City of Carroll

112 E. 5th Street Carroll, Iowa 51401-2799 (712) 792-1000 FAX: (712) 792-0139

MEMO TO: Mike Pogge-Weaver, City Manager MJP-W

FROM: Randall M. Krauel, Director of Public Works RMK

DATE: November 12, 2019

SUBJECT: Wastewater Treatment Plant
Nutrient Reduction Strategy Report

The Wastewater Treatment Plant National Pollutant Discharge Elimination System (NPDES) Permit issued on November 1, 2016, includes the requirement to prepare and submit a report that evaluates the feasibility and reasonableness of reducing the amounts of nitrogen and phosphorus discharged into surface water. Veenstra & Kimm, Inc. has prepared and submitted a Wastewater Treatment Plant Nutrient Reduction Strategy Final Report. A copy is attached.

Information in the Report is detailed and summarized as follows:

The Total Nitrogen and Total Phosphorus removal history for the past three years is summarized as follows:

Total Nitrogen (TN) Removal History Annual Average

	Influent (mg/L)	Effluent (mg/L)	% Removal	Goal	Concentration (mg/L)
2017	28.7	10.7	62.7	66%	10 mg/L
2018	26.2	10.7	59.1	66%	10 mg/L
2019	25.9	11.5	55.6	66%	10 mg/L

Total Phosphorous (TP) Removal History Annual Average

2017	5.2	0.3	94.2	75%	1 mg/L
2018	5.5	0.7	87.2	75%	1 mg/L
2019	5.0	1.1	78.0	75%	1 mg/L

Two alternatives for nutrient reduction are detailed in the Report and summarized as follows:

Alternative No. 1 – Upgrade Existing Wastewater Treatment Plant. Includes construction of additional treatment process tanks and equipment installation to achieve nutrient reduction. The upgrades include separate process tanks for total nitrogen and total phosphorus reduction. Estimated cost is $1,450,000.

Alternative No. 2 – Operational Modifications to Existing Wastewater Treatment Plant. Includes optimizing the operational protocols for the existing treatment process in order to achieve reduction in total nitrogen and total phosphorus. Costs are anticipated to be staff time spent monitoring and sampling the process.

Alternative No. 2 in the preferred alternative.

The implementation schedule for nutrient reduction proposed in the Report is as follows:

November, 2019	Submit Nutrient Reduction Report to DNR
November, 2024	Submit Progress Report
November, 2028	Submit Progress Report
November, 2029	Achieve compliance with nutrient discharge limits.

RECOMMENDATION: Mayor and City Council consideration of acceptance of the Wastewater Treatment Plant Nutrient Reduction Strategy Final Report for submittal to the Iowa Department of Natural Resources

RMK:ds

attachment

REPORT

ON

WASTEWATER TREATMENT PLANT NUTRIENT REDUCTION STRATEGY FINAL REPORT

CARROLL, IOWA

October 2019

REPORT

ON

WASTEWATER TREATMENT PLANT
NUTRIENT REDUCTION STRATEGY
FINAL REPORT

CARROLL, IOWA

OCTOBER 2019

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

LICENSED PROFESSIONAL ENGINEER
Todd W. Penisten
No. 16918
IOWA

Signed: Date:

Todd W. Penisten, P.E.
Iowa License No. 16918
My license renewal date is December 31, 2019

Parts covered by this seal:
All

Prepared by
VEENSTRA & KIMM, INC.
West Des Moines,
Iowa

CHAPTER 1 - GENERAL

INTRODUCTION

This report presents the findings of the evaluation performed on the existing Wastewater Treatment Plant's performance for nutrient removal (Total Nitrogen [TN] and Total Phosphorus [TP]) with the current flows and loadings. The report provides a strategy for improvements to achieve nutrient reduction and a proposed schedule to implement those improvements. The report does not include any in-depth analysis of existing processes or equipment other than capability for nutrient removals. There will be a discussion of operational changes possible that could enhance overall nutrient removal performance.

SCOPE

This report presents the results of the engineering studies and analysis of the Wastewater Treatment Plant for the City of Carroll, Iowa. The studies include the following:

1. Identification of alternatives for upgrading or replacing the existing Wastewater Treatment Plant to meet current and future needs and forthcoming regulatory nutrient reduction requirements.

2. Preliminary design considerations, estimated cost and methods of financing the recommended improvements.

DESCRIPTION OF SERVICE AREA

The service area includes the incorporated limits of the City of Carroll. The City of Carroll is located in West Central Iowa approximately 90 miles northwest of Des Moines.

PRESENT LAND USE

The community consists of residential development with some commercial and industrial development.

PLANNING PERIOD

The Iowa Department of Natural Resources (IDNR) requires the planning period for proposed improvements extend at least 20 years beyond the date when the improvements are scheduled to begin operation. For the purposes of this report, the planning period will be 20 years and extend to the year 2039.

TOPOGRAPHY AND DRAINAGE

The general ground surface topography consists of nearly level to strongly sloping terrain.

The drainage in the study area flows into an Unnamed Creek to the Middle Raccoon River.

SOILS

Generally, the soil types in the study area can be characterized as well-drained and poorly drained loamy or silty materials.

COST ESTIMATES AND PRESENT WORTH ANALYSES

All costs included herein represent present day costs. No provisions have been made for inflation or deflation.

CHAPTER 2 - EFFLUENT LIMITATIONS

GENERAL

This chapter discusses the water quality standards and effluent limitations which impact the proposed improvements to the Carroll, Iowa Wastewater Treatment Plant. Point discharges of pollution in Iowa are normally regulated by permits issued by IDNR. Because the permits limit the quantity of certain parameters and pollutants in the effluent from point sources, the limitations which apply to a given effluent are essential for proper planning and design of wastewater treatment facilities. These effluent limitations are also, in turn, directly related to the water quality standards which apply to the river or stream receiving the discharge and must be appropriately modified to suit local conditions.

WATER QUALITY STANDARDS

Water quality standards for the State of Iowa are regulated by IDNR and presented in Section 567 - Environmental Protection Commission of the Iowa Administrative Code under Chapter 61 - Water Quality Standards. IDNR has developed a classification system for all surface waters in the State of Iowa to define water quality according to use and for the protection of beneficial uses. This classification system establishes general use and designated use river and stream segments.

General use segments are watercourses with intermittent flow or typically flow only for short periods of time following precipitation or as a result of discharges from wastewater treatment facilities. These waters do not support a viable aquatic community of significance during low flow, and do not maintain pooled conditions during periods of no flow. However, during elevated flow periods when sufficient flow exists in the intermittent watercourses to support various uses, the general use segments are to be protected in accordance with the "General Water Quality Criteria" which are discussed later in this chapter. Also, aquatic life existing within these watercourses during elevated flows are to be protected from acutely toxic conditions.

Designated use segments are bodies of water which maintain flow throughout the year, or contain sufficient pooled areas during intermittent flow periods to maintain a viable aquatic community of significance. Designated use waters are to be protected for all uses of general use segments in addition to the specific uses assigned.

Designated use segments include:

Class A1 - Primary Contact Recreation Use: Waters in which recreational or other uses may result in prolonged and direct contact with the water, involving considerable risk of ingesting water in quantities sufficient to pose a health hazard. Such activities would include, but not be limited to, swimming, diving, water skiing, and water contact recreational canoeing.

Class A2 - Secondary Contact Recreational Use: Waters in which recreational or other uses may result in contact with the water that is either incidental or accidental. During the recreational use, the probability of ingesting appreciable quantities of water is minimal. Class A2 uses include fishing, commercial and recreational boating, any limited contact incidental to shoreline activities and activities in which users do not swim or float in the water body while on a boating activity.

Class A3 - Children's Recreational Use: Waters in which recreational uses by children are common. Class A3 waters are water bodies having definite banks and bed with visible evidence of the flow or occurrence of water. This type of use would primarily occur in urban or residential areas.

Class B(WW-1) Warm Water - Type 1: Waters in which temperature, flow and other habitat characteristics are suitable to maintain warm water game fish populations along with a resident aquatic community that includes a variety of native nongame fish and invertebrate species. These waters generally include border rivers, large interior rivers, and the lower segments of medium-size tributary streams.

Class B(WW-2) Warm Water - Type 2: Waters in which flow or other physical characteristics are capable of supporting a resident aquatic community that includes a variety of native nongame fish and invertebrate species. The flow and other physical characteristics limit the maintenance of warm water game fish populations. These waters generally consist of small perennially flowing streams.

IDNR has also established "General Water Quality Criteria" which are applicable to all surface waters including those which are designated use segments. As stated in Chapter 61, the "General Water Quality Criteria" are applicable at all places and at all times to protect livestock and wildlife watering, aquatic life, non-contact recreation, crop irrigation, and industrial, domestic, agricultural and other incidental water withdrawal uses not protected by specific numerical criteria. The "General Water Quality Criteria" are as follows:

1. Such waters shall be free from substances attributable to point source waste discharges that will settle to form sludge deposits.

2. Such waters shall be free from floating debris, oil, grease, scum, and other floating materials attributable to wastewater discharges or agricultural practices in amounts sufficient to create a nuisance.

3. Such waters shall be free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor, or other aesthetically objectionable conditions.

4. Such waters shall be free from substances attributable to wastewater discharges or agricultural practices in concentrations or combinations which or toxic to human, animal, or plant life.

5. Such waters shall be free from substances attributable to wastewater discharges or agricultural practices, in quantities which would produce undesirable or nuisance aquatic life.

6. The turbidity of the receiving water shall not be increased by more than 25 Nephelometric turbidity units by any point source discharge.

7. Cations and anions guideline values to protect livestock watering may be found in the "Supporting Document for Iowa Water Quality Management Plans," Chapter IV, July 1976, as revised on November 11, 2009.

8. The Escherichia coli (E. coli) content of water which enters a sinkhole or losing stream segment, regardless of the water body's designated use, shall not exceed a Geometric Mean value of 126 organisms/100 ml or a sample maximum value of 235 organisms/100 ml. No new wastewater discharges will be allowed on watercourses which directly or indirectly enter sinkholes or losing stream segments.

