

REPORT OF COMPLIANCE SAMPLING INSPECTION (CSI)

AT
Carroll Wastewater Treatment Facility (WWTF)
Carroll, IA 51002

NPDES NO: IA-0021377

May 15-18, 2023

BY
U. S. ENVIRONMENTAL PROTECTION AGENCY
Region 7
Enforcement and Compliance Assurance Division (ECAD)

INTRODUCTION

I performed a Compliance Sampling Inspection (CSI) at the Carroll WWTF in Carroll, Iowa from July 17, 2023, through July 20, 2023. The inspection was authorized by Section 308(a) of the Federal Water Pollution Control Act, as amended. This narrative report presents the findings of the inspection.

PARTICIPANTS

Carroll WWTF

Sean Kleespies, Wastewater Superintendent/Operator (712) 792-2560

Email: wastewater@cityofcarroll.com

Paul Kersey, Operator

U. S. Environmental Protection Agency (EPA)

Joe Heafner, Life Scientist (913) 551-7091

Email: heafner.joseph@epa.gov

PROCEDURES

On July 17, 2023, I arrived at the Carroll WWTF at 10:30 a.m. and introduced myself to Mr. Kleespies, presented my credentials, and explained the purpose and procedures of the inspection. These procedures included completing the Water Compliance Inspection Report (attachment 1), an EPA Region 7 Biosolids Checklist (attachment 2), a facility walk-through with photos (attachment 3), a check of the self-monitoring records, the collection of influent, effluent and biosolids samples, and an exit interview.

From July 17, 2023, through July 20, 2023, I used an ISCO model 3710 automatic composite sampler to collect a 24-hour composite sample of the influent after screening. I suspended a weighted length of new Tygon tubing into the influent channel before the screen, and I connected the other end to the sampler pump and programmed it to collect evenly spaced aliquots every 30 minutes into a clean Nalgene bottle, which was packed in ice. I returned each day to service the sampler. I removed the bottle, agitated its contents, and poured them into clean, pre-labeled containers for the analysis of Carbonaceous Biochemical Oxygen Demand (CBOD), Non-Filterable Solids (NFS), Ammonia, Total Kjeldahl Nitrogen (TKN), Nitrate+Nitrite, Total Nitrogen (by calculation), Total Phosphorus (TP) and Metals. I measured the pH and temperature in a separate grab sample using a field meter.

From July 17, 2023, through July 20, 2023, I used an ISCO model 3710 automatic composite sampler to collect a 24-hour composite sample of the effluent after the Ultraviolet (UV) disinfection system before effluent discharges through Outfall 001. I suspended a weighted length of new Tygon tubing into the channel and connected the other end to the sampler pump and programmed it to collect evenly spaced aliquots every 30 minutes into a clean Nalgene bottle, which was packed in ice. I returned each day to service the sampler. I removed the collection bottle, agitated its contents, and poured them into clean, pre-labeled containers for the analysis of CBOD, NFS, Ammonia, TKN, Nitrate+Nitrite, Total Nitrogen (by calculation), TP and Metals. I measured the pH and temperature in a separate grab sample using a field meter.

On July 20, 2023, I took six grab samples at various locations from the biosolids storage lagoon mixed the samples together in a teflon lined bucket then then composited the into one 32-ounce glass jar. I shipped the sample of biosolids with the other collected samples on July 20, 2023. The biosolids were analyzed for Metals, percent solids, Total Phosphorus, and TKN.

On July 18, 2023 through July 19, 2023, I used an ISCO model 3710 automatic composite sampler to collect a 24-hour composite sample of the process wastewater from the Smithfield processing facility. I suspended a weighted length of new Tygon tubing into the wet well and connected the other end to the sampler pump and programmed it to collect evenly space aliquots every 15 minutes into a clean Nalgene bottle, which was packed in ice. I returned on July 19, 2023, to collect the sample. I removed the collection bottle, agitated its contents, and poured them into clean, pre-labeled containers for the analysis of CBOD, NFS, Ammonia, TKN, Nitrate+Nitrite, Total Nitrogen (by calculation), TP and Metals. I measured the pH and temperature in a separate grab sample using a field meter. I also collected a separate grab sample for analysis of Oil and Grease.

