area immediately south of the lagoon has potential for hosting a package plant or other system of small footprint. However, the land further south of the lagoon area slopes upward at approximately 13%.

The property east of the lagoon site and downstream of the dam might be available for purchase. There are several clay pits in the surrounding area that could serve as soil borrow sites.

3.) EXISTING DEVELOPMENTS
In August 2013, the Peaceful Valley Property Owners Association included 170 homes with one home currently under construction and a total of 720 dues paying lots.

III. PURPOSE AND SCOPE

Table 1 summarizes the current residences that are being served by the wastewater lagoon. It summarizes the existing hydraulic and organic data for the area served.

TABLE 2
EXISTING SERVICE AREA AND THEORETICAL FLOW CHARACTERISTICS

Units	Type	PE Units	Population Equivalent	$BOD_{5/Cap.}$ (lbs)	Total BOD_5 (lbs)	GPCD	Total GPD
171	Homes	3.7	633	0.17	107.6	100	63,300

This table indicates the theoretical average hydraulic flow is estimated to be 63,300 GPD based on a flow of 100 gallons per capita per day (gpcd). The actual average

hydraulic flow as reported in DMR data for May 2012 – August 2013 is 58,000 GPD. The discrepancy between estimated flows and actual flows are likely a result of the following factors:

1. DMR flow readings are made once per month as instantaneous measurements taken at the discharge. These measurements may not accurately represent 24-hour average flows.
2. The service area at Peaceful Valley Lake has approximately 50% full-time occupancy.
3. The original collection system was installed in 1966. It is likely that the lagoon experiences periodic flow increases due to inflow and infiltration (I&I).

The population equivalent, PE, is anticipated to increase in the next 20 years making a total PE of 718 being served. The average hydraulic flow will increase proportionately. Average daily flows (58,000 gpd) at the lagoon are currently almost one and a half times the permitted hydraulic capacity (40,750 gpd) and are projected to increase. The existing lagoon needs to be improved in order to handle current flows and anticipated growth.

Furthermore, the facility must be upgraded in order to stay in compliance with the required National Pollutant Discharge Elimination System (NPDES) permit limits. NPDES permitting is mandated by EPA and is under the control authority of DNR. The limits are set to protect the water quality of the receiving stream. The previous discharge permit did not include an ammonia limit, but the new draft permit does.

The new NPDES permit limits are: BOD_5 – 45 mg/L, TSS - 80 mg/L, pH at or above 6.5, NH3-N 1.3 mg/L from April 1 to September 30, and NH3-N 1.3 mg/L from October 1 to March 31.

The existing WWTP is a one-cell facultative lagoon with a surface area of approximately 2.28 acres and an operating depth of 3 feet. It has a hydraulic NPDES design flow of 40,750 gpd. The present wastewater treatment facility cannot consistently meet the new discharge limits and must be upgraded or replaced.

Furthermore, expansion of the facility to a higher hydraulic capacity invokes an Antidegradation Review, which drives the NPDES discharge limits even lower. This will be discussed later in this report.

The scope of this study is to evaluate environmentally safe alternatives for upgrading the WWTP facility. The report will include identifying cost-effective means of treating the wastewater. The selected alternatives will meet current Department of Natural

Resources regulations, be cost effective to build and operate, be expandable to meet the needs of the growing population, and fit into the rural setting of the lake.

A new treatment plant needs to have a design life of at least twenty years and should be sized to accommodate the projected population growth. The data indicates that the new treatment plant should be able to serve an equivalent of at least 718 people and a hydraulic flow of 71,800 GPD. This facility plan evaluates treatment plant options, costs, and the associated financing.

IV. EXISTING FACILITIES EVALUATION

Existing Wastewater Treatment Facilities

The existing centralized treatment facility is a one-cell facultative lagoon which was originally constructed in 1966. The 1966 plan set shows a 3 foot operating depth and a berm height of 5 feet. A 1974 set of plans were found to upgrade the facility to an aerated lagoon with a wooden baffle separating the aerated portion from the settling zone. The 1974 plan set includes raising the berms to provide 5 feet of operating depth. The existing lagoon is not aerated. However, the lagoon's shape more closely resembles the 1974 plan set than the 1966 plan set so it is possible that some modifications were made. The actual lagoon depth has not been determined.

Based on the available information, the lagoon facility is a one-cell facultative lagoon with a water surface area of approximately 2.28 acres and an operating depth of 3 feet. Sludge is retained within the lagoon. The current DNR draft operating permit was placed on Public Notice on August 9, 2013. According to the current DNR draft operating permit, the existing lagoon is designed for a population equivalent of 410 people and a hydraulic design flow of 40,750 gallons per day. The facility has one outfall which is classified under SIC #4952. The draft permit states that the actual daily flow is 48,356 gallons per day, which is 119% of the design flow. The current DNR Draft Operating Permit is shown in the Appendix.

Existing Hydraulic and BOD_5 and TSS Loading

The wastewater treatment facility is discharging the following hydraulic, organic, and solids loading. The data is taken from the monthly Discharge Monitoring Reports (DMRs). The hyraulic flows recorded for the DMRs are instantaneous readings taken once per month at the time of sample collection. Therefore, the flow readings in the table below do not indicate diurnal or wet weather peaks.