RECEIVING STREAMS

The City of Carroll currently discharges its treated wastewater into an Unnamed Creek which discharges to Middle Raccoon River. This Unnamed Creek is classified as secondary contact recreational use (Class A2) and a warm water fisheries.

EFFLUENT LIMITATIONS

The Federal Wastewater Treatment Act Amendment of 1972 (PL92-500) increased the role each state plays in control of the discharge of pollutants into its waterways. Under this amendment, the National Pollutant Discharge Elimination System (NPDES) permit program was established which is administered by the Environmental Protection Agency (EPA). Monitoring and surveillance of water quality is conducted by IDNR through its operation permit program. IDNR has assumed the responsibility of the NPDES program for the State and the program is now operated through the state operating permit system. The NPDES permit establishes effluent limitations for all wastewater treatment systems discharging or planning to discharge effluent to rivers and streams within the State of Iowa.

REGULATORY REQUIREMENTS

The City of Carroll's Wastewater Treatment Plant operates under Iowa NPDES Permit No. 1415001 issued by the IDNR. The current permit was issued on November 1, 2016 and expires on October 31, 2021. A copy of this permit is included in Appendix A. A summary of the major effluent parameters of the operating permit are:

Parameter	Permit Limit
Average 30 Day $CBOD_5$, mg/l	25
Average 30 Day $CBOD_5$, ppd	876
Maximum 7 Day Average $CBOD_5$, mg/l	40
Maximum 7 Day Average $CBOD_5$, ppd	1,401
Average 30 Day TSS, mg/l	30
Average 30 Day TSS, ppd	1,051
Maximum 7 Day Average TSS, mg/l	45
Maximum 7 Day Average TSS, ppd	1,576
Average 30 Day TKN, ppd	1,940
Daily Maximum, ppd	3,175
D.O. Yearly Minimum, mg/l	5.0
Minimum pH	6.5
Daily Maximum pH	9.0

Copper, Total (as CU) Effective Dates 11/01/2016 to 09/30/2021

Average 30 Day CU, mg/l	0.076
Average 30 Day CU, ppd	2.7
Daily Maximum CU, ppd	0.092
Daily Maximum CU, ppd	3.2

Copper, Total (as CU) Effective Dates 10/01/2021 to 10/31/2021

Average 30 Day CU, mg/l	0.01691
Average 30 Day CU, ppd	0.5914
Daily Maximum CU, ppd	0.02691
Daily Maximum CU, ppd	0.9423

Ammonia Nitrogen

	30-Day Average (mg/L)	**Maximum Day (mg/l)**
January	5.2	15.2
February	5.9	14.2
March	4.6	14.7
April	2.1	15.7
May	1.9	12.1
June	1.4	7.3
July	1.1	5.0
August	1.0	5.6
September	1.5	6.6
October	2.8	12.3
November	3.4	14.7
December	4.0	16.0

E. Coli (March to November), Geometric Mean 126#/100 ml

The new disinfection and D.O. limits do not become effective until April 1, 2020. The disinfection requirements are such that the geometric mean is less than 126 colonies of E. coli per 100 ml. The E. coli effluent limitations are only required to be met from March 15 through November 15 of each year.

Proposed Nutrient Limits

The current permit, page 26, includes a requirement to prepare and submit a report that evaluates the feasibility and reasonableness of reducing the amounts of nitrogen and phosphorous discharged into surface water.

The Final Effluent goal to achieve is on an annual average mass limits based upon AWW design flow as follows:

	Concentration	% Removal
Total Nitrogen	10.0 mg/l	66%
Total Phosphorous	1.0 mg/l	75%

CHAPTER 3 - POPULATION AND FLOWS

The population projections of the City of Carroll are based on the Carroll 2013 Comprehensive Plan report prepared by the Region VII Council of Governments. That study utilized the forecasts made by Woods & Pooole Economics Incorporated, a national economics research firm, for each county in the United States. The population projections of the City of Carroll were interpolated from the Carroll County projections made by Woods & Pool Economics Incorporated.

The population projections of the City of Carroll are summarized below in Table 3-1

TABLE 3-1
Population

Year	Population
1910	3,546
1920	4,254
1930	4,691
1940	5,389
1950	6,231
1960	7,682
1970	8,716
1980	9,705
1990	9,579
2000	10,106
2010	10,103
2020	10,251*
2030	10,473*
2040	10,705*

*Estimate

INDUSTRIES

The City of Carroll is home to two Significant Industrial User (SIU), Smithfield Farmland Corp. and Carroll County Solid Waste Management Commission. The City has a Pretreatment Agreement with both Smithfield Farmland Corp. and Carroll County Solid Waste Management Commission included in their NPDES permit. Effluent flow from both Smithfield Farmland Corp. and Carroll County Solid Waste Management Commission are reported in the City's monthly operating reports to IDNR.

WASTEWATER FLOWS

The IDNR requires wastewater flows during specific conditions be determined to establish the design parameters for improvements to wastewater treatment facilities. These conditions include the following:

Average Dry Weather (ADW) Flow – The daily average flow when the groundwater is at or near normal and runoff is not occurring.

Average Wet Weather Flow (AWW 30) – The daily average flow for the wettest 30 consecutive days.

Maximum Wet Weather (MWW) Flow – The total maximum flow received during any 24-hour period when the groundwater is high and runoff is occurring.

Peak Hourly Wet Weather (PHWW) Flow – The total maximum flow received during one hour when the groundwater is high, runoff is occurring, and the domestic, commercial and industrial flows are at their peak.

EXISTING WASTEWATER HYDRAULIC AND ORGANIC LOADINGS

The existing wastewater hydraulic and organic loadings for the Wastewater Treatment Plant will remain unchanged under this facility plan. If future upgrades to the existing Wastewater Treatment Plant become necessary, the design flows and loadings will be modified accordingly. The design of the disinfection facilities would include the flexibility to accommodate an increase in the hydraulic capacity of the facility without requiring significant modifications.

TABLE 3-2
EXISTING PERMITTED DESIGN CAPACITY

CARROLL, IOWA Flow/Loading	Existing Permitted Design Capacity
Flow, mgd	
ADW	1.600
AWW	4.200
MWW	6.300
PHWW (Plant Capacity)	6.300
PHWW (Plant Capacity plus Equalization Basin	15.00
Organic Loadings, lbs./day	
BOD	4,735
TKN	1,021

CHAPTER 4 – EXISTING WASTEWATER TREATMENT PLANT

GENERAL

Construction of the existing Wastewater Treatment Plant started in 2004 with plant startup in 2006. The secondary treatment process is a Vertical Loop Reactor (VLR). This is equivalent to the extended aeration mode of activated sludge process and is discussed later in this section.

WASTEWATER TREATMENT PLANT PROCESS SUMMARY

The following Table 4-1 is a summary of the process units and equipment.

Table 4-1 Process Units and Equipment Summary

Process	Equipment	Description	Comments
Influent Flow Metering	Fiberglass Reinforced Plastic (FRP) Parshall Flumes	18″	Level Sensors
Screening	Cylindrical Fine Screen	1/4″ Openings	Level Control
	Manual Screens (2)	2″ Openings	Hand Raked
Grit Removal	Vortex Grit Removal	10′ Diameter	Waste-Tech
Grit Washing Equipment	Spiral Conveyor	10.75″ ID Tube	Parkson
Primary Clarifiers	40′ Diameter (1), 7′ SWD 50′ Diameter (1)	Pier Supported Clarifier Mechanism	U.S. Filter
Vertical Loop Reactor	Rectangular Tanks (3)	110′ x 25′ x 20′ SWD (Each Tank)	Mechanical Disc Aerators, Coarse Bubble Aeration
Final Clarifiers	75′ Diameter (2), 14′ SWD	Pier Supported Clarifier Mechanism	Eimco

Anerobic Sludge Digesters	35′ Diameter (1) 40′ Diameter (1)	Mechanical Mixer	Eimco

VLR PROCESS DESCRIPTION

The current VLR is a tank with three (3) passes. Each pass is 110 FT x 25 FT x 20 FT SWD or 411,000 gallons with a total tank volume of 1,233,000 gallons. The tanks or passes are in series but isolation or bypassing of a pass is available when needed.

Each pass has two 30 circular disc aerators with a 15 HP drive on each to provide velocity in the pass or channel as well as aeration. Each pass has a coarse bubble diffuser grid to provide additional aeration as flow travels under the horizontal baffle.

At the typical flows and loadings shown in 2018, the Plant effluent BOD and TSS have been <6.0 mg/l and < 12.1 mg/l respectively. Ammonia-Nitrogen has been <0.96 mg/l.

CHAPTER 5 – EXISTING FACILITY OPERATION

GENERAL

The existing facility has performed well in compliance with the past permit effluent limits.

NUTRIENT REMOVAL PERFORMANCE

Influent nutrient loadings for total nitrogen (TN) and total phosphorus (TP) are included in a summary in Appendix B – Wastewater Nutrient Testing. Influent nutrient loadings would be considered as domestic range concentrations.

Effluent nutrient discharge and the test results for Middle Raccoon River are included in the summary found in Appendix B – Wastewater Nutrient Testing. The Middle Raccoon River test results include samples taken both upstream and downstream of discharge location for the Wastewater Treatment Plant. Table 5-1 Total Nitrogen (TN) Removal History and Table 5-2 Total Phosphorous (TP) Removal History both include the annual average TN and TP concentrations.

