

REPORT OF COMPLIANCE EVALUATION INSPECTION (CEI)

AT
City of Keokuk - Combined Sewer Overflow (CSO)
Keokuk, Iowa

NPDES NO: IA0042609

February 21-23, 2024

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

INTRODUCTION

I performed a Compliance Evaluation Inspection (CEI) of the City of Keokuk's CSO in Keokuk, Iowa from February 21, through February 23, 2024. 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

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PROCEDURES

On February 21, 2024, Mr. Ahmad and I met Mr. Wills, Mr. Schechinger, and Mr. Askew at the Keokuk Sewage Treatment Plant. I introduced myself to Mr. Wills, and presented my credentials, and explained the purpose and procedures of the inspection. These procedures included completing a review of compliance records associated with the facility's Long Term Control Plan (LTCP) and Capacity, Management, Operations, and Management (CMOM) program, evaluating the City's compliance status with Administrative Order on Consent (Order) CWA-07-2008-0053 (attachment 7), conducting observations of the sanitary sewer collection system, and an exit interview.

Mr. Clark joined the inspection at approximately 11:30 on February 21, 2024, and I introduced myself, presented my credentials, and explained the purpose of the inspection.

FACILITY DESCRIPTION / REGULATORY HISTORY

The City of Keokuk's sanitary sewer collection system is owned and operated by the City of Keokuk, Iowa. The collection system consists of approximately 3,800 total service connections, 14 lift stations, 75 miles of sewer mains, and one CSO Outfall (CSO 002) that discharges to the Mississippi River.

The City of Keokuk's National Pollutant Discharge Elimination System (NPDES) Permit (IA5640001) was issued on September 1, 2018. The permit expired on August 31, 2023. The NPDES permit lists multiple CSO Outfalls including Outfall 002 CSO interceptor structure at 3rd and Des Moines, 007 Bypass at Middle Road Lift Station Overflow, 009 Bypass at Indian Hills Lift Station Overflow, and 010 Bypass at Soap Creek Lift Station Sewer Overflow. The Permit includes language stating, *"Bypasses from any portion of a treatment facility or from a sanitary sewer collection system designed to carry only sewage are prohibited."*

The collection system receives domestic, commercial, and industrial wastewater discharges from the City of Keokuk serving an approximate population of 10,000 people. Wastewater received by the collection system is routed to the City's Sewage Treatment Plant located at 1000 Mississippi Drive.

On December 30, 2010, the EPA and the City of Keokuk agreed to the administrative Order listed as Docket Number: CWA-07-2008-0053. The purpose of the Order was to establish a compliance schedule to address and/or eliminate Combined Sewer Overflows (CSO) from the City's sanitary sewer system. As part of the Order, the City was required to develop and submit a LTCP, separate the sanitary sewer system from the stormwater sewer system, submit Annual Progress Reports, conduct a Sewer System Evaluation Survey (SSES) and Capacity Assessment Report (CAR), and develop and implement a CMOM program.

The current LTCP was finalized on April 12, 2013, the SSES and CAR was initially approved on December 23, 2015, and then amended on May 23, 2016, and the CMOM was completed in July

2011.

The City's CMOM program has multiple elements that direct the operation and maintenance of the sanitary sewer system (SSS) with obtaining and maintaining compliance with the EPA's CSO policy, the STP's NPDES Permit, and the Administrative Order. These programs are documented and included in the City's July 2011 "City of Keokuk Sewer System Maintenance Plan" (attachment 2) and include 1) Collection System Management, 2) General Information about the Keokuk SSS, 3) Cleaning, Inspection, and Assessment Program, 4) Gravity Line Preventative Maintenance, 5) Pump Station/Force Main Maintenance, 6) Reactive Maintenance, 7) Equipment and Tool Inventory, 8) Capacity Management, 9) Resources and Budget, 10) Sewer System Preventative Maintenance Plan Updates, and 11) a Sewer Overflow Response Plan (SORP). These programs provide SSS staff with procedures to prevent and address overflow issues in the collection system.