TABLE 3
DMR DATA

	MONTH	FLOW MGD	BOD mg/L	TSS mg/L	Temp Celsius	pH	NH3-N mg/L
2012	May	0.0043	11.3	12.5	23	7.7	5.41
2012	June	0.0310	13.4	51.9	20	7.5	2.79
2012	July	0.0540	13.1	35.0	25	7.1	7.57
2012	August	0.0230	13.2	44.2	25	7.2	10.3
2012	September	0.0432	18.6	37.7	20	7.2	12.2
2012	October	0.0540	18.3	24.4	14	7.8	5.54
2012	November	0.0480	24.7	29.3	11	7.7	5.36
2012	December	0.0740	18.3	40.7	7	7.7	4.61
2013	January	0.0680	13.2	16.3	10.5	7.9	10.5
2013	February	0.0670	18.6	42.7	8	8.3	2.51
2013	March	0.0720	10.5	14.9	9	6.8	1.41
2013	April	0.0880	4.2	9.2	13	6.7	5.37
2013	May	0.0900	3.1	1.1	23	6.8	7.57
2013	June	0.0860	4.5	10.6	21	7.1	3.75
2013	July	0.0617	14.4	16.7	21	6.8	1.69
2013	August	0.0576	12	10.3	22	7.2	6.32

TABLE 4
DMR DATA SUMMARY

	FLOW MGD	BOD mg/L	TSS mg/L	Temp Celsius	pH	NH3-N mg/L
AVG	0.058	13.2	24.8	17.0	7.3	5.8
MAX	0.0900	24.7	51.9	25.0	8.3	12.2
MIN	0.0043	3.1	1.1	7.0	6.7	1.4

V. PROJECTED GROWTH

The Peaceful Valley Service Company reported 156 homes in 2001 and 170 homes in 2013. This is 14 additional homes in 12 years or an average rate of 1.17 new homes per year. One house is currently under construction. A 20-year growth projection yields 23 new homes for a total of 194 homes in the year 2033.

The hydraulic and organic loading on the wastewater facility will increase as the population being served increases. The lagoon is presently serving a PE of 633 persons. A 20-year growth projection raises the population served to 718 PE with a resulting increase in hydraulic and organic load. In order to analyze the wastewater

treatment system, the organic and hydraulic loading must be determined. These loadings are estimated based on the Rules & Regulations of the MDNR 10 CSR 20-8.120(5) and 8.020(11) Table 1 (Flow design table for small wastewater treatment works). The hydraulic loading is 100 gallons per capita-day (GPCD) and the organic loading is 0.17 lbs. BOD_5 per capita per day. Calculations for hydraulic and organic loading are based on 3.7 occupants per house.

Flow and Organic Strength for Future WWTP System

With the increase in population served by the lagoon and the more restrictive NPDES permit limits being promulgated by DNR, it is incumbent on the Peaceful Valley Homeowner's Association that a wastewater treatment upgrade be instigated that will serve the association for the next twenty years.

TABLE 5
TWENTY YEAR PROJECTED ORGANIC AND HYDRAULIC LOADING

Units	Type	PE Units	Population Equivalent	$BOD_{5/Cap.}$ (lbs)	Total BOD_5 (lbs)	GPCD	Total GPD
194	Homes	3.7	718	0.17	122	100	71,800

Table 5 summarizes the hydraulic and organic loads to be served using the 20-year forecast. Taking this into consideration, this facility plan proposes to build a wastewater treatment facility to handle a population of 718; an average daily hydraulic loading of 71,800 GPD; an organic loading of 122 lb/day; and a solids loading of 135 lb/day. The present facility is not adequate to handle this volume of organic and hydraulic loading.

As per the antidegradation rules, the proposed organic and solids loading on the receiving stream is not to degrade the receiving stream. The present organic and solids loading on the receiving stream from the permitted lagoon discharge is 23.8 lbs/day BOD_5 and 42.2 lbs/day TSS, based on the current population served and the NPDES limits. An antidegradation review will be necessary during the design phase.

The proposed effluent limits, subject to antidegradation review, for the upgraded facility will be based on the type of treatment selected. It is anticipated that effluent limits of 30 mg/L BOD_5, 30 mg/L TSS, 1.3 mg/L Total Ammonia (summer), and 2.9 mg/L Total Ammonia (winter) will be imposed on the new facility. However, DNR has stated that lower ammonia limits will be issued soon. Tentatively, these limits are going to be 0.6 mg/L Total Ammonia (summer), and 2.1 mg/L Total Ammonia (winter). Only alternatives that are capable of meeting these lower ammonia limits will be considered as viable alternatives.

VI. PROPOSED ALTERNATIVES

The proposed alternatives of treatment systems will be presented with total life cycle costs over 20 years. A recommended treatment method will be based on the total life cycle cost of each alternative. In order to be considered a viable alternative, it will need to be capable of meeting the stringent stream ammonia effluent requirements. The forms of treatment explored will be:

1. Modification to existing lagoon
2. Land application in a timbered area
3. Package treatment plant – Extended Aeration
4. Package treatment plant - BioRotor
5. Recirculating biofilter system

When sizing the proposed treatment systems, the 20-year hydraulic and organic loading will be used. The evaluation will require creating a preliminary capital cost estimate of the treatment options considered. The capital cost and annual O & M will be estimated for each alternative. These alternatives will then be compared using equivalent uniform annual costs (EUAC). From this analysis, the most cost effective treatment will be proposed.