Table 5-1 Total Nitrogen (TN) Removal History

	TN (PPD) Annual Average				
	Influent (mg/l)	**Effluent (mg/l)**	**% Removal**	**Goal**	**Concentration (mg/l)**
2013	45.5	12.1	73.4	66%	10 mg/l
2014	37	12.2	67.0	66%	10 mg/l
2015	30.1	9.7	67.7	66%	10 mg/l
2016	25.2	11.9	52.8	66%	10 mg/l
2017	28.7	10.7	62.7	66%	10 mg/l
2018	26.2	10.7	59.1	66%	10 mg/l
2019	25.9	11.5	55.6	66%	10 mg/l

Table 5-2 Total Phosphorous (TP) Removal History

	TP (PPD) Annual Average				
	Influent (mg/l)	Effluent (mg/l)	% Removal	Goal	Concentration (mg/l)
2013	6.9	0.8	88.4	75%	1 mg/l
2014	4.9	0.5	73.7	75%	1 mg/l
2015	4.6	0.9	80.4	75%	1 mg/l
2016	4.4	0.6	86.4	75%	1 mg/l
2017	5.2	0.3	94.2	75%	1 mg/l
2018	5.5	0.7	87.2	75%	1 mg/l
2019	5.0	1.1	78.0	75%	1 mg/l

The proposed effluent limits outlined in the NPDES permit on an annual basis are as follows:

	Minimum Concentration	or	Minimum Removal
Total Nitrogen (TN)	10.0 mg/l		66%
Total Phosphorus (TP)	1.0 mg/l		75%

CHAPTER 6 – NUTRIENT REDUCTION ALTERNATIVES

GENERAL

This chapter is to evaluate potential nutrient reduction alternatives. The existing Vertical Loop Reactor (VLR) equipment installed in 2004 was manufactured by Evoqua Water Technologies.

NUTRIENT REDUCTION ALTERNATIVE 1 – UPGRADE EXISTING WASTEWATER TREATMENT PLANT

Nutrient Reduction Alternative 1 would include the construction of additional treatment process tanks and equipment installation to achieve the desired nutrient reduction. The upgrades would include separate process tanks for both total nitrogen and total phosphorous reduction.

Total Nitrogen Reduction

Total nitrogen reduction would be achieved by constructing two process tanks. The total nitrogen reduction component of this option would include construction of a post-anoxic tank followed by a re-aeration tank. The post-anoxic tank would include submersible mixers as well as the addition of coarse bubble aeration. The anticipated total nitrogen effluent under this alternative is anticipated at less than 3 mg/l.

Total Phosphorous Reduction

Total phosphorous reduction would be achieved by constructing an upfront anaerobic tank. The anaerobic tank would include submersible mixers.

The cost estimate for this alternative is shown in Table 6-1 – Upgrade Existing Wastewater Treatment Plant.

TABLE 6-1 – UPGRADE EXISTING WASTEWATER TREATMENT PLANT TOTAL NITROGEN & TOTAL PHOSPHOROUS

Total Nitrogen Reduction	
Post Anoxic Tank	$125,000
Re-Aeration Tank	75,000
Coarse Bubble Aeration	25,000
Blowers	50,000
Submersible Mixing Equipment	50,000
Piping	75,000
Electrical	250,000
Sitework	40,000
Total Phosphorous Reduction	
Anaerobic Tank	100,000
Submersible Mixing Equipment	40,000
Piping	40,000
Electrical	150,000
Sitework	30,000
Construction Total	$1,050,000
Contingency @ 20%	210,000
Engineering, Legal & Administrative	190,000
Project Total	$1,450,000

NUTRIENT REDUCTION ALTERNATIVE 2 – OPERATIONAL MODIFICATIONS TO EXISTING WASTEWATER TREATMENT PLANT

Nutrient Reduction Alternative 2 includes a review of the existing VLR treatment process. During the review it has been determined that the current treatment process could potentially meet the proposed National Pollutant Discharge Elimination System (NPDES) permit for total nitrogen and total phosphorous discharge limits. This would include optimizing the operational protocols for the existing VLR treatment process in order to achieve the desired reduction in total nitrogen and total phosphorous in the effluent discharge.

The City is currently adjusting operation of the VLR process in order to optimize the level of nutrient reduction achieved. This includes monitoring and adjusting the rates for both waste activated sludge and return activated sludge. The adjustment for these components is based upon the dissolved oxygen levels, nitrite levels and ammonia levels within the various stages of the VLR process. If the desired total phosphorous reduction is not able to be achieved through adjustment of the VLR process then chemical addition may become necessary. This nutrient reduction alternative does not currently have a cost associated with it other than staff hours spent monitoring and sampling the VLR process.

A review of the effluent sampling results from 2013 to the present indicate that the existing VLR treatment process is very close to achieving compliance with the proposed NPDES permit. Therefore, this alternative would include continuing to monitor, sample and adjust the operational protocols as needed for the existing VLR process over the next several years.

At the same this would afford the City of Carroll the opportunity to continue to utilize the existing wastewater treatment plant while also potentially achieving compliance with the NPDES permit. This would also allow the City of Carroll to potentially avoid a significant capital expenditure associated with upgrading the wastewater treatment plant.

CHAPTER 7 – NUTRIENT REDUCTION ALTERNATIVE SELECTION AND IMPLEMENTATION SCHEDULE

NUTRIENT REDUCTION ALTERNATIVE SELECTION

As a part of this report, two alternatives were evaluated for the reduction of both total nitrogen and total phosphorous for the City of Carroll wastewater treatment plant. Those alternatives include the following:

NUTRIENT REDUCTION ALTERNATIVE 1 – UPGRADE EXISTING WASTEWATER TREATMENT PLANT

NUTRIENT REDUCTION ALTERNATIVE 2 – OPERATIONAL MODIFICATIONS TO EXISTING WASTEWATER TREATMENT PLANT

IMPLENTATION SCHEDULE

Two primary factors were included in nutrient reduction alternative selection by the City of Carroll. One, the costs associated with each of the two alternatives. Two, the ability to continue to use the existing wastewater treatment plant to the extent possible. Therefore, the City of Carroll has selected Nutrient Reduction Alternative 2 – Operational Modifications to Existing Wastewater Treatment Plant as the preferred alternative.

A schedule for implementing the selected method for the wastewater treatment plant nutrient reduction as proposed in this report is presented in the following schedule.

November 1, 2019	Submit Nutrient Reduction Report to IDNR
November 1, 2024	Submit Progress Report
November 1, 2028	Submit Progress Report
November 1, 2029	Achieve Compliance with proposed nutrient discharge limits

APPENDIX A

NPDES PERMIT

IOWA DEPARTMENT OF NATURAL RESOURCES

National Pollutant Discharge Elimination System (NPDES) Permit

OWNER NAME & ADDRESS

CITY OF CARROLL
CITY HALL
112 E 5TH STREET
CARROLL, IA 51401

FACILITY NAME & ADDRESS

CARROLL, CITY OF STP
1400 E ANTHONY
CARROLL, IA 51401

Section 30, T84N, R34W
Carroll County

IOWA NPDES PERMIT NUMBER: 1415001
DATE OF ISSUANCE: 11/01/2016
DATE OF EXPIRATION: 10/31/2021

YOU ARE REQUIRED TO FILE FOR RENEWAL OF THIS PERMIT BY: 05/04/2021
EPA NUMBER: IA0021377

This permit is issued pursuant to the authority of section 402(b) of the Clean Water Act (33 U.S.C 1342(b)), Iowa Code section 455B.174, and rule 567-64.3, Iowa Administrative Code. You are authorized to operate the disposal system and to discharge the pollutants specified in this permit in accordance with the effluent limitations, monitoring requirements and other terms set forth in this permit.

You may appeal any condition of this permit by filing a written notice of appeal and request for administrative hearing with the director of this department within 30 days of your receipt of this permit.

Any existing unexpired Iowa operation permit or Iowa NPDES permit previously issued by the department for the facility identified above is revoked by the issuance of this permit. This provision does not apply to any authorization to discharge under the terms and conditions of a general permit issued by the department or to any permit issued exclusively for the discharge of stormwater.

FOR THE DEPARTMENT OF NATURAL RESOURCES

By _____

Melinda McCoy
NPDES Section
ENVIRONMENTAL SERVICES DIVISION

Facility Name: CARROLL, CITY OF STP

Permit Number: 1415001

Outfall No.: 001 DISCHARGE FROM A VERTICAL LOOP REACTOR WASTEWATER TREATMENT FACILITY

Receiving Stream: UNNAMED CREEK

Route of Flow: UNNAMED CREEK TO MIDDLE RACCOON RIVER

Class A2 waters are secondary contact recreational use waters in which recreational or other uses may result in contact with the water that is either incidental or accidental. During the recreational use, the probability of ingesting appreciable quantities of water is minimal. Class A2 uses include fishing, commercial and recreational boating, any limited contact incidental to shoreline activities and activities in which users do not swim or float in the water body while on a boating activity.

Waters designated Class B(WW2) are those in which flow or other physical characteristics are capable of supporting a resident aquatic community that includes a variety of native nongame fish and invertebrate species. The flow and other physical characteristics limit the maintenance of warm water game fish populations. These waters generally consist of small perennially flowing streams.

Outfall No.: 006 BYPASS LOCATED AT THE OVERFLOW FROM THE FLOW EQUALIZATION BASIN

Receiving Stream: UNNAMED CREEK

Route of Flow: UNNAMED CREEK TO MIDDLE RACCOON RIVER

Class A2 waters are secondary contact recreational use waters in which recreational or other uses may result in contact with the water that is either incidental or accidental. During the recreational use, the probability of ingesting appreciable quantities of water is minimal. Class A2 uses include fishing, commercial and recreational boating, any limited contact incidental to shoreline activities and activities in which users do not swim or float in the water body while on a boating activity.

Waters designated Class B(WW2) are those in which flow or other physical characteristics are capable of supporting a resident aquatic community that includes a variety of native nongame fish and invertebrate species. The flow and other physical characteristics limit the maintenance of warm water game fish populations. These waters generally consist of small perennially flowing streams.

Bypasses from any portion of a treatment facility or from a sanitary sewer collection system designed to carry only sewage are prohibited.