On July 19, 2023 through July 20, 2023, I used an ISCO model 3710 automatic composite sampler to collect a 24-hour composite sample of the process wastewater from the Carroll County Sanitary Landfill. I suspended a weighted length of new Tygon tubing into the wet well and connected the other end to the sampler pump and programmed it to collect evenly space aliquots every 15 minutes into a clean Nalgene bottle, which was packed in ice. I returned on July 20, 2023, to collect the sample. I removed the collection bottle, agitated its contents, and poured them into clean, pre-labeled containers for the analysis of CBOD, NFS, Ammonia, TKN,

Nitrate+Nitrite, Total Nitrogen (by calculation), TP and Metals. I measured the pH and temperature in a separate grab sample using a field meter.

On July 18, 2023, and July 19, 2023, I placed the samples I collected on ice in an ice chest, sealed the container and shipped it overnight to the EPA Region 7 Science and Technology Center (STC) for analysis. On July 20, 2023, I placed the samples I collected on ice in an ice chest sealed the container and hand delivered the samples to the EPA Region 7 STC for analysis. I followed Region 7 LSASD standard operating procedures in the collection, packaging, transportation, and handling of the samples. Field Sheets and Chain of Custody forms were electronically submitted each day following Region 7 procedures. Samples shipped on July 19, 2023, did not arrive to the STC until Monday, July 24, 2023, therefore CBOD was not analyzed.

FACILITY DESCRIPTION

The Carroll WWTF is owned and operated by the City of Carroll, Iowa. The legal description is the SW ¼, NE ¼, Section 30, Township 84 North, Range 34 West within Carroll County, Iowa. The physical address of the WWTF is 1400 E. Anthony Street, Carroll, IA 51401. The mailing address is 112 E. 5th Street, Carroll, IA 51401. The WWTF treats domestic wastewater from the city of Carroll. According to the NPDES permit there are two significant industrial users (Smithfield and the Carroll County Sanitary Landfill) that discharge to the WWTF. Final effluent from the WWTF is discharged to an unnamed tributary of the Middle Raccoon River.

The following are components of the WWTF. See attachment 4 for a layout map of the facility:

- Headworks (which includes mechanical screening and grit removal)
- (2) primary clarifiers
- (1) trickling filter (not operational)
- (3) vertical loop reactor basins (activated sludge)
- (2) secondary clarifiers
- UV Disinfection (not in operation during the inspection)
- Peak Flow Equalization Basin

Biosolids are handled by the following sequence:

- anaerobic Sludge Digestion (2)
- biosolids holding pond

According to Mr. Kleespies, the biosolids are land applied to agricultural ground by a contractor in the spring and fall of each year.

The facility has a designed average dry weather flow of 1.6 MGD with an actual flow average during the inspection of 0.762 MGD.

The WWTF's National Pollutant Discharge Elimination System (NPDES) Permit (IA-0021377) was issued on September 1, 2022 (attachment 5). The permit expires on August 31, 2027. The WWTF currently has four active compliance schedules contained in their NPDES permit. The first schedule is for the Iowa Nutrient Reduction Strategy. This is a report that evaluates the feasibility and reasonableness of reducing the amounts of total nitrogen and total phosphorus discharged into surface water. Progress reports are to be submitted annually on February 1st. Construction improvements should be completed by February 1, 2026, with optimization for nutrient reduction by August 1, 2026. The second schedule is for compliance with final effluent copper limits. Final compliance with limits is required by October 1, 2023. The third compliance schedule is for meeting final selenium and thallium limits. The compliance strategy must describe the steps the facility will take to comply with the selenium and thallium effluent limits no later than August 1, 2027. Finally, a compliance schedule with chloride limits. A Chloride Compliance Strategy shall be submitted by June 1, 2023, and must include the steps that will be taken to achieve compliance with effluent limits no later than August 1, 2027.