1. Upgrade Existing Peaceful Valley Lagoon

According to the May 25, 2012 stream survey and the new draft MSOP, the lagoon facility must be upgraded or replaced to protect and improve the receiving stream water quality and to meet the new NH3 discharge limits. The existing lagoon has a surface area of 2.28 acres, a depth of 4 feet, three-to-one side slopes, and a calculated volume of 2,755,600 gallons. According to the DMR data for May 2012 through August 2013, the existing lagoon has consistently met the BOD and TSS effluent limits. However, the lowest measured NH3 concentration from the lagoon's effluent was 1.4 mg/L. This is marginally higher than the summer limit of 1.3 mg/L and significantly higher than the likely future NH3 limit of 0.6 mg/L.

Two options for upgrading the existing lagoon for ammonia removal were evaluated. The first option would not modify the existing lagoon but would follow it with an additional process for nitrification. The additional process would be an aerated, fixed-film process. However, this option was eliminated because nitrifying bacteria do not compete well against BOD removing heterotrophic bacteria. For nitrification to take place, BOD levels must be sufficiently reduced in order to eliminate competition. Even though the lagoon has performed well in meeting the BOD effluent limits, BOD removal would need to be enhanced in the existing lagoon in order for this process to be a viable option.

The second option considered for upgrading the existing lagoon is to convert it into an aerated lagoon to enhance BOD removal and then follow the modified lagoon with the same type of aerated, fixed-film process discussed in the first option. This option is hindered by the small size and shallow depth of the existing lagoon. Any modifications to the existing lagoon would require that it comply with the current design regulations. The lagoon volume is too small to subdivide into an aerated cell and a settling cell. The total detention time in the aerated cell would be too small to accommodate BOD removal based on a 20-year design life. The existing lagoon site is too constrained to perform the necessary expansion to make this option viable.

As a result of the factors discussed in the above paragraphs, it is not anticipated that a modified lagoon-based facility can consistently meet the required ammonia limits for the receiving stream. This alternative is not considered a viable alternative.

2. **Land Application of Wastewater**

This alternative utilizes a slow rate land application system to store and land-apply wastewater. The system would contain sufficient storage to hold all the wastewater generated from the facility during a 90-day winter shut down period during very cold weather. Storage lagoons require a minimum operating depth of 2 feet in order to keep the clay liner moist and sealed. It also is required to hold the one-in-ten-year maximum precipitation event, which for this area is equal to 14.5 inches of rainfall. Considering all of these storage requirements, the total storage capacity would be 13.93 million gallons or 1,862,820 cubic feet at the maximum operating depth. Calculating the lagoon area based on a maximum operating depth of 8 feet, yields a lagoon surface area of approximately 310,470 square feet or 5.35 acres.

The existing lagoon is approximately 2.28 acres and its total depth is approximately four feet. Insufficient land is available at the existing lagoon site for this size of expansion, which necessitates building the storage pond in a different location. Also, the existing lagoons depth is inadequate to provide significant storage above the 2 feet minimum operating depth and the 14.5" of rainfall storage depth. Therefore the existing lagoon would be abandoned. A new transfer pump station would pump the raw wastewater to a new storage lagoon.

There would be a pump installed in an effluent structure at the new storage lagoon that would screen and pump the pond effluent into a system of buried force mains and electric valves. This buried force main would be connected to multiple large volume impact sprinkler heads which would apply the effluent at a rate that the soil could handle without runoff. The system will be designed to apply less than 24" per year to

the area that is irrigated, which will allow a conservative approach to land application. A total of 40.2 acres of land would be required to land apply the wastewater.

According to the November 1997 USDA Soil Survey, the hilltop storage lagoon site and the hilltop land application site are classified as having a severe overall geological limitation. The lagoon storage site soils are mapped as beemont gravelly silt loam, 5 to 14% slopes. The land application site soils are also mapped as beemont gravelly silt loam. However, the slopes fall within to ranges: 5 to 14% and 14 to 35%. These higher slopes are not suitable for land application. Furthermore, the necessary 5.35 acre storage lagoon would be positioned on the hilltop where slopes range from 7 to 14% and the total elevation change across the 5.35 acre lagoon site is in excess of 40 feet. The combination of steep hillsides and large land area requirements make this option unsuitable for wastewater disposal on the property currently owned by Peaceful Valley Lake. The topography of the hillsides above Peaceful Valley Lake could cause wastewater runoff or seepage to enter the lake and/or a homeowner's property.

Other property downstream of the Peaceful Valley Lake Dam might be available for purchase to install a storage lagoon and land application system. The soils in this area are mapped as gladden loam with 0 to 3% slopes, nolin silt loam that is frequently flooded, and Hartville silt loam with 2 to 5% slopes. The gladden loam and nolin silt loam have moderate permeability and are suitable for land application.

The total amount of land required to house this alternative would be approximately 46 acres, all of which would need to be purchased by the association. It is estimated that this land could be purchased for $5,000 per acre.