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Effluent Limitations:

You are prohibited from discharging pollutants except in compliance with the following effluent limitations:

001 DISCHARGE FROM A VERTICAL LOOP REACTOR WASTEWATER TREATMENT FACILITY

Outfall: 001 Effective Dates: 11/01/2016 to 10/31/2021			
Parameter	**Season**	**Limit Type**	**Limits**
CBOD5			**85% Removal Required**
	Yearly	7 Day Average	40 MG/L 1401 LBS/DAY
	Yearly	30 Day Average	25 MG/L 876 LBS/DAY
TOTAL SUSPENDED SOLIDS			**85% Removal Required**
	Yearly	7 Day Average	45 MG/L 1576 LBS/DAY
	Yearly	30 Day Average	30 MG/L 1051 LBS/DAY
NITROGEN, TOTAL KJELDAHL (AS N)			
	Yearly	30 Day Average	1940 LBS/DAY
	Yearly	Daily Maximum	3175 LBS/DAY
PH			
	Yearly	Daily Maximum	9.0 STD UNITS
	Yearly	Minimum	6.5 STD UNITS
ACUTE TOXICITY, CERIODAPHNIA			
	Yearly	Daily Maximum	1 NO TOXICITY
ACUTE TOXICITY, PIMEPHALES			
	Yearly	Daily Maximum	1 NO TOXICITY

Facility Name: CARROLL, CITY OF STP

Permit Number: 1415001

Outfall: 001 Effective Dates: 11/01/2016 to 10/31/2021			
Parameter	**Season**	**Limit Type**	**Limits**
AMMONIA NITROGEN (N)			
	JAN	30 Day Average	5.2 MG/L 181.9 LBS/DAY
	JAN	Daily Maximum	15.2 MG/L 532.1 LBS/DAY
	FEB	30 Day Average	5.9 MG/L 204.5 LBS/DAY
	FEB	Daily Maximum	14.2 MG/L 497.4 LBS/DAY
	MAR	30 Day Average	4.6 MG/L 159.9 LBS/DAY
	MAR	Daily Maximum	14.7 MG/L 514.5 LBS/DAY
	APR	30 Day Average	2.1 MG/L 73.8 LBS/DAY
	APR	Daily Maximum	15.7 MG/L 550.0 LBS/DAY
	MAY	30 Day Average	1.9 MG/L 64.5 LBS/DAY
	MAY	Daily Maximum	12.1 MG/L 357.3 LBS/DAY
	JUN	30 Day Average	1.4 MG/L 47.3 LBS/DAY
	JUN	Daily Maximum	7.3 MG/L 210.2 LBS/DAY
	JUL	30 Day Average	1.1 MG/L 38.1 LBS/DAY
	JUL	Daily Maximum	5.0 MG/L 140.1 LBS/DAY
	AUG	30 Day Average	1.0 MG/L 34.7 LBS/DAY
	AUG	Daily Maximum	5.6 MG/L 161.1 LBS/DAY
	SEP	30 Day Average	1.5 MG/L 52.1 LBS/DAY
	SEP	Daily Maximum	6.6 MG/L 192.7 LBS/DAY
	OCT	30 Day Average	2.8 MG/L 98.8 LBS/DAY
	OCT	Daily Maximum	12.3 MG/L 409.8 LBS/DAY
	NOV	30 Day Average	3.4 MG/L 119.8 LBS/DAY
	NOV	Daily Maximum	14.7 MG/L 514.5 LBS/DAY
	DEC	30 Day Average	4.0 MG/L 139.1 LBS/DAY
	DEC	Daily Maximum	16.0 MG/L 559.2 LBS/DAY

Facility Name: CARROLL, CITY OF STP

Permit Number: 1415001

Outfall	Wastewater Parameter	Sample Frequency	Sample Type	Monitoring Location
The following monitoring requirements shall be in effect from 11/01/2016 to 10/31/2021				
001	FLOW	7/WEEK OR DAILY	24 HOUR TOTAL	MECHANICAL PLANT INFLUENT
001	FLOW	7/WEEK OR DAILY	24 HOUR TOTAL	INFLUENT TO STORM WATER RETENTION BASIN
001	FLOW	7/WEEK OR DAILY	24 HOUR TOTAL	STORM WATER BASIN RETURN
001	FLOW	7/WEEK OR DAILY	CALCULATED	TOTAL RAW WASTE
001	FLOW	7/WEEK OR DAILY	24 HOUR TOTAL	FINAL EFFLUENT
001	BIOCHEMICAL OXYGEN DEMAND (BOD5)	2 TIMES PER WEEK	24 HOUR COMPOSITE	RAW WASTE
001	TOTAL SUSPENDED SOLIDS	2 TIMES PER WEEK	24 HOUR COMPOSITE	RAW WASTE
001	NITROGEN, TOTAL KJELDAHL (AS N)	1 EVERY MONTH	24 HOUR COMPOSITE	RAW WASTE
001	PH	2 TIMES PER WEEK	GRAB	RAW WASTE
001	TEMPERATURE	2 TIMES PER WEEK	GRAB	RAW WASTE
001	CBOD5	2 TIMES PER WEEK	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	TOTAL SUSPENDED SOLIDS	2 TIMES PER WEEK	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	DISSOLVED OXYGEN	2 TIMES PER WEEK	GRAB	EFFLUENT AFTER DISINFECTION
001	AMMONIA NITROGEN (N)	2 TIMES PER WEEK	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	NITROGEN, TOTAL KJELDAHL (AS N)	1 EVERY MONTH	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	NITROGEN, TOTAL (AS N)	1 TIME PER WEEK	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	PHOSPHORUS, TOTAL (AS P)	1 TIME PER WEEK	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	PH	5 TIMES PER WEEK	GRAB	EFFLUENT AFTER DISINFECTION
001	TEMPERATURE	2 TIMES PER WEEK	GRAB	EFFLUENT AFTER DISINFECTION
001	CHLORIDE (AS CL)	1 EVERY MONTH	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	ARSENIC, TOTAL (AS AS)	1 EVERY MONTH	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	COPPER, TOTAL (AS CU)	1 TIME PER WEEK	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	ACUTE TOXICITY, CERIODAPHNIA	1 EVERY 12 MONTHS	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION
001	ACUTE TOXICITY, PIMEPHALES	1 EVERY 12 MONTHS	24 HOUR COMPOSITE	EFFLUENT AFTER DISINFECTION

Outfall	Wastewater Parameter	Sample Frequency	Sample Type	Monitoring Location
The following monitoring requirements shall be in effect from 04/01/2020 to 10/31/2021				
001	E. COLI	GEO. MEAN 1/3 MONTHS	GRAB	EFFLUENT AFTER DISINFECTION

Facility Name: CARROLL, CITY OF STP

Permit Number: 1415001

Special Monitoring Requirements

Outfall #	Description
001	**TOTAL RAW WASTE FLOW**

To calculate the total raw waste flow: (TOTAL RAW WASTE FLOW = MECHANICAL PLANT INFLUENT + INFLUENT TO STORM WATER RETENTION BASIN - STORM WATER BASIN RETURN).

Mass calculations for BOD5, TSS, and TKN raw waste samples shall use the calculated total raw waste flow.

E. COLI

The limit for E. coli of 126 org/100 ml specified on the limit page(s) of this permit for outfall 001 is a geometric mean. The disinfection season is established in the Iowa Administrative Code, Subparagraph 567 IAC 61.3(3)"a"(1), and is in effect from March 15 to November 15. Any disinfection system (chlorine, UV light, etc.) shall be operated to comply with the limit during the entire disinfection season whenever wastewater is being discharged from outfall 001.

The facility must collect and analyze a minimum of five samples in one calendar month during each 3-month period from March 15 to November 15. The 3-month periods are March – May, June – August, and September – November. The collection of five samples in each 3-month period will result in a minimum of 15 samples being collected during a calendar year. For example, for the first 3-month period, the operator may choose April as the calendar month to collect the 5 individual E. coli samples to determine compliance with the limits. The operator may also choose the months of March or May as well, as long as each of the 5 samples is collected during a single calendar month. The same principle applies to the other two 3-month periods during the disinfection season. The following requirements apply to the individual samples collected in one calendar month:
Samples must be spaced over one calendar month.
No more than one sample can be collected on any one day.
There must be a minimum of two days between each sample.
No more than two samples may be collected in a period of seven consecutive days.

If the effluent has been disinfected using chlorine, ultraviolet light (UV), or any other process intended to disrupt the biological integrity of the E. coli, the samples shall be analyzed using the Most Probable Number method found in Standard Method 9223B (Colilert® or Colilert-18® made by IDEXX Laboratories, Inc.). If the effluent has not been disinfected the samples may be analyzed using either the MPN method above or EPA Method 1603: Escherichia coli (E. coli) in water by membrane filtration using modified membrane-thermotolerant E. coli agar (modified mTEC) or mColiBlue-24® made by the Hach Company.

The geometric mean must be calculated using all valid sample results collected during a month. The geometric mean formula is as follows: Geometric Mean = (Sample one * Sample two * Sample three * Sample four *Sample five…Sample N)^(1/N), which is the Nth root of the result of the multiplication of all of the sample results where N = the number of samples. If a sample result is a less than value, the value reported by the lab without the less than sign should be used in the geometric mean calculation.

The geometric mean can be calculated in one of the following ways:
Use a scientific calculator that can calculate the powers of numbers.
Enter the samples in Microsoft Excel and use the function "GEOMEAN" to perform the calculation.
Use the geometric mean calculator on the Iowa DNR webpage at: http://www.iowadnr.gov/Environmental-Protection/Water-Quality/NPDES-Wastewater-Permitting/NPDES-Operator-Information/Bacteria-Sampling

AMMONIA NITROGEN (N)

Ammonia shall be sampled and analyzed using an EPA approved method specified in 40 CFR 136 or using the Timberline Method Ammonia-001 alternative test procedure.

NITROGEN, TOTAL (AS N)

Total nitrogen shall be determined by testing for Total Kjeldahl Nitrogen (TKN) and nitrate + nitrite nitrogen and reporting the sum of the TKN and nitrate + nitrite results (reported as N). Nitrate + nitrite can be analyzed together or separately.

COPPER, TOTAL (AS CU)

EPA approved test methods shall be used to test at or below the limits on the limit page(s) of this permit. If a sample result is not at a detection level which is low enough to demonstrate compliance with the limit in the permit, the facility will be considered non-compliant with that limit.

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Significant Industrial User Discharges:

Significant Industrial User: SMITHFIELD FARMLAND CORP.

Outfall #	Outfall Description
001	EFFLUENT (WASTE) PRIOR TO DISCHARGE TO MUNICIPAL COLLECTION SYSTEM.