The initial LTCP included sewer separation plan with Phases I – VII with an ultimate completion date of 2030. The seven phases consisted of:

Table 1 – LTCP Project Phases

Phase #	Project	Estimated Completion	Estimated Cost (million \$)
Phase I	Water Pollution Control Plan Improvements	End of 2015	1.0
Phase II	Victory Park Sewer Separation	End of 2015	3.6
Phase III	9 th Street and Grand Ave. Storm Sewer and CSO 005 elimination	End of 2014	0.6
Phase IV	Rand Park Storm Water Diversion	End of 2016	11.0
Phase V	Basins 1,2, and 3 Storm Sewer Separation	End of 2018	10.0
Phase VI	Basin 7 and 8 Storm Sewer Separation	End of 2020	16.0
Phase VII	Basin 4 Storm Sewer Separation	End of 2030	10.0

In May of 2017, the city provided the EPA with an update on the progress on the elimination of multiple CSO outfalls. The status is captured below in Table 2.

Table 2 – CSO Outfall Elimination Status

CSO #	Location	Status
004	7 th and Soap Creek	Eliminated in 2011
005	5 th Street	Eliminated in 2012
006	Victory Park	Eliminated in 2015
011	10 th and Soap Creek	Eliminated in 2011
012	B Street	Eliminated by Roquette America
013, 014, & 015	Victory Park	Eliminated in 2015

In addition, the May 2017 correspondence also requested an amendment to the LTCP to extend the Phase IV completion deadline but maintained the completion of all Phases by the end of 2030. This amendment was approved by the EPA on July 17, 2017. Annual progress reports,

submitted by the City and as required by the Order in 2018, 2019, and 2020, explained that the Phase IV - Rand Park Tunnel was on track for completion by the December 2020 timeframe. However, a CSO inspection of the city, conducted by the Iowa Department of Natural Resources in November 2020, identified that the Phase IV project had not been started and would not meet the completion timeframe. The IDNR notified the City of the need to reach out to EPA Region 7 to discuss an extension.

Following the 2020 IDNR Inspection, the City engaged in multiple discussions with EPA Region 7 for available options to meet the CSO Policy goals and the Order requirements and on March 19, 2021 a one year extension was granted to evaluate options for the remaining Phases of the LTCP. On October 6, 2021, the City provided a proposal to EPA Region 7 describing a modified approach to completing the LTCP. In lieu of implementing the diversion and separation projects described in Phases IV through VII of the LTCP, the City proposed installing offline retention volume in the collection system to divert first flush flows during heavy precipitation events and return volume back to the collection system for treatment at the WWTP once flows subside. The City believed this would meet the 85 percent pollution reduction presumption in EPA's CSO Policy.

The City received technical assistance from the Eastern Research Group (ERG), an EPA contractor, who reviewed the LTCP and the City's October 2021 proposal, and provided areas that could be incorporated into LTCP proposals or revisions. The technical assistance memorandum was transmitted to the City on February 22, 2022 (attachment 4).

On January 8, 2024, the City provided a request for approval of a "First Flush Study" and on January 29, 2024, the EPA approved the City's request to proceed with the study.

FINDINGS AND OBSERVATIONS

The following findings were noted during the inspection of the collection system, discussions with staff, and record review. These findings were discussed with Mr. Clark and provided in the Notice of Preliminary Findings (NOPF) (attachment 3) to Mr. Clark, Mr. Wills, Mr. Schechinger, and Dr. Askew at the end of the inspection.

Staffing

According to Mr. Wills and Mr. Clark, the sewer system collection staff are separate from the wastewater treatment plant staff. Mr. Clark supervises the collection system staff and Mr. Wills oversees operations of the treatment plant. Mr. Clark explained that there are 5 additional staff that operate and maintain the collection system. Their duties primarily include inspection and maintenance of lift stations, street cleaning, sewer inspections, sewer cleaning, and responding to sewer backups.

CSO Outfalls

The inspection began with an observation of CSO 002 at the location where the outfall enters the Mississippi River (photographs #1-3). A surface water boom was present to prevent floatable solids from entering the river. Mr. Schechinger explained that flow from the outfall can be controlled up to flows of 10 million gallons per day (MGD) and then flows must be diverted directly to the river. A warning sign was present at the Outfall to warn citizens to avoid recreational contact and a CSO marking sign to notify citizens.

Mr. Wills provided records of monitoring conducted at the CSO 002 outfall but explained that the flow meter had quit working in October 2023. He explained that the flow meter would be replaced, and monitoring resumed with the First Flush study.

According to the CSO Policy, LTCPs should include CSO Monitoring language. Permittees should develop a comprehensive, representative monitoring program that measures the frequency, duration, flow rate, volume, and pollutant concentration of CSO discharges and assesses the impact of the CSOs on the receiving waters. The monitoring program should include necessary CSO effluent and ambient in-stream monitoring and where appropriate, other monitoring protocols such as biological assessment, toxicity testing and sediment sampling.

According to Mr. Clark the additional CSO outfalls listed in the NPDES Permit are no longer applicable and should be removed. I recommended that the outfall locations be discussed with the Iowa Department of Natural Resources permit staff to ensure that the permit be updated, when it is renewed, to reflect the current conditions.

I reminded Mr. Wills that bypasses of treatment that discharge through the CSO are required to be recorded and reported to the IDNR on the monthly discharge monitoring reports as required by Standard Condition #21 of the City's NPDES Permit (Attachment 6) and in accordance with Chapter 63, Section 567 of the Iowa Administrative Code.

567 IAC 63.6 requires: Bypasses shall be reported with the monthly operation report, as a separate attachment, that includes: (1) The reason for the bypass, including the amount and duration of any rainfall event that may have contributed to the bypass; (2) The date and time of onset or discovery of the bypass; (3) The duration of the bypass; (4) An estimate of the amount of untreated or partially treated sewage or wastewater that was discharged; (5) The location of the bypass; and (6) The name of any body of surface water that was affected by the bypass.

A summary report of the recorded CSOs should be reported as part of the Annual Report required, by the Order, to be submitted to the EPA by April 15th of each Year. In addition, the Annual Report shall include (a minimum of): *Keokuk shall submit progress reports to EPA and IDNR describing the CSO work performed during the previous April 1 through March 31 time period and, include a projection of the work to be performed during the next April 1st through March 31 time period.*

Sanitary Sewer Overflows

I asked the City staff of the number of overflows or basement backups that have occurred in the past. Mr. Davis explained that historically the City averages approximately 3-4 backups per year, but there have only been 1 or 2 total backups or overflows in the past 2 years. Mr. Davis explained that the City's SORP provides for Reactive Maintenance procedures, where citizens can report issues and how collection staff respond to these incidents. I reviewed the SORP and noted that overflows and basement backups are required to be reported to the IDNR. The SORP states, *"Sewage Overflow Report within 6 hours of the sewer overflow confirmation and provides the information by phone to the IDNR"*.

Sewer Separation and CSO outfall elimination

As part of the inspection, I observed areas of the collection system that had been previously separated. The Victory Park area was observed (photographs #4-7), the Soap Creek area (photographs #20-21), and the former 5th Street CSO (photographs #24-25). No overflows or evidence of overflows was observed in these areas and the CSO controls appeared effective.

Collection System

Observations of multiple lift stations throughout the collection system were conducted during the inspection, including the River Road lift station, Victory Park lift station, Middle Road lift station, Indian Hills lift station, Soap Creek lift station, and the Messenger Road lift station. Each lift station observed appeared to be secured including security gates, electrical panels, pump buildings, etc. The lift stations were equipped with high level alarms and notification lights to alert residents and staff of issues. Multiple lift stations were equipped with back up diesel power generators. Mr. Davis explained that City staff conduct regular and frequent inspections of the lift stations to ensure proper operation and maintenance. Staff utilize an inspection checklist to document their observations. Mr. Davis provided copies of recent inspections of the Soap Creek and the Indian Hills lift stations. These documents are maintained in the ECAD Water Facility Site File for the City of Keokuk. The inspections were conducted approximately every 4 days and recorded pump usage (pump hours) for each pump and electric amperage readings. In addition, Staff checked and recorded hours and fuel levels of emergency diesel powered generators (photographs #9 & #15-16) at the lift stations (if available) to ensure the generators were operational. The lift stations and generators appeared well maintained and fully operational.

Mr. Clark explained that many of the lift stations have been updated including the Indian Hills lift station being upgraded 3 years prior, the Messenger Road lift station updated 5 years ago, and the Soap Creek lift station pumps being replaced over 5 years ago.

Nine Minimum Controls (NMC)

The City's LTCP establishes the policies and procedures that outline the controls the City utilizes to obtain compliance with the Order and the EPA's CSO Policy. During the inspection, I

observed the current actions being conducted by the sewer collection system staff. For NMC-1: Proper operations and regular maintenance for the CSS and CSO Outfalls. The sewer department has an active preventative maintenance program that includes scheduled inspections and cleaning of sewer mains. The schedule is established in the CMOM program and records of these activities were provided by Mr. Clark.

The City's policy and procedures for addressing and preventing issues in the collection system from fats, oils, and grease (FOG) are specified in the City's Sewer System Maintenance Plan (Attachment 2 – Section 4).

Controls specified in the Sewer System Maintenance Plan include:

- *Inspection of grease interceptors/separators is performed by the Sewer Department.*
- *Outreach for Fats, Oils and Grease is performed jointly by Sewer Department personnel and City Planning Department.*
- *The discharge of fats, oils, and grease (FOG) is regulated through our Pretreatment Ordinance program.*

All City staff members did not appear to be fully aware of what actions were being conducted to control FOG in the system. Mr. Clark did explain however, that there was only one area of the collection system, that received waste from a nursing home, that has or had experienced issues with FOG. He explained that the lift station and lines are regularly cleaned, every six months and provided a "2024 North Side Cleaning Report" (attachment 5) that an inspection sheet that evaluated specific location, length, and condition of the sewer lines.

Control of FOG should continue to be evaluated and all staff members should be aware of the program's requirements.

For NMC-2: Maximum use of the system for storage, the City is preparing to begin the First Flush Study that will measure rainfall along with basin flows to determine necessary capture volumes. Preliminary plans call for a potential detention area to be constructed near the 3rd and Des Moines intersection to serve as an additional basin to collect first flush volumes to prevent overloading of the STP or a bypass to CSO 002.

The results of the Study will be utilized to revise the LTCP. The EPA approved the City's proposal to conduct the Study on January 29, 2024.

For NMC-3: Review and modification of pretreatment requirements, the City's pretreatment program has undergone significant changes since the original LTCP was developed. These changes should be reflected in the revised LTCP and efforts to improve the pretreatment program compliance continued.

For NMC-4: Maximization of flow to the POTW for treatment, the collection system's flow dynamics have changed since the 2013 LTCP was developed. Portions of the collection system have been repaired or separated and all but one CSO has been closed. Additionally, a dynamic

weir has been added to CSO 002 as a regulator and the treatment capacity of the WWTP has increased. According to Mr. Davis, Mr. Wills, and Mr. Schechinger, flows up to 10 MGD can be received by the STP. Once the flows reach that level the flows are routed to the CSO outfall to the Mississippi River.

For NMC-5: Elimination of CSOs during dry weather, the City is utilizing preventative maintenance efforts established in NMC-1 along with the sewer separation efforts conducted.

For NMC-6: Control of solid and floatable materials in CSOs, the City utilizes a surface boom (see photograph #1) to collect these. City staff regularly inspect the boom and remove accumulated debris.

For NMC-7: Pollution Prevention Programs, the 2013 LTCP provided a number of education programs, it was not clear if all or some of these programs were still being utilized. The City should evaluate the program effectiveness and incorporate any changes into the revised LTCP as necessary.

For NMC-8: Public Notification, the City maintains public notification signage at the location where CSO 002 enters the receiving water. The signage lists a City phone number for citizens to contact with questions.

For NMC-9: Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls. Mr. Wills provided data collected from CSO 002 for 2022 – 2023 and explained that monitoring of the CSO will continue with the First Flush Study.

Based on the review of the city's implementation of the LTCP's NMC, there has been substantial changes to the collection system. However, the NMCs appear to remain in effect and appear to be implemented as outlined in the LTCP.

First Flush Study

During the inspection, we toured the areas that would be evaluated during the Study. I observed the areas of Rand Park where the combined sewer system began (photographs #11-12) and what would be one of the upstream flow monitoring locations for the study. Mr. Schechinger explained that a building would be constructed to house the monitoring equipment. I also observed the CSO 002 interceptor location at 3rd and Des Moines. Mr. Schechinger and Mr. Clark described the area as a 10' x 10' brick lined tunnel that continued under the downtown area. Mr. Schechinger explained that the detention basin was planned for this area. Mr. Schechinger explained that flow monitoring would resume at this location to determine the flow volumes and the necessary detention basin volume.

I explained that changes from the demonstrative approach of addressing CSOs to the presumptive approach would require changes to the LTCP to incorporate the findings of the Study.

Summary

The NOPF (attachment 3) was provided to the City staff at the end of the inspection on March 4, 2024. No response to the NOPF was submitted. The findings of the inspection are summarized below:

- 1) Ensure the City's Sewer Preventative Maintenance Plan and Sewer Overflow Response Plan (SORP) is updated to reflect current points of contact, emergency contact information, updated number of industrial user connections, and other necessary changes.
- 2) Ensure the Fats, Oils, and Grease (FOG) Control is conducted in accordance with the City's Sewer System Maintenance Plan.
- 3) Measure (