TABLE 6

LAND APPLICATION

PROBABLE CONSTRUCTION COST ESTIMATE

ITEM	QUANTITY	UNIT	UNIT PRICE	COST
Land Purchase	46	Acre	$ 5,000	$ 230,000
Storage Pond and Clay Liner	1	LS	$ 650,000	$ 650,000
3-Phase Power to Site	1	LS	$ 40,000	$ 40,000
Duplex Transfer Lift Station	1	LS	$ 48,000	$ 48,000
4" Force Main to Storage Pond	900	LF	$ 12	$ 10,800
Pond Effluent Structure	1	LS	$ 30,000	$ 30,000
Pond Pump Station and Controls	1	LF	$ 55,000	$ 55,000
Electric Valves and Wiring	1	LS	$ 69,000	$ 69,000
Access roads	2,000	LF	$ 20	$ 40,000

Buried Irrigation Piping	1	LS	$ 236,000	$ 236,000
Solid Set Large Volume Impact Sprinklers	108	EA	$ 1,500	$ 162,000
Subtotal				$ 1,469,800
Contingency (10%)				$ 146,980
Total Construction Costs				$ 1,616,780
Design Bidding and Construction Services (NTE)*				$ 145,100
Total Project Cost				$ 1,761,880
Equivalent Uniform Annual Cost over 20 years				
Construction EUAC (20 Yrs, 4.5%)				$ 135,453
Annual O&M				$ 18,589
Total EUAC				$ 154,042
NET MONTHLY COST (20 YRS)				$ 12,837

* NTE = Not To Exceed

Electrical Usage: 15 hp x 8760 hr/yr x 0.7457 kW/hp x $0.096/kW.hr = $9,309/yr.

Labor: One part-time operator for the land application facility including benefits.
1 x $14/hr x 10 hr/wk x 52 weeks/yr = $7,280

Equipment Replacement Fund is estimated at: $2,000/yr

Labor, electrical costs, and equipment replacement for the proposed mechanical wastewater treatment facility will be approximately $18,589/year.

The annual Present Worth value of the package plant capital cost over a 20-year life cycle at 4.5% interest is as follows:

(A/P, 4.5%, 20 yr) = 0.07688; $1,761,880(0.07688) = $135,453/year

The total annual capital, operation and maintenance costs for the proposed mechanical wastewater treatment plant is ($135,453 + $18,589) = $154,042/year.

These costs will affect the existing homeowner's rates as follows:
Net monthly cost, 20 year design life: $154,042/12 = $12,837.
Monthly cost per homeowner: $12,837 / 171 = $75.07/month

3. **Package Treatment Plant A – Extended Aeration**

A mechanical, package wastewater treatment plant is the smallest footprint alternative considered and it is capable of consistently meeting the NPDES effluent limits for BOD_5, TSS, and NH3-N. A wide variety of mechanical package plants is available and will be considered during the design phase – if this option is the recommended alternative. However, for this alternative, an extended aeration package plant will be evaluated. In order to consistently meet the very low NH3-N limits, a larger than usual aeration volume will be required. In this case, a standard extended aeration package plant designed for 100,000 gallons per day will be used.

The package plant considered will be a complete system with the following integral components: inlet bar screen, flow equalization chamber with duplex pumps, rectangular aeration tank, air diffusion system with blower assembly, hopper type clarifier with necessary baffles and overflow weir trough, sludge return piping, surface skimmers, sludge holding tank, and control panels.

Design Criteria Employed

Design flow rate = 71,800 gpd
Peaking factor = 3.88
Influent organic loading as measured by BOD_5 = 122 lbs/day
Design Effluent BOD_5 = 30 mg/l
Design Effluent TSS = 30 mg/l
Site elevation = 725 ft
Minimum dissolved oxygen (DO) to be maintained in the system = 2 mg/l
Winter and summer wastewater temperature of 1° and 20°C, respectively.
Alpha = 0.75 (ratio of oxygen transfer rate in field conditions versus clean water)
Beta = 0.95 (ratio of solubility of oxygen in field conditions versus clean water)

Flow Equalization Chamber

Static bar screen, duplex pumps, liquid level control system, coarse air diffuser, and blower assembly
Peak Flow: 3.88 x 71,800 gpd = 278,584 gpd
Basin Volume: 25,465 gallons

Extended Aeration Chamber

Design Hydraulic Detention Time = 50 hours
Basin Volume: 150,000 gallons

Clarifier

Surface Area = 260 square feet
Basin Volume: 17,324 gallons

Sludge Holding Tank / Aerobic Digester

Basin Volume = 10,771 gallons

Sludge Disposal Process

The activated sludge process involved in the extended aeration plant provides for a net growth of volatile suspended solids and an accumulation of inorganic suspended solids, which need to be wasted periodically. Normal domestic wastewater treated with activated sludge generally produces sludge at a rate of 0.65 lb sludge per lb BOD_5 removed. The estimated waste sludge production is as follows.

Influent BOD_5 = 122 lb BOD_5/day
Removed BOD_5 = 104 lb BOD_5/day
Discharged BOD_5 = 18 lb BOD_5/day
Estimated daily solids generation = (122 – 18) * 0.65= 67.6 lb sludge/day
The volume of liquid sludge waste @ 2% solids = 67.6 / (0.02 * 8.34) =
405 gal/day = 54 ft^3/day
Total sludge storage = 20 days
The liquid waste sludge would be pumped periodically and the sludge transported to a municipal wastewater treatment plant for disposal.

TABLE 7

EXTENDED AERATION PACKAGE PLANT
Probable Construction Cost Estimate

ITEM	QUANTITY	UNIT	UNIT PRICE	COST
Extended Air Package Plant (complete)	1	LS	$ 595,000	$ 595,000
Concrete Slab Foundation	125	CY	$ 150	$ 18,750
Installation and Connection	1	LS	$ 125,000	$ 125,000
3-Phase Power to Site	1	LS	$ 30,000	$ 30,000
Fence	430	LF	$ 25	$ 10,750
Access road improvements	550	LF	$ 12	$ 6,600
Seeding, fert. and mulch	1	EA	$ 1,200	$ 1,200
Subtotal				$ 787,300
Contingency (10%)				$ 78,730
Total Construction Costs				$ 866,030
Design Bidding and Construction Services (NTE)				$ 84,000
Total Project Cost				$ 950,030
Equivalent Uniform Annual Cost over 20 years				
Construction EUAC (20 Yrs, 4.5%)				$ 73,038
Annual O&M				$ 30,656
Total EUAC				$ 103,694

NET MONTHLY COST (20 YRS)	$ 8,641

Electrical Usage: 28 hp x 8760 hr/yr x 0.7457 kW/hp x $0.095/kW.hr = $17,376/yr.