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Significant Industrial User Effluent Limitations

You are prohibited from discharging pollutants except in compliance with the following effluent limitations:

SMITHFIELD FARMLAND CORP. *Outfall: 001 Effective Dates: 11/01/2016 to 10/31/2021*			
Parameter	**Season**	**Limit Type**	**Limit Values**
FLOW			
	Yearly	30 Day Average	0.13 MGD
	Yearly	Daily Maximum	0.195 MGD
BIOCHEMICAL OXYGEN DEMAND (BOD5)			
	Yearly	30 Day Average	1000.0 LBS/DAY
	Yearly	Daily Maximum	1500.0 LBS/DAY
TOTAL SUSPENDED SOLIDS			
	Yearly	30 Day Average	550.0 LBS/DAY
	Yearly	Daily Maximum	950.0 LBS/DAY
NITROGEN, TOTAL KJELDAHL (AS N)			
	Yearly	30 Day Average	55.0 LBS/DAY
	Yearly	Daily Maximum	70.0 LBS/DAY
OIL AND GREASE			
	Yearly	30 Day Average	500.0 MG/L
	Yearly	Daily Maximum	750.0 MG/L
PH			
	Yearly	Daily Maximum	10.5 STD UNITS
	Yearly	MINIMUM	6.0 STD UNITS

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Monitoring and Reporting Requirements

(a) Samples and measurements taken shall be representative of the volume and nature of the monitored wastewater.

(b) Analytical and sampling methods specified in 40 CFR Part 136 or other methods approved in writing by the department shall be utilized. Samples collected for operational testing need not be analyzed by approved analytical methods; however, commonly accepted test methods should be used.

(c) You are required to report all data including calculated results needed to determine compliance with the limitations contained in this permit. The results of any monitoring not specified in this permit performed at the compliance monitoring point and analyzed according to 40 CFR Part 136 shall be included in the calculation and reporting of any data submitted in accordance with this permit. This includes daily maximums and minimums and 30-day and 7-day averages for all parameters that have concentration (mg/l) and mass (lbs/day) limits. In addition, flow data shall be reported in million gallons per day (MGD).

(d) Results of all monitoring shall be recorded on forms provided by, or approved by, the department, and shall be submitted to the appropriate regional field office of the department by the fifteenth day following the close of the reporting period. Your reporting period is on a MONTHLY basis, ending on the last day of each reporting period.

(e) Any records of monitoring activities and results shall include for all samples: the date, exact place and time of the sampling; the dates the analyses were performed; who performed the analyses; the analytical techniques or methods used; and the results of such analyses.

(f) Chapter 63 of the Iowa Administrative Code contains further explanation of these monitoring requirements.

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

SMITHFIELD FARMLAND CORP.				
Outfall	**Wastewater Parameter**	**Sample Frequency**	**Sample Type**	**Monitoring Location**
001	BIOCHEMICAL OXYGEN DEMAND (BOD5)	2 TIMES PER WEEK	24 HOUR COMPOSITE	PRIOR TO DISCHARGE TO CITY SEWER
001	FLOW	7/WEEK OR DAILY	24 HOUR TOTAL	PRIOR TO DISCHARGE TO CITY SEWER
001	NITROGEN, TOTAL KJELDAHL (AS N)	2 TIMES PER WEEK	24 HOUR COMPOSITE	PRIOR TO DISCHARGE TO CITY SEWER
001	OIL AND GREASE	1 EVERY MONTH	GRAB	PRIOR TO DISCHARGE TO CITY SEWER
001	PH	2 TIMES PER WEEK	GRAB	PRIOR TO DISCHARGE TO CITY SEWER
001	TOTAL SUSPENDED SOLIDS	1 TIME PER WEEK	24 HOUR COMPOSITE	PRIOR TO DISCHARGE TO CITY SEWER
001	TEMPERATURE	2 TIMES PER WEEK	GRAB	PRIOR TO DISCHARGE TO CITY SEWER

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Significant Industrial User Discharges:

Significant Industrial User: CARROLL COUNTY SOLID WASTE MANAGEMENT COMMISSION

Outfall #	Outfall Description
001	SANITARY LANDFILL LEACHATE DISCHARGE TO SANITARY SEWER.

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Significant Industrial User Effluent Limitations

You are prohibited from discharging pollutants except in compliance with the following effluent limitations:

CARROLL COUNTY SOLID WASTE MANAGEMENT COMMISSION *Outfall: 001 Effective Dates: 11/01/2016 to 10/31/2021*			
Parameter	**Season**	**Limit Type**	**Limit Values**
FLOW			
	Yearly	30 Day Average	0.025 MGD
	Yearly	Daily Maximum	0.05 MGD
BIOCHEMICAL OXYGEN DEMAND (BOD5)			
	Yearly	30 Day Average	50.0 LBS/DAY
	Yearly	Daily Maximum	50.0 LBS/DAY
PH			
	Yearly	Daily Maximum	9.0 STD UNITS
	Yearly	MINIMUM	6.0 STD UNITS

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Monitoring and Reporting Requirements

(a) Samples and measurements taken shall be representative of the volume and nature of the monitored wastewater.

(b) Analytical and sampling methods specified in 40 CFR Part 136 or other methods approved in writing by the department shall be utilized. Samples collected for operational testing need not be analyzed by approved analytical methods; however, commonly accepted test methods should be used.

(c) You are required to report all data including calculated results needed to determine compliance with the limitations contained in this permit. The results of any monitoring not specified in this permit performed at the compliance monitoring point and analyzed according to 40 CFR Part 136 shall be included in the calculation and reporting of any data submitted in accordance with this permit. This includes daily maximums and minimums and 30-day and 7-day averages for all parameters that have concentration (mg/l) and mass (lbs/day) limits. In addition, flow data shall be reported in million gallons per day (MGD).

(d) Results of all monitoring shall be recorded on forms provided by, or approved by, the department, and shall be submitted to the appropriate regional field office of the department by the fifteenth day following the close of the reporting period. Your reporting period is on a MONTHLY basis, ending on the last day of each reporting period.

(e) Any records of monitoring activities and results shall include for all samples: the date, exact place and time of the sampling; the dates the analyses were performed; who performed the analyses; the analytical techniques or methods used; and the results of such analyses.

(f) Chapter 63 of the Iowa Administrative Code contains further explanation of these monitoring requirements.

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

CARROLL COUNTY SOLID WASTE MANAGEMENT COMMISSION

Outfall	Wastewater Parameter	Sample Frequency	Sample Type	Monitoring Location
001	AMMONIA NITROGEN (N)	1 EVERY MONTH	24 HOUR COMPOSITE	PRIOR TO DISCHARGE TO CITY SEWER
001	BIOCHEMICAL OXYGEN DEMAND (BOD5)	1 EVERY MONTH	24 HOUR COMPOSITE	PRIOR TO DISCHARGE TO CITY SEWER
001	COPPER, TOTAL (AS CU)	1 EVERY MONTH	24 HOUR COMPOSITE	PRIOR TO DISCHARGE TO CITY SEWER
001	FLOW	7/WEEK OR DAILY	24 HOUR TOTAL	PRIOR TO DISCHARGE TO CITY SEWER
001	PH	1 EVERY MONTH	GRAB	PRIOR TO DISCHARGE TO CITY SEWER
001	TOTAL SUSPENDED SOLIDS	1 EVERY MONTH	24 HOUR COMPOSITE	PRIOR TO DISCHARGE TO CITY SEWER

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

ADDITIONAL MONITORING REQUIREMENTS – CARROLL COUNTY SOLID WASTE MANAGEMENT COMMISSION (CCSWMC) LANDFILL

The permittee shall analyze a representative sample of the leachate discharge from the CCSWMC Landfill at least annually for each of the pollutants listed below. Also, the permittee shall monitor the volume of waste discharged and BOD5, TSS, Ammonia Nitrogen, pH and Copper at the frequencies specified on the "Industrial Contributor Monitoring and Reporting Requirements" page of this permit for the CCSWMC Landfill.

Conventional Pollutants and Metals

Biochemical Oxygen Demand (BOD_5)
Total Organic Carbon
Total Dissolved Solids
Total Suspended Solids
Ammonia Nitrogen
pH
Arsenic, Total (as As)
Barium, Total (as Ba)
Cadmium, Total (as Cd)
Chemical Oxygen Demand*
Chloride*
Chromium, Total (as Cr)
Chromium, Hexavalent (as Cr^{+6})*
Copper, Total (as Cu)
Cyanide*
Iron, Total (as Fe)
Lead, Total (as Pb)
Mercury, Total (as Hg)
Molybdenum (as Mo)*
Nickel, Total (as Ni)
Nitrate*
Phosphate (Total)*
Phosphorus*
Potassium, Total (as K)*
Selenium, Total (as Se)
Silver, Total (as Ag)
Zinc, Total (as Zn)

*Added consistent with Attachment B of the Treatment Agreement between the City of Carroll and CCSWMC Landfill dated September 14, 2009.