FINDINGS AND OBSERVATIONS

The following findings were noted during the plant and record review. A complete summary is given in the NPDES Compliance Inspection Report Checklist (attachment 1). These findings were discussed with Mr. Pedersen during the exit meeting.

Self-Monitoring Data Review:

I obtained a spreadsheet of the NetDMR data for the Carroll WWTF from January 2019, through March 2023, and reviewed the data. During the inspection, I also obtained an electronic copy of the facility's Discharge Monitoring Reports for the years 2019 – 2023.

Table 1A below represent the effluent violations noted during the review.

Table 1A: Effluent violations at Outfall 001 reported from January 2019 – July 2023

CARROLL EPA #: IA0021377		AVERAGE - LBS/DAY		DAILY MAXIMUM - LBS/DAY		7DAY - MG/L		AVERAGE - MG/L		DAILY MAXIMUM - MG/L		DAILY MINIMUM - MG/L		AVERAGE - MGD	
		Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR
Outfall: 001															
10/2020	DO											5	3.6200000		
2/2021	CU									0.092	0.1530000				
6/2021	NIB-N							1.4	1.8613333						
7/2021	NIB-N							1.1	3.3011777	5	13.2000000				
8/2021	NIB-N							1	1.2859666						
9/2021	NIB-N	52.1	56.0787788	192.7	198.8964900			1.5	6.4431222	6.6	21.2500000				
10/2021	NIB-N							2.8	3.5918250						
11/2021	TSS					45	79.0000000								

Sample Results

The analytical results from the sampling conducted during the inspection were received on June 15, 2022, from the Region 7 STC laboratory. This data was not discussed during the exit interview. The analytical results for BOD, NFS, TKN, Ammonia, Nitrates+Nitrites, Total Nitrogen, Total Phosphorus, metals, pH, and temperature of the samples I collected are presented in Tables 2 and 3 below. See attachment 6 for the analytical data packet for Activity JAH2317.

Table 2A: Analytical Results for Influent

Parameter	(July 18) 2300269-01	(July 19) 2300270-01	(July 20) 2300271-01
CBOD₅ (mg/L)¹	210	NA	202
NFS (mg/L)	172	252	243
TKN (mg/L)	36.7	40.0	29.0
Nitrate+Nitrate (mg/L)	0.118	0.0855	0.0660
Total Nitrogen	36.8	40.1	29.1
Ammonia (mg/L)	35.2	39.9	34.2
Total Phosphorus (mg/L)	6.34	7.57	6.58
Copper (mg/L)	0.171	0.156	0.150
Temperature (°C)²	18.3	18.1	19.3
pH³	7.76	7.74	7.72
Flow	0.058	0.818	0.848

¹mg/L = milligrams per liter

² °C = degrees Celsius, Temperature was measured in the field.

³ pH is not to be averaged; pH was measured in the field.

Table 2B: Analytical Results for Effluent Samples Collected During Inspection

Parameter	(July 18) Sample # 2300269-02	(July 19) Sample 2300270-02	(July 20) Sample 2300271-02	Concentration Permit Limits³
CBOD5 (mg/L)¹	ND ⁴	NA	ND ⁴	40/25
NFS (mg/L)	ND ⁴	ND ⁴	ND ⁴	45/30
Ammonia (mg/L)	ND ⁴	ND ⁴	ND ⁴	For July 1.0/5.0
TKN (lbs/day)	8.12	7.37	7.81	1940/3175
Nitrate+Nitrite (mg/L)	16.6	16.5	14.2	NA
Total Nitrogen (lbs/day)	17.8	17.7	15.4	NA
Total Phosphorus (mg/L)	0.657	0.466	0.350	NA
Copper (mg/L)	0.012	0.0115	0.00984	0.092/0.076
Temperature (°C)²	19.2	19.8	20.2	NA
pH²	7.72	7.64	7.68	6.0-9.0
Disolved Oxygen (mg/L)	6.41	6.02	6.14	<5.0
Flow in MGD	0.779	0.752	0.756	NA

¹mg/L = milligrams per liter.