Labor: One part-time operator for the wastewater treatment facility including benefits.
1 x $14/hr x 10 hr/wk x 52 weeks/yr = $7,280

Equipment Replacement Fund is estimated at: $6,000/yr

Labor, electrical costs, and equipment replacement for the proposed mechanical wastewater treatment facility will be approximately $30,656/year.

The annual Present Worth value of the package plant capital cost over a 20-year life cycle at 4.5% interest is as follows:

(A/P, 4.5%, 20 yr) = 0.07688; $950,030(0.07688) = $73,038/year

The total annual capital, operation and maintenance costs for the proposed mechanical wastewater treatment plant is ($73,038 + $30,656) = $103,694/year.

These costs will affect the existing homeowner's rates as follows:
Net monthly cost, 20 year design life: $103,694/12 = $8,641.
Monthly cost per homeowner: $8,641 / 171 = $50.53/month

Effectiveness and Reliability
This alternative is considered effective and reliable. This alternative is a suspended growth process and provides consistent and reliable treatment and is resistant to biological upsets. The extended aeration process can consistently produce quality effluents meeting 30 mg/L BOD_5, 30 mg/L TSS, 1.3 mg/L summer NH3-N levels, and 2.9 mg/L winter NH3-N levels. The mechanical equipment capital/replacement cost and electric consumption is significant. The operation and maintenance of this process requires a trained operator. The process requires regular operational testing and monitoring. Regular work is required to operate, clean, and maintain the blowers, float switches, pumps, weirs, and wasting and hauling off of accumulated sludge.

Environmental Factors
There are sporadic odors and loud noise issues with the required blowers. The process is not unsightly if well maintained. This process is not an ideal wastewater treatment process adjacent to a residential development. The effluent produced is in

compliance with the required stream standards. There are no health risks. The main negative environmental impact attributed to the extended aeration process is power consumption and blower motor noise.

Practicability
This process is considered a practical alternative for the 20-year design life. The process can achieve the necessary water quality criteria and is reliable.

4. **Package Treatment Plant B – BioRotor MXR**

This mechanical, package wastewater treatment plant is another small footprint alternative and it is capable of consistently meeting the NPDES effluent limits for BOD_5, TSS, and NH3-N. A wide variety of mechanical package plants is available and will be considered during the design phase – if this option is the recommended alternative.

The package plant considered will be a complete system with the following integral components: inlet bar screen, flow equalization chamber with duplex pumps, BioRotorMXR aeration tank, rotor drive assembly, hopper type clarifier with necessary baffles and overflow weir trough, sludge return piping, surface skimmers, sludge holding tank, and control panels.

Design Criteria Employed

Design flow rate = 71,800 gpd
Peaking factor = 3.88
Influent organic loading as measured by BOD_5 = 122 lbs/day
Design Effluent BOD_5 = 30 mg/l
Design Effluent TSS = 30 mg/l
Site elevation = 725 ft
Minimum dissolved oxygen (DO) to be maintained in the system = 2 mg/l
Winter and summer wastewater temperature of 1° and 20°C, respectively.
Alpha = 0.75 (ratio of oxygen transfer rate in field conditions versus clean water)
Beta = 0.95 (ratio of solubility of oxygen in field conditions versus clean water)

Number of parallel trains

Two parallel trains with the same equipment
Each train rated to serve an average daily flow of 36,000 gpd

Flow Equalization Chamber

Static bar screen, duplex pumps, liquid level control system, coarse air diffuser, and blower assembly

BioRotor MXR Aeration Chamber

Design Hydraulic Detention Time = 8 hours

Basin Volume: 12,000 gallons

Clarifier

Surface Area = 144 square feet

Sludge Holding Tank / Aerobic Digester

Basin Volume = 10,000 gallons

Sludge Disposal Process

The activated sludge process involved in this package plant provides for a net growth of volatile suspended solids and an accumulation of inorganic suspended solids, which need to be wasted periodically. Normal domestic wastewater treated with activated sludge generally produces sludge at a rate of 0.65 lb sludge per lb BOD_5 removed. The estimated waste sludge production is as follows.

Influent BOD_5 = 122 lb BOD_5/day
Removed BOD_5 = 104 lb BOD_5/day
Discharged BOD_5 = 18 lb BOD_5/day
Estimated daily solids generation = (122 – 18) * 0.65= 67.6 lb sludge/day
The volume of liquid sludge waste @ 21 solids = 67.6 / (0.01 * 8.34) =
405 gal/day = 108 ft^3/day
Total sludge storage = 25 days
The liquid waste sludge would be pumped periodically and the sludge transported to a municipal wastewater treatment plant for disposal.