Volatile Compounds

Method of Analysis: EPA Methods 624 or 1624

Chloromethane (methyl chloride)
Bromomethane (methyl bromide)
Vinyl chloride
Chloroethane (ethyl chloride)
Methylene chloride (dichloromethane)
1,1-Dichloroethene (1,1-dichloroethylene)
1,1-Dichloroethane
1,2-Dichloroethene (1,2-dichloroethylene)
Chloroform
1,2-Dichloroethane
1,1,1-Trichloroethane (methyl chloroform)
Carbon tetrachloride
Bromodichloromethane
1,1,2,2-Tetrachloroethane
1,2-Dichloropropane
1,3-Dichloropropene
Trichloroethene
Dibromochloromethane
1,1,2-Trichloroethane
Benzene
2-Chloroethyl vinyl ether
Bromoform
Tetrachloroethene
Toluene
Chlorobenzene
Ethylbenzene

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Acid Extractable Compounds

Method of Analysis: EPA Methods 625 or 1625

2-Chlorophenol
2-Nitrophenol
2,4-Dimethylphenol
Benzoic acid
2,4-Dichlorophenol
4-Chloro-3-methylphenol
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
2,4-Dinitrophenol
4-Nitrophenol
4,6-Dinitro-2-methylphenol
Pentachlorophenol

Chlorinated Hydrocarbon Insecticides

Methods of Analysis: EPA Methods 608 or 625

Beta BHC
Delta BHC
Gamma BHC
Heptachlor
Aldrin
Heptachlor epoxide
Endosulfan
Dieldrin
4,4'-DDE
Endrin
Endosulfan II
4,4'-DDD
Endosulfan sulfate
4,4'-DDT
Endrin aldehyde
Chlordane
Toxaphene

Polychlorinated Biphenyls

Methods of Analysis: EPA Methods 608 or 625

Arochlor-1016
Arochlor-1221
Arochlor-1232
Arochlor-1242
Arochlor-1248
Arochlor-1254
Arochlor-1260

Base/Neutral Compounds

Methods of Analysis: EPA Methods 625 or 1625

bis (2-chloroethyl) ether
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Benzyl alcohol
1,2-Dichlorobenzene
bis (2-chloroisopropyl) ether
N-Nitroso-dipropylamine
Hexachloroethane
Nitrobenzene
Isophorone
bis (2-chloroethoxy) methane
1,2,4-Trichlorobenzene
Naphthalene
Hexachlorobutadiene
Hexachlorocyclopentadiene
2-Chloronaphthalene
Dimethyl phthalate
Acenaphthylene
Acenaphthene
Dibenzofuran
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Diethyl phthalate
4-Chlorophenyl phenyl ether
Fluorene
N-Nitrosodiphenylamine
4-Bromophenyl phenyl ether
Hexachlorobenzene
Phenanthrene
Anthracene
Di-n-butyl phthalate
Fluoranthene
Pyrene
Butyl benzyl phthalate
3,3'-Dichlorobenzidine
Benzo (a) anthracene
bis (2-ethylhexyl) phthalate
Chrysene
Di-n-octyl phthalate
Benzo (b) fluoranthene
Benzo (k) fluoranthene
Benzo (a) pyrene
Indeno (1,2,3-cd) pyrene
Dibenz (a,h) anthracene
Benzo (g,h,i) perylene

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Outfall Number: 001

Ceriodaphnia and Pimephales Toxicity Effluent Testing

1. For facilities that have not been required to conduct toxicity testing by a previous NPDES permit, the initial annual toxicity test shall be conducted within three (3) months of permit issuance. For facilities that have been required to conduct toxicity testing by a previous NPDES permit, the initial annual toxicity test shall be conducted within twelve months (12) of the last toxicity test.

2. The test organisms that are to be used for acute toxicity testing shall be Ceriodaphnia dubia and Pimephales promelas. The acute toxicity testing procedures used to demonstrate compliance with permit limits shall be those listed in 40 CFR Part 136 and adopted by reference in rule 567--63.1(1). The method for measuring acute toxicity is specified in USEPA, October 2002, Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. U.S. Environmental Protection Agency, Office of Water, Washington, D.C., EPA 821-R-02-012.

3. The diluted effluent sample must contain a minimum of 100.00 % effluent and no more than 0.00 % of culture water.

4. One valid positive toxicity result will require, at a minimum, quarterly testing for effluent toxicity until three successive tests are determined not to be positive.

5. Two successive valid positive toxicity results or three positive results out of five successive valid effluent toxicity tests will require a toxicity reduction evaluation to be completed to eliminate the toxicity.

6. A non-toxic test result shall be indicated as a "1" on the monthly operation report. A toxic test result shall be indicated as a "2" on the monthly operation report. DNR Form 542-1381 shall also be submitted to the DNR field office along with the monthly operation report.

Ceriodaphnia and Pimephales Toxicity Effluent Limits

The maximum limit of "1" for the parameters Acute Toxicity, Ceriodaphnia and Acute Toxicity, Pimephales means no positive toxicity results.

Definition: "Positive toxicity result" means a statistical difference of mortality rate between the control and the diluted effluent sample. For more information see USEPA, October 2002, Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, U.S. Environmental Protection Agency, Office of Water, Washington, D.C., EPA 821-R-02-012.

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Design Capacity

Design: 1

The design capacity for the treatment works is specified in Construction Permit Number 2002-450-S, issued Monday, October 13, 2003.
The treatment plant is designed to treat:
* An average dry weather (ADW) flow of 1.6000 Million Gallons Per Day (MGD).
* An average wet weather (AWW) flow of 4.2000 Million Gallons Per Day (MGD).
* A maximum wet weather (MWW) flow of 6.3000 Million Gallons Per Day (MGD).
* A design 5-day biochemical oxygen demand (BOD5) load of 4735 lbs/day.
* A design Total Kjeldahl Nitrogen (TKN) load of 1021.00 lbs/day.

Operator Certification Type/Grade: WW/IV

Wastes in such volumes or quantities as to exceed the design capacity of the treatment works or reduce the effluent quality below that specified in the operation permit of the treatment works are considered to be a waste which interferes with the operation or performance of the treatment works and are prohibited by rule IAC 567-62.1(7).

Facility Name: CARROLL, CITY OF STP

Permit Number: 1415001

SEWAGE SLUDGE HANDLING AND DISPOSAL REQUIREMENTS

"Sewage sludge" is solid, semisolid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge does not include the grit and screenings generated during preliminary treatment.

1. The permittee shall comply with all existing Federal and State laws and regulations that apply to the use and disposal of sewage sludge and with technical standards developed pursuant to Section 405(d) of the Clean Water Act when such standards are promulgated. If an applicable numerical limit or management practice for pollutants in sewage sludge is promulgated after issuance of this permit that is more stringent than a sludge pollutant limit or management practice specified in existing Federal or State laws or regulations, this permit shall be modified, or revoked and reissued, to conform to the regulations promulgated under Section 405(d) of the Clean Water Act. The permittee shall comply with the limitation no later than the compliance deadline specified in the applicable regulations.

2. The permittee shall provide written notice to the Department of Natural Resources prior to any planned changes in sludge disposal practices.

3. Land application of sewage sludge shall be conducted in accordance with criteria established in rule IAC 567--67.1 through 67.11 (455B).

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

MAJOR CONTRIBUTING INDUSTRIES LIMITATIONS, MONITORING AND REPORTING REQUIREMENTS

1. You are required to notify the department, in writing, of any of the following:
(a) 180 days prior to the introduction of pollutants to your facility from a significant industrial user. A significant industrial user means an industrial user of a treatment works that:
(1) Discharges an average of 25,000 gallons per day or more of process wastewater excluding sanitary, noncontact cooling and boiler blowdown wastewater;
(2) Contributes a process waste stream which makes up five percent or more of the average dry weather hydraulic or organic capacity of the publicly-owned treatment works:
(3) Is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or
(4) Is designated by the department as a significant industrial user on the basis that the contributing industry, either singly or in combination with other contributing industries, has a reasonable potential for adversely affecting the operation of or effluent quality from the publicly-owned treatment works or for violating any pretreatment standards or requirements.

(b) 60 days prior to a proposed expansion, production increase or process modification that may result in the discharge of a new pollutant or a discharge in excess of limitations stated in the existing treatment agreement.

(c) 10 days prior to any commitment by you to accept waste from any new significant industrial user. Your written notification must include a new or revised treatment agreement in accordance with rule 64.3(5)(455B).

2. You shall require all users of your facility to comply with Sections 204(b), 307 and 308 of the Clean Water Act.

Section 204(b) requires that all users of the treatment works constructed with funds provided under Sections 201(g) or 601 of the Act to pay their proportionate share of the costs of operation, maintenance and replacement of the treatment works.

Section 307 of the Act requires users to comply with pretreatment standards promulgated by EPA for pollutants that would cause interference with the treatment process or would pass through the treatment works.

Section 308 of the Act requires users to allow access at reasonable times to state and EPA inspectors for the purpose of sampling the discharge and reviewing and copying records.

3. You shall limit and monitor pollutants for each significant industrial user as required elsewhere in this permit, and submit sample results to the department monthly. Your report shall be submitted by the fifteenth day of the following month.

Revised: June 16, 2009 CAC

Facility Name: CARROLL, CITY OF STP

Permit Number: 1415001

Dissolved Oxygen and *E. coli* Compliance Schedule

1. The facility shall make necessary improvements to meet the dissolved oxygen and *E.coli* limits according to the following schedule:

   - Complete a Self-Assessment Matrix and submit a Work Record Request form to DNR's Wastewater Engineering Section by 1/1/2017. The forms and instructions are available on the DNR website at http://www.iowadnr.gov/InsideDNR/RegulatoryWater/WastewaterConstruction.aspx. Questions on the forms should be directed to either Terry Kirschenman at 515/725-8422 or Emy Liu at 515/725-8421.

   - Submit a Facility Plan by 10/1/2017. The Facility Plan shall be in accordance with Chapter 11.2 of the Iowa Wastewater Facilities Design Standards adopted April 25, 1979.

   - Submit progress report by 4/1/2018.

   - Submit final plans and specifications by 9/1/2018.

   - Award contract for construction of wastewater treatment improvements by 11/1/2018.

   - Submit progress report by 7/1/2019.

   - Complete construction of wastewater treatment improvements by 3/1/2020.

   - Achieve compliance with final dissolved oxygen and *E. coli* limits by 4/1/2020.

Within fourteen (14) days following all dates of compliance, the permittee shall provide written notice of compliance with the scheduled event. All written notices and progress reports shall be sent to the following address:

Iowa Department of Natural Resources
Environmental Services Division
Regional Office #4
1401 Sunnyside Lane
Atlantic, IA 50022-2259

Facility Name: CARROLL, CITY OF STP
Permit Number: 1415001

Compliance Schedule for Copper

1. The facility shall meet the final copper limits listed on the limits page of this permit according to the following schedule:

   - The facility shall submit a compliance strategy, by 5/1/2017. The compliance strategy must describe the steps the facility will take to comply with the final effluent limits for the above-identified pollutants as soon as possible, but no later than 10/1/2021.

   - The facility shall submit progress reports every 12 months until compliance with final effluent limits for the above-identified pollutants is achieved, with the first progress report due 5/1/2018.

   - Achieve compliance with final effluent limits for copper by 10/1/2021.