²°C = degrees Celsius, pH is not to be averaged, pH was measured in the field.

³Permit limits for CBOD and NFS are Monthly followed by 7-day Averages. Limits for Ammonia are Daily Maximum followed by 30-day average. Copper limits are for Daily Maximum followed by Monthly Average.

⁴ND= No Detection

As stated previously, samples shipped on July 19, 2023 (2300270-02), did not arrive to the STC for analysis on time, therefore, BOD5 was not analyzed. All other parameters were analyzed, and no violations of effluent limits were noted.

Table 2C: Analytical Results for Biosolids Sample Collected During Inspection reported as Milligrams per Kilograms (mg/kg)

Parameter	May 18 2300188-03
Aluminum	1820
Antimony	ND
Arsenic*	25.9
Barium	349
Beryllium	ND
Cadmium*	ND
Calcium	28800
Chromium	14.8
Cobalt	3.99
Copper*	407
Iron	7340
Lead*	8.74
Magnesium	5570
Manganese	4080
Molybdenum*	4.70
Nickel*	8.86
Potassium	3770
Selenium	16.9
Silver*	ND
Sodium	11400
Thallium	ND
Vanadium	ND
Zinc*	267
Mercury*	0.350
% Solids	2.67

*40 CFR Part 503 Metals

Results from sampling conducted during the inspection indicate that the facility was in compliance with effluent limits set in the NPDES permit for the sampling conducted during the inspection.

Biosolids (sludge)

As mentioned above, the facility utilizes two anerobic digesters and a storage basin to treat and store biosolids. Mr. Kleespies stated that they periodically dewater the storage pond. Water from the basin is pumped to the equalization basin then is fed back to the WWTF for treatment. Mr. Kleespies stated that biosolids are typically land applied in the spring and fall by a contractor.

During the inspection, I requested copies of the 2021 and 2022 annual biosolids reports. Mr. Kleespies provided the 2021 and 2022 reports which include sampling results and hauling records. I reviewed the sampling data, and it appears to meet the requirements of 40 CFR Part 503.

According to the 2021 and 2022 biosolids sampling results, the facility meets the Pathogen Reduction requirements for producing “Class B” biosolids anaerobic digestion. Mr. Kleespies also stated that the vector attraction reduction (VAR) is met by reducing the volatile solids to at least 38%. The facility also meets VAR by injecting biosolids during land application. The 2021 biosolids report stated that approximately 381 dry tons of biosolids were land applied while 299 dry tons were land applied in 2022. In 2021, the land application rate equaled approximately 2.89 dry tons per acre and in 2022 the land application rate was 3.42 dry tons per acre.

Laboratory

The facility is certified (IA-Lab #187) by the IDNR for the analysis of BOD and TSS. During the inspection, I reviewed bench sheets for 2022 and 2023. During the review, I noted that the methods used for BOD and TSS appear to follow the methods required by 40 CFR Part 136. While reviewing laboratory procedures, I noted that the pH 7.0 buffer was expired and needed to be replaced. Mr. Kleespies also stated that all other regulatory analysis is conducted by a contract laboratory, Foundation Analytical Laboratory of Cherokee, Iowa. During the inspection, I requested the laboratory records to ensure that all analysis complied with requirements of 40 CFR part 136. My review indicated that all holding times were being met and that all analytical methods appeared to be in compliance with 40 CFR Part 136.

Collection System

During the inspection, I discussed the city’s collection system with Mr. Kleespies. Mr. Kleespies estimated that the city has approximately 76 miles of sanitary sewer and includes several lift stations. Mr. Kleespies stated that the city cleans approximately 50 miles of sewer line per year with some “problem” areas cleaned more often.