TABLE 8

BIOROTOR PACKAGE PLANT
Probable Construction Cost Estimate

ITEM	QUANTITY	UNIT	UNIT PRICE	COST
Biorotor Package Plant (complete)	2	EA	$ 333,000	$ 666,000
Concrete Slab Foundation	60	CY	$ 150	$ 9,000
Installation and Connection	1	LS	$ 150,000	$ 150,000
3-Phase Power to Site	1	LS	$ 30,000	$ 30,000
Fence	350	LF	$ 25	$ 8,750
Access road improvements	550	LF	$ 12	$ 6,600
Seeding, fert. and mulch	1	EA	$ 1,200	$ 1,200
Subtotal				$ 871,550
Contingency (10%)				$ 87,155
Total Construction Costs				$ 958,705
Design Bidding and Construction Services (NTE)				$ 92,700
Total Project Cost				**$ 1,051,405**
Equivalent Uniform Annual Cost over 20 years				

Construction EUAC (20 Yrs, 4.5%)	$	80,832
Annual O&M	$	25,433
Total EUAC	$	106,265
NET MONTHLY COST (20 YRS)	**$**	**8,855**

Electrical Usage: 22 hp x 8760 hr/yr x 0.7457 kW/hp x $0.095/kW.hr = $13,653/yr.

Labor: One part-time operator for the wastewater treatment facility including benefits.
1 x $14/hr x 10 hr/wk x 52 weeks/yr = $7,280

Equipment Replacement Fund is estimated at: $4,500/yr

Labor, electrical costs, and equipment replacement for the proposed mechanical wastewater treatment facility will be approximately $25,433/year.

The annual Present Worth value of the package plant capital cost over a 20-year life cycle at 4.5% interest is as follows:

(A/P, 4.5%, 20 yr) = 0.07688; $1,051,405 x (0.07688) = $80,832/year

The total annual capital, operation and maintenance costs for the proposed mechanical wastewater treatment plant is ($80,832 + $25,433) = $106,265/year.

These costs will affect the existing homeowner's rates as follows:
Net monthly cost, 20 year design life: $106,265/12 = $8,855.
Monthly cost per homeowner: $8,855 / 171 = $51.79/month

Effectiveness and Reliability
This alternative is considered effective and reliable. This alternative is a combined attached growth and suspended growth process and provides consistent and reliable treatment and is resistant to biological upsets. The biorotor process can consistently produce quality effluents meeting 30 mg/L BOD_5, 30 mg/L TSS, 1.3 mg/L summer NH3-N levels, and 2.9 mg/L winter NH3-N levels. The mechanical equipment capital/replacement cost and electric consumption is significant. The operation and maintenance of this process requires a trained operator. The process requires regular operational testing and monitoring. Regular work is required to operate, clean, and maintain the blowers, float switches, pumps, weirs, and wasting and hauling off of accumulated sludge.

Environmental Factors
There are sporadic odor issues with the required mechanical aerators. The process is not unsightly if well maintained. This process is not an ideal wastewater treatment process adjacent to a residential development. The effluent produced is in compliance with the required stream standards. There are no health risks. The main negative environmental impact attributed to the extended aeration process is power consumption.

Practicability
This process is considered a practical alternative for the 20-year design life. The process can achieve the necessary water quality criteria and is reliable.

5. **Recirculating Biofilter System**

This method of treatment is very similar to a recirculating sand filter with the exception that the filter media is an engineered fabric textile and the filter is preassembled in a fiberglass enclosure. The primary treatment is a septic tank facilitating anaerobic digestion and sedimentation. The septic tank is followed by Advantex AX-MAX units. Pumps within the units deliver wastewater to the filter media in frequent, timer controlled doses. With each dose, the primary treated wastewater percolates through the fabric media. This fabric media is the substrate for the biofilm that biologically treats the applied wastewater. The biofilm consists of bacteria, protozoa, and other organisms. After the water percolates through the fabric media it gets recirculated through the underdrain system. Each AX-MAX unit has integrated duplex pumps which will allow redundancy in case of pump failure.

To achieve the low ammonia effluent limits, a two-stage system will be used with 5 AX-MAX units providing secondary treatment followed by 2 AX-MAX units providing supplemental nitrification for ammonia conversion. Operational requirements include power supply, periodic sludge pumping of the septic tank, pump maintenance and replacement, and monitoring elapsed time meters on pumps. This system is easily upgraded to handle more hydraulic and organic loadings by adding additional units. The following are the preliminary components and sizes for this type of treatment:

Primary Treatment
Serpentine cast-in-place septic tank: 216,000 gallons total volume

AdvanTex AX-MAX Treatment System
Design flowrate: 71,800 gpd
Max. Loading for Secondary Treatment: 15,000 gpd per unit

Number of Units for Secondary Treatment: 5 units
Number of Units for Ammonia Polishing: 2 units
AX-MAX Unit Dimensions: 42 ft x 7 ft x 8 ft = 294 ft^2 per unit
7 units x 294 SF/unit = 2058 ft^2

Sludge Disposal Process

The anaerobic digestion process occurring within the septic tanks will produce excess sludge. The tanks will need to be pumped periodically and the sludge transported to a municipal wastewater treatment plant for disposal.