Within fourteen (14) days following all dates of compliance, the permittee shall provide written notice of compliance with the scheduled event. All written notices and progress reports shall be sent to the following address:

Iowa Department of Natural Resources
Environmental Services Division
Regional Office #4
1401 Sunnyside Lane
Atlantic, IA 50022-2259

Facility Name: CARROLL, CITY OF STP

Permit Number: 1415001

Nutrient Reduction Requirements

In support of the Iowa Nutrient Reduction Strategy you shall prepare and submit a report that evaluates the feasibility and reasonableness of reducing the amounts of nitrogen and phosphorus discharged into surface water. The report shall be submitted no later than **11/1/2018** and shall address the following:

- A description of the existing treatment facility with particular emphasis on its capabilities for removing nitrogen and phosphorus. The description shall include monitoring data that define the current amounts of total nitrogen (TKN+nitrate+nitrite) and total phosphorus in both the raw wastewater and the final effluent.

- A description and evaluation of operational changes to the existing treatment facility that could be implemented to reduce the amounts of total nitrogen and total phosphorus discharged in the final effluent and the feasibility and reasonableness of each. Your evaluation must discuss the projected degree of total nitrogen and total phosphorus reduction achievable for each operational change. When evaluating feasibility you must consider what, if any, effect operational changes would have on the removal of other pollutants (e.g. $CBOD_5$, TSS). When evaluating reasonableness you shall include estimates of the additional cost, if any, to implement such changes and for a publicly-owned treatment works the impact on user rates.

- A description and evaluation of new or additional treatment technologies that would achieve significant reductions in the amounts of total nitrogen and total phosphorus discharged in the final effluent with a goal of achieving annual average concentrations of 10 mg/L total nitrogen and 1 mg/L total phosphorus for plants treating typical domestic strength sewage. For purposes of this evaluation typical domestic sewage is considered to contain approximately 25 – 35 mg/L total nitrogen and 4 - 8 mg/L total phosphorus. For plants treating wastewater with total nitrogen and/or total phosphorus concentrations greater than typical domestic strength sewage, the evaluation shall include the projected reductions in the total nitrogen and phosphorus effluent concentrations achievable with the application of feasible and reasonable treatment technology with a goal of achieving at least a 66 % reduction in nitrogen and 75% reduction in total phosphorus. For each treatment technology the report shall assess its feasibility, reasonableness, practicability, the availability of equipment, capital costs, annual operating costs, impact on user rates and any non-water quality environmental impacts (e.g. additional air pollution, increased sludge production, etc.).

- Based on the evaluations of operational changes and new or additional treatment technologies the report must select the preferred method(s) for reducing total nitrogen and total phosphorus in the final effluent, the rationale for the selected method(s) and an estimate of the effluent quality achievable.

- The report must include a schedule for making operational changes and/or installing new or additional treatment technologies to achieve the concentration and/or percentage removal goals listed above. Additional financial justification must be included in the report if no operational changes or treatment technologies are feasible or reasonable.

The schedule will be incorporated into the NPDES permit by amendment. Effluent discharge limits will be based on one full year of operating data after implementation of the operational changes or completion of plant modifications and a six month optimization period.

The report shall be sent to the following address:
Melinda McCoy
NPDES Section
Iowa Department of Natural Resources
502 East 9th Street
Des Moines, IA 50319

STANDARD CONDITIONS

1. **ADMINISTRATIVE RULES**
Rules of this Department that govern the operation of your facility in connection with this permit are published in Part 567 of the Iowa Administrative Code (IAC) in Chapters 60-65, 67, and 121. Reference to the term "rule" in this permit means the designated provision of Part 567 of the IAC. Reference to the term "CFR" means the Code of Federal Regulations.

2. **DEFINITIONS**
(a) 7 day average means the sum of the total daily discharges by mass, volume, or concentration during a 7 consecutive day period, divided by the total number of days during the period that measurements were made. Four 7 consecutive day periods shall be used each month to calculate the 7-day average. The first 7-day period shall begin with the first day of the month.
(b) 30 day average means the sum of the total daily discharges by mass, volume, or concentration during a calendar month, divided by the total number of days during the month that measurements were made.
(c) Daily maximum means the total discharge by mass, volume, or concentration during a twenty-four hour period.

3. **DUTY TO PROVIDE INFORMATION**
You must furnish to the Director, within a reasonable time, any information the Director may request to determine compliance with this permit or determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, in accordance with 567 IAC 64.3(11)"*c*". You must also furnish to the Director, upon request, copies of any records required to be kept by this permit.

4. **MONITORING AND RECORDS OF OPERATION**
(a) Maintenance of records. You shall retain for a minimum of three years all paper and electronic records of monitoring activities and results including all original strip chart recordings for continuous monitoring instrumentation and calibration and maintenance records. ***{See 567 IAC 63.2(3)}***
(b) Any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years, or both. ***{See 40 CFR 122.41(j)(5)}***

5. **SIGNATORY REQUIREMENTS**
Applications, reports or other information submitted to the Department in connection with this permit must be signed and certified in accordance with 567 IAC 64.3(8).

6. **OTHER INFORMATION**
Where you become aware that you failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, you must promptly submit such facts or information. Where you become aware that you failed to submit any relevant facts in the submission of in any report to the director, including records of operation, you shall promptly submit such facts or information.
{See 567 IAC 60.4(2)"a" and 567 IAC 63.7}

7. **TRANSFER OF TITLE OR OWNER ADDRESS CHANGE**
If title to your facility, or any part of it, is transferred the new owner shall be subject to this permit. You are required to notify the new owner of the requirements of this permit in writing prior to any transfer of title. The Director shall be notified in writing within 30 days of the transfer. No transfer of the authorization to discharge from the facility represented by the permit shall take place prior to notifying the department of the transfer of title. Whenever the address of the owner is changed, the department shall be notified in writing within 30 days of the address change. Electronic notification is not sufficient; all title transfers or address changes must be reported to the department by mail. ***{See 567 IAC 64.14}***

8. **PROPER OPERATION AND MAINTENANCE**
All facilities and control systems shall be operated as efficiently as possible and maintained in good working order. A sufficient number of staff, adequately trained and knowledgeable in the operation of your facility shall be retained at all times and adequate laboratory controls and appropriate quality assurance procedures shall be provided to maintain compliance with the conditions of this permit.
{See 40 CFR 122.41(e) and 567 IAC 64.7(7)"f"}

9. **PERMIT MODIFICATION, SUSPENSION OR REVOCATION**
(a) This permit may be modified, suspended, or revoked and reissued for cause including but not limited to those specified in 567 IAC 64.3(11).
(b) This permit may be modified due to conditions or information on which this permit is based, including any new standard the department may adopt that would change the required effluent limits. ***{See 567 IAC 64.3(11)}***
(c) If a toxic pollutant is present in your discharge and more stringent standards for toxic pollutants are established under Section 307(a) of the Clean Water Act, this permit will be modified in accordance with the new standards.
{See 40 CFR 122.62(a)(6) and 567 IAC 64.7(7)"g"}
The filing of a request for a permit modification, revocation or suspension, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

10. **DUTY TO REAPPLY AND PERMIT CONTINUATION**
If you wish to continue to discharge after the expiration date of this permit, you must file a complete application for reissuance at least 180 days prior to the expiration date of this permit. If a timely and sufficient application is submitted, this permit will remain in effect until the Department makes a final determination on the permit application. ***{See 567 IAC 64.8(1) and Iowa Code 17A.18}***

11. **DUTY TO COMPLY**
You must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. Issuance of this permit does not relieve you of the responsibility to comply with all local, state and federal laws, ordinances, regulations or other legal requirements applying to the operation of your facility. ***{See 40 CFR 122.41(a) and 567 IAC 64.7(4)"e"}***

STANDARD CONDITIONS

12. DUTY TO MITIGATE

You shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. ***{See 40 CFR 122.41(d) and 567 IAC 64.7(7)"i"}***

13. TWENTY-FOUR HOUR REPORTING

You shall report any noncompliance that may endanger human health or the environment, including, but not limited to, violations of maximum daily limits for any toxic pollutant (listed as toxic under 307(a)(1) of the Clean Water Act) or hazardous substance (as designated in 40 CFR Part 116 pursuant to 311 of the Clean Water Act). Information shall be provided orally within 24 hours from the time you become aware of the circumstances. A written submission that includes a description of noncompliance and its cause; the period of noncompliance including exact dates and times, whether the noncompliance has been corrected or the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent a reoccurrence of the noncompliance must be provided within 5 days of the occurrence. ***{See 567 IAC 63.12}***

14. OTHER NONCOMPLIANCE

You shall report all instances of noncompliance not reported under Condition #13 at the time monitoring reports are submitted. You shall give advance notice to the appropriate regional field office of the department of any planned activity which may result in noncompliance with permit requirements. ***{See 567 IAC 63.14}***

15. INSPECTION OF PREMISES, RECORDS, EQUIPMENT, METHODS AND DISCHARGES

You are required to permit authorized personnel to:

(a) Enter upon the premises where a regulated facility or activity is located or conducted or where records are kept under conditions of this 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, practices or operations regulated or required under this permit; and

(d) Sample or monitor, at reasonable times, to assure compliance or as otherwise authorized by the Clean Water Act.

16. FAILURE TO SUBMIT FEES

This permit may be revoked, in whole or in part, if the appropriate permit fees are not submitted within thirty (30) days of the date of notification that such fees are due. ***{See 567 IAC 64.16(1)}***

17. NEED TO HALT OR REDUCE ACTIVITY

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. ***{See 40 CFR 122.41(c) and 567 IAC 64.7(7)"j"}***

18. NOTICE OF CHANGED CONDITIONS

You are required to notify the director of any changes in existing conditions or information on which this permit is based. This includes, but is not limited to, the following:

(a) If your facility is a publicly owned treatment works (POTW) or otherwise may accept waste for treatment from an indirect discharger or industrial contributor (See 567 IAC 64.3(5) for further notice requirements).