Mr. Kersey and I observed four lift stations (photos 13-14) during the inspection. I observed the wet wells at the “Wal-Mart” and “Leachate” lift stations. I noted that all lift stations appear to be well maintained. I observed that each station is equipped with a SCADA communication system to alert the WWTF of issues at the station. I also noted that audible and or visual alarms were at each station.

Mr. Kleespies stated that the city does experience bypasses from the sanitary sewer system from time to time. He also stated that since it has been very dry the past few years, the bypasses have been very infrequent. Mr. Kleespies stated that the city response to each call and notes if it a private service line or the blockage is along the main.

Industrial Users

As mentioned above, the facility has two significant industrial users (Smithfield Foods and Carroll County Sanitary Landfill) that discharge process wastewater to the WWTF. Each industrial user has effluent limits for their respective process wastewater discharges that have been incorporated into the WWTF's NPDES permit. Below is a description of each industrial user and results of sampling that was conducted during the inspection.

Smithfield Foods

Smithfield Farmland is located at 401 N Grant Road, Carroll, Iowa. This facility processes pork into ham, for distribution. In addition to the domestic waste, process wastewater is sent to the Carroll wastewater treatment facility. A roto-screen is used to remove solids from the wastewater before being discharged into the sanitary sewer. The facility has experienced periodic exceedances of the limits. I received a violation report from IDNR that shows the effluent violations for Smithfield Foods since 2019.

Table 3A: Effluent violations at Smithfield reported from January 2019 – July 2023

		AVERAGE - LBS/DAY		DAILY MAXIMUM - LBS/DAY		7DAY - MG/L		AVERAGE - MG/L		DAILY MAXIMUM - MG/L		DAILY MINIMUM - MG/L		AVERAGE - MGD	
		Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR
SMITHFIELD FARMLAND CORP. Outfall: 001															
3/2019	O&G							500	1956.2000000	750	3884.4700000				
4/2019	O&G							500	679.6400000						
5/2019	BOD5			1500	4405.7884800										
	FLOW													0.13	0.1339548
	TKN			70	123.8927016										
7/2020	FLOW														
8/2020	FLOW													0.13	14.0886419
10/2020	FLOW														
12/2020	BOD5			1500	2636.2323000										
5/2021	FLOW														
	ISS	550	609.6723480	950	1536.5616000										
7/2021	BOD5			1500	1605.4816920										
	TKN			70	71.1269394										
9/2021	O&G							500	564.0000000						
1/2022	BOD5			1500	2853.6144000										
	FLOW														
	TKN			70	119.0835240										
3/2022	O&G							500	524.0000000						
3/2023	PH														
7/2023	FLOW														

Below is a table that represents the analysis of samples that were obtained during the inspection. See attachment 7 for the analytical data packet for Activity JAH23018.

Table 3B: Analytical Results for Samples Collected at Smithfield Foods During Inspection

Parameter	(July 19) Sample # 2300271-02	Concentration Permit Limits³
BOD5 (lbs/day)	NA	1,000/1,500
NFS (lbs/day)	81.16	550/950
Oil and Grease (mg/L)	19.1	500/750
TKN (lbs/day)	20.27	55/70
pH	8.32	6.0-10.5
Flow in MGD	0.0998	0.13/0.195

As stated previously, samples shipped on July 19, 2023 (2300271-02) did not arrive to the STC for analysis on time, therefore, BOD5 was not analyzed. All other parameters were analyzed, and no violations of effluent limits were noted.

Carroll County Sanitary Landfill

The Carroll County Solid Waste Management Commission owns and operates the sanitary landfill located west of the city of Carroll, Iowa. The landfill discharges sanitary landfill leachate to the WWTF via a lift station located west of the landfill entrance. No treatment of the leachate occurs prior to discharging to the lift station. The facility has experienced periodic exceedances of the limits. I received a violation report from IDNR that shows the effluent violations for sanitary landfill since 2019.