TABLE 9

ADVANTEX TREATMENT SYSTEM
Probable Construction Cost Estimate

ITEM	QUANTITY	UNIT	UNIT PRICE	COST
AdvanTex AX-MAX Units (complete)	7	EA	$ 90,000	$ 630,000
Installation and Connection	7	EA	$ 30,000	$ 210,000
Single-Phase Power to Site	1	LS	$ 15,000	$ 15,000
Primary Tankage (Cast in Place)	1	LS	$ 48,500	$ 48,500
Flow Splitter	1	LS	$ 8,000	$ 8,000
Fence	500	LF	$ 25	$ 12,500
Access road improvements	550	LF	$ 12	$ 6,600
Seeding, fert. and mulch	1	EA	$ 1,200	$ 1,200
Subtotal				$ 931,800
Contingency (10%)				$ 93,180
Total Construction Costs				$ 1,024,980
Design Bidding and Construction Services (NTE)				$ 89,900
Total Project Cost				$ 1,114,880
Equivalent Uniform Annual Cost over 20 years				
Construction EUAC (20 Yrs, 4.5%)				$ 85,712
Annual O&M				$ 8,927
Total EUAC				$ 94,639
NET MONTHLY COST (20 YRS)				$ 7,887

Electrical Usage: 8.75 hp x 8760 hr/yr x 0.7457 kW/hp x $0.075/kW.hr = $4,287/yr.

Labor: One part-time operator for the wastewater treatment facility including benefits.
1 x $14/hr x 5 hr/wk x 52 weeks/yr = $3,640

Equipment Replacement Fund is estimated at: $1000/yr

Labor, electrical costs, and equipment replacement for the proposed mechanical wastewater treatment facility will be approximately $8,927/year.

The annual Present Worth value of the package plant capital cost over a 20-year life cycle at 4.5% interest is as follows:

(A/P, 4.5%, 20 yr) = 0.07688; $1,114,880(0.07688) = $85,712/year

The total annual capital, operation and maintenance costs for the proposed mechanical wastewater treatment plant is ($85,712 + $8,927) = $94,639/year.

These costs will affect the existing homeowner's rates as follows:
Net monthly cost, 20 year design life: $94,639/12 = $7,887.
Monthly cost per homeowner: $7, 887 / 171 = $46.12/month

Effectiveness and Reliability
This process is a fixed film reactor, provides consistent and reliable treatment and is not as sensitive and susceptible to upset as activated sludge treatment systems. A two-stage AdvanTex system can consistently produce the required effluent BOD_5, TSS, and NH3-N levels. The operation and maintenance of an Advantex system is very simplistic. The screen, float switches, pumps, and valves need to be checked and cleaned on a regular basis.

Environmental Factors
There are no odors, noise issues or unsightliness to a well maintained AdvanTex system, which makes it an ideal wastewater treatment process adjacent to residential developments and wildlife areas. The effluent is in compliance with receiving stream standards. There are no health risks or negative environmental impacts attributed to an AdvanTex system.

Practicability
This process is considered a practical alternative. This alternative also offers the benefit of being modular; thus, process units can be added as needed for growth. Since the footprint of this treatment option is low and the treatment site is land locked, this process alternative offers the ability for additional growth. The process

can achieve the necessary water quality criteria and is reliable.

VII. SUMMARY OF ALTERNATIVES

The options considered include: upgrading the existing lagoon facility, land application of wastewater, two package treatment plant options, and a recirculating biofilter system. The lagoon upgrade option was eliminated from consideration due to the uncertainty of this treatment method achieving the very low ammonia limits. Even though the land application option eliminates the discharge, it is by far the most costly alternative.

Each of the three remaining alternatives protects the designated water uses and is practical. Both of the package treatment plants and the recirculating biofilter system are effective, reliable and stable wastewater treatment systems. The pollutants of concern discharged from the proposed treatment alternatives are within the required water quality standards. The discharges will be continuous year round.

The receiving stream and groundwater uses will be unchanged by the proposed treatment alternatives. There will be no effect on endangered species in the area. There is limited potential to generate secondary water quality impacts since the treatment systems will incorporate any rainwater that falls within the treatment system. Both of the options considered have limited footprints. Odors should not be a problem with a well maintained system. Energy consumption and noise are negative issues in the package plant treatment systems because blowers and mechanical aerators are required to maintain oxygen concentrations in the MLSS. Solid waste will be generated by each alternative and must be regularly hauled off for disposal.

It is anticipated that construction will take four to six months.

Economic Efficiency for Practicable Alternatives

Present worth and equivalent uniform annual cost analyses were conducted over a twenty year life cycle on all practical alternatives. In the evaluation of feasible wastewater treatment facilities, the use of only the initial construction cost is not the proper basis for selection. Total life cycle costs for each treatment alternative, which includes operation and maintenance over 20 years at a 4.5 percent interest is compared in Table 10.

Operational and Maintenance costs vary for each option. Generally the option which has the most mechanical systems requires the largest amount of operation

and maintenance. The four evaluated treatment options have varying operation and maintenance costs. Thus, this factor can impact the selection of one alternative's cost effectiveness over another.

TABLE 10
ECONOMIC EFFICIENCY COMPARISON OF TREATMENT ALTERNATIVES
20 YEAR LIFE CYCLE ANALYSIS

ALTERNATIVE DESCRIPTION	LAND APPLICATION	EXTENDED AERATION	BIOROTOR	BIOFILTER SYSTEM
TOTAL PROJECT COST	$1,761,880	$950,030	$1,051,405	$1,114,880
CONSTRUCTION EUAC (20 YRS)	$135,453	$73,036	$80,832	$85,712
ANNUAL O & M	$18,589	$30,658	$25,433	$8,927
TOTAL EUAC	$154,042	$103,694	$106,265	$94,639
NET MONTHLY COST (20 YRS)	$12,837	$8,641	$8,855	$7,887
NET MONTHLY COST PER HOME	$75.07	$50.53	$51.79	$46.12

From this analysis, the lowest present worth and equivalent uniform annual cost alternative is the recirculating biofilter system, which is the recommended alternative for the lagoon replacement. This alternative is recommended because of the lowest life-cycle cost and extensive operational track record. The facility will include appropriate fencing and warning signs.

Recommended Project

Based on the Equivalent Uniform Annual Cost methodolgy, the recirculating biofilter system is the most cost effective for a twenty year life cycle and is the recommended wastewater treatment alternative for the Peaceful Valley Service Company.

Operator Requirements

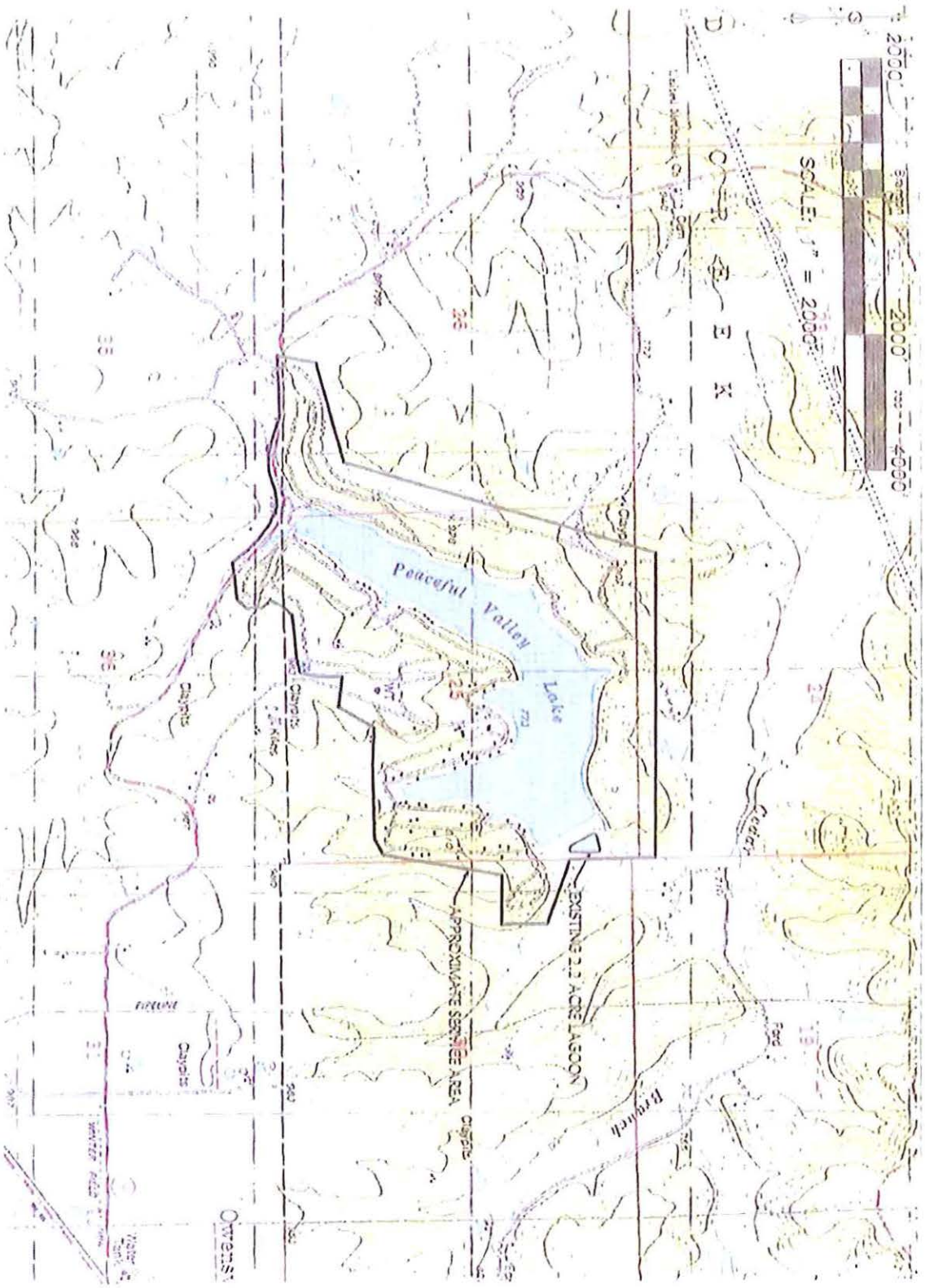
The proposed secondary wastewater treatment facility is a recirculating biofilter system, which is similar to a conventional recirculating sand filter. There will be primary settling, primary effluent filter, secondary treatment, ammonia polishing, and occasional sludge hauling and disposal. In accordance with 10 CSR 20-9.020,

"Classification of Wastewater Treatment Systems", these processes indicate that an "D" certification level will be sufficient to operate this facility. It is anticipated that one part time operator will be sufficient for plant maintenance, sludge hauling, and laboratory testing.

Project Implementation

The land adjacent to and south of the existing lagooon is already owned by the Property Owner's Association. The proposed alternative will need to be designed and a means to fund the project will need to be developed. The Public Service Commission must approve a rate increase for the privately owned utility.

APPENDIX



PEACEFUL VALLEY LAGOON

PROJECT LOCATION MAP

INTEGRITY ENGINEERING, INC.