(b) If your facility is a POTW and there is any substantial change in the volume or character of pollutants being introduced to the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit. ***{See 40 CFR 122.42(b)}***

(c) As soon as you know or have reason to believe that any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in this permit. ***{See 40 CFR 122.42(a)}***

(d) If you have begun or will begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

19. PLANNED CHANGES

The permittee shall give notice to the appropriate regional field office of the department 30 days prior to any planned physical alterations or additions to the permitted facility. Notice is required only when:

(a) Notice has not been given to any other section of the department. (Note: Facility expansions, production increases, or process modifications which may result in new or increased discharges of pollutants must be reported to the Director in advance. If such discharges will exceed effluent limitations, your report must include an application for a new permit. If any modification of, addition to, or construction of a disposal system is to be made, you must first obtain a written permit from this Department. In addition, no construction activity that will result in disturbance of one acre or more shall be initiated without first obtaining coverage under NPDES General Permit No. 2 for "Storm water discharge associated with construction activity.") ***{See 567 IAC 64.7(7)"a" and 64.2}***

(b) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source as defined in 567 IAC 60.2;

(c) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices; or

(d) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in the permit. ***{See 567 IAC 63.13 and 63.14}***

20. USE OF CERTIFIED LABORATORIES

Analyses of wastewater, groundwater or sewage sludge that are required to be submitted to the department as a result of this permit must be performed by a laboratory certified by the State of Iowa. Routine, on-site monitoring for pH, temperature, dissolved oxygen, total residual chlorine and other pollutants that must be analyzed immediately upon sample collection, settleable solids, physical measurements, and operational monitoring tests specified in 567 IAC 63.3(4) are excluded from this requirement.

21. BYPASSES

(a) Definition. "Bypass" means the diversion of waste streams from any portion of a treatment facility or collection system. A bypass does not include internal operational waste stream diversions that are part of the design of the treatment facility, maintenance diversions where redundancy is provided, diversions of wastewater from one point in a collection system to another point in a collection system, or wastewater backups into buildings that are caused in the building lateral or private sewer line.

(b) Prohibitions.

i. Bypasses from any portion of a treatment facility or from a sanitary sewer collection system designed to carry only sewage are prohibited.

ii. Bypass is prohibited and the department may not assess a civil penalty against a permittee for bypass if the permittee has complied with all of the following:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

(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 backup 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 by paragraph (d) of this section.

(c) The Director may approve an anticipated bypass after considering its adverse effects if the Director determines that it will meet the three conditions listed above and a request for bypass has been submitted to the Department in accordance with 567 IAC 63.6(2).

(d) Reporting bypasses. Bypasses shall be reported in accordance with 567 IAC 63.6.

22. UPSET PROVISION

(a) Definition. "Upset" means 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.

(b) Effect of an upset. An upset constitutes an affirmative defense in an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph *"c"* of this condition 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.

(c) Conditions necessary for demonstration of an upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate through properly signed 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;

iii. The permittee submitted notice of the upset to the Department in accordance with 567 IAC 63.6(3); and

iv. The permittee complied with any remedial measures required in accordance with 567 IAC 63.6(6)"*b*".

(d) Burden of Proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

23. PROPERTY RIGHTS

This permit does not convey any property rights of any sort or any exclusive privilege. ***{See 567 IAC 64.4(3)"b"}***

24. EFFECT OF A PERMIT

Compliance with a permit during its term constitutes compliance, for purposes of enforcement, with Sections 301, 302, 306, 307, 318, 403 and 405(a)-(b) of the Clean Water Act, and equivalent limitations and standards set out in 567 IAC Chapters 61 and 62. ***{See 567 IAC 64.4(3)"a"}***

25. SEVERABILITY

The provisions of this permit are severable and if any provision or application of any provision to any circumstance is found to be invalid by this department or a court of law, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected by such finding.

APPENDIX B

WASTEWATER NUTRIENT TESTING

WASTEWATER NUTRIENT TESTING

Sample	Wastewater						Middle Raccoon River					
	Influent			Effluent			Upstream			Downstream		
Date	TN	TP	CU	TN[A]	TP[A]	CU	TN[B]	TP[B]	CU	TN[B]	TP[B]	CU
12-08-12	40.0 mg/L	9.00 mg/L		2.3 mg/L	0.56 mg/L							
01-09-13							5.80 mg/L	0.10 mg/L		12.6 mg/L	0.09 mg/L	
03-19-13	46.60 mg/L	9.60 mg/L		13.2 mg/L	0.54 mg/L		10.0 mg/L	0.29 mg/L		15.6 mg/L	0.59 mg/L	
06-25-13	24.40 mg/L	4.40 mg/L	.07 mg/L	8.50 mg/L	0.57 mg/L	<.01 mg/L	11.6 mg/L	0.06 mg/L	<.01 mg/L	11.2 mg/L	0.36 mg/L	.01 mg/L
10-11-13	56.00 mg/L	6.23 mg/L	.18 mg/L	11.6 mg/L	1.72 mg/L	.01 mg/L	3.20 mg/L	<0.20 mg/L	<.01 mg/L	7.60 mg/L	0.44 mg/L	.02 mg/L
12-30-13	55.00 mg/L	7.61 mg/L	.19 mg/L	15.1 mg/L	0.28 mg/L	<.01 mg/L	10.0 mg/L	0.20 mg/L	<.01 mg/L	11.7 mg/L	0.20 mg/L	<.01 mg/L
03-18-14	60.00 mg/L	10.1 mg/L	.30 mg/L	21.1 mg/L	0.38 mg/L	<.01 mg/L	6.20 mg/L	0.21 mg/L	<.01 mg/L	6.90 mg/L	0.20 mg/L	.01 mg/L
06-24-14	31.00 mg/L	2.29 mg/L	.08 mg/L	9.2 mg/L	0.44 mg/L	.01 mg/L	21.7 mg/L	<0.20 mg/L	<.01 mg/L	22.8 mg/L	0.20 mg/L	<.01 mg/L
09-16-14	30.00 mg/L	3.40 mg/L	.14 mg/L	7.8 mg/L	0.95 mg/L	<.01 mg/L	19.7 mg/L	<0.20 mg/L	<.01 mg/L	21.1 mg/L	<0.20 mg/L	<.01 mg/L
12-11-14	27.00 mg/L	3.90 mg/L	.097 mg/L	10.6 mg/L	0.27 mg/L	.013 mg/L	17.1 mg/L	<0.20 mg/L	.002 mg/L	19.9 mg/L	<0.20 mg/L	.003 mg/L
03-25-15	47.00 mg/L	10.01 mg/L	.187 mg/L	15.4 mg/L	1.30 mg/L	.013 mg/L	15.7 mg/L	<0.40 mg/L	.002 mg/L	14.4 mg/L	0.64 mg/L	.002mg/L
06-23-15	26.00 mg/L	<0.40 mg/L	1.38 mg/L	9.7 mg/L	<0.40 mg/L	.014 mg/L	24.0 mg/L	<0.40 mg/L	.002 mg/L	23.0 mg/L	<0.40 mg/L	.003 mg/L
09-24-15	26.00 mg/L	7.23 mg/L	.167 mg/L	7.50 mg/L	1.40 mg/L	.011 mg/L	18.41 mg/L	<0.40 mg/L	.007 mg/L	17.90 mg/L	<0.40 mg/L	.007 mg/L
12-08-15	21.40 mg/L	<1.00 mg/L	.075 mg/L	6.40 mg/L	<.40 mg/L	.012 mg/L	20.23 mg/L	<0.40 mg/L	.005 mg/L	18.1 mg/L	<0.40 mg/L	.006 mg/L
03-17-16	28.40 mg/L	3.98 mg/L	.091 mg/L	19.10 mg/L	1.15 mg/L	.016 mg/L	16.30 mg/L	<0.40 mg/L	.004 mg/L	15.80 mg/L	<0.40 mg/L	.006 mg/L
06-16-16	22.50 mg/L	3.69 mg/L	.105 mg/L	6.70 mg/L	<0.40 mg/L	.013 mg/L	17.11 mg/L	<0.40 mg/L	.003 mg/L	16.11 mg/L	<0.40 mg/L	.003 mg/L
10-05-16	19.40 mg/L	3.23 mg/L	.100 mg/L	10.80 mg/L	0.40 mg/L	.012 mg/L	13.70 mg/L	0.53 mg/L	.014 mg/L	14.30 mg/L	0.71 mg/L	.010 mg/L
11-17-16	30.50 mgL	6.56 mg/L	.179 mg/L	11.10 mg/L	<0.40 mg/L	.015 mg/L	14.70 mg/L	<0.40 mg/L	.003 mg/L	13.80 mg/L	<0.40 mg/L	.004 mg/L
02-09-17	28.25 mg/L	6.60 mg/L	.140 mg/L	11.73 mg/L	0.32 mg/L	.009 mg/L	10.27 mg/L	0.67 mg/L	<.002 mg/L	8.08 mg/L	0.55 mg/L	.003 mg/L
05-25-17	18.35 mg/L	1.50 mg/L	.089 mg/L	7.57 mg/L	0.27 mg/L	.013 mg/L	19.08 mg/L	0.38 mg/L	.008 mg/L	19.65 mg/L	0.27 mg/L	.007 mg/L
11-08-17	39.64 mg/L	7.60 mg/L	.16 mg/L	12.87mg/L	0.29 mg/L	.039 mg/L	10.49 mg/L	0.17 mg/L	.014 mg/L	10.33 mg/L	0.15 mg/L	.018 mg/l
03-28-18	26.83 mg/L	6.00 mg/L		10.41 mg/L	0.33 mg/L	.049 mg/L	11.89 mg/L	0.37 mg/L	.028 mg/L	11.83 mg/L	0.34 mg/L	.019 mg/L
07-25-18	26.12 mg/L	4.90 mg/L	.14 mg/L	11.68 mg/L	0.56 mg/L	.021 mg/L	11.68 mg/L	.56 mg/L	.011 mg/L	13.73 mg/L	0.18 mg/L	.015 mg/L
12-06-18	25.83 mg/L	5.50 mg/L	.11 mg/L	10.17 mg/L	1.40 mg/L	.024 mg/L	11.13 mg/L	0.16 mg/L	.005 mg/L	10.63 mg/L	0.18 mg/L	.005 mg/L

Notes:

A. DNR-proposed, technology-based discharge limits: TN - 10 mg/L, TP - 1.0 mg/L. Source: Iowa Nutrient Reduction Strategy

B. EPA-proposed storm water quality standards: TN - 0.712 to 3.26 mg/L, TP - 0.070 to 0.118 mg/L. Source: Iowa Nutrient Reduction Strategy