Table 4A: Effluent violations at Carroll County Sanitary Landfill reported from January 2019 – July 2023

		AVERAGE - LBS/DAY		DAILY MAXIMUM - LBS/DAY		7DAY - MG/L		AVERAGE - MG/L		DAILY MAXIMUM - MG/L		DAILY MINIMUM - MG/L		AVERAGE - MGD	
		Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR	Limit	DMR
CARROLL COUNTY SOLID WASTE MANAGEMENT COMMISSION Outfall: 001															
1/2019	BOD5	50	78.9939780	50	78.9939780										
3/2019	BOD5	50	64.4815440	50	128.9630880										
4/2019	BOD5	50	51.6663000	50	51.6663000										
5/2019	BOD5	50	53.8697280	50	53.8697280										
6/2019	BOD5	50	116.7608340	50	116.7608340										
7/2019	BOD5	50	119.2369800	50	119.2369800										
9/2019	FLOW													0.025	0.0372033
10/2019	BOD5	50	108.9145620	50	108.9145620										
	FLOW													0.025	0.0387516
2/2020	BOD5	50	107.6810760	50	107.6810760										
4/2020	BOD5	50	1586.9435400	50	1586.9435400										
	FLOW														
9/2020	BOD5	50	131.3916960	50	233.0946600										
10/2020	BOD5			50	72.2977920										
1/2021	BOD5	50	55.8752200	50	165.1470120										

Below is a table that represents the analysis of samples that were obtained during the inspection. See attachment 8 for the analytical data packet for Activity JAH2319

Table 4B: Analytical Results for Samples Collected at Carroll County Sanitary Landfill During Inspection

Parameter	(July 19) Sample # 2300271-02	Concentration Permit Limits ³
BOD5 (lbs/day)	14.4	50/50
NFS (lbs/day)	23.8	NA
Copper (ug/L)	20.4	NA
TKN (lbs/day)	1580	NA
pH	7.67	6.0-9.0
Flow in MGD	0.0025	0.025/0.05

Operational Issues and Observations

1. I observed all areas of the WWTF during the inspection (photos 1-12). I noted that all units were operating and functional at the time of the inspection.
2. Federal regulations at 40 CFR 122.26(b)(14)(xi) requires that treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more to obtain a stormwater discharge permit to cover this type of industrial activity. As part of the stormwater permit, a facility is required to develop and implement a Stormwater Pollution Prevention Plan (SWPPP).

Summary

The facility has had previous effluent violations for Ammonia. Operational changes made by the facility, appeared to correct the effluent violations.

The facility needs to ensure that pH buffers used to calibrate laboratory equipment has not expired.

The facility must apply and receive an industrial stormwater permit in accordance with 40 CFR Part 122.26 (b)(14)(xi).

The facility has two significant industrial users that discharge to the sanitary sewer system. The facility must ensure that all industrial users comply with the effluent limitations set in the NPDES permit.

**JOSEPH
HEAFNER**

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JOSEPH HEAFNER
Date: 2023.08.29
17:47:41 -05'00'

Joe Heafner
Life Scientist

**NICOLE
MORAN**

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NICOLE MORAN
Date: 2023.08.30
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Nicole Moran
Section Chief

Attachments:

1. Water Compliance Inspection Report, Form 3560-3 (4 pages)
2. EPA Region 7 Biosolids Checklist (3 pages)
3. Digital Photographs with Photo Log (16 pages)
4. Facility Satellite Photos/Maps (1 page)
5. NPDES permit issued on September 1, 2022 (30 pages)
6. Laboratory Analytical Report for Activity JAH2317 (44 pages)
7. Laboratory Analytical Report for Activity JAH23018 (13 pages)
8. Laboratory Analytical Report for Activity JAH2319 (19 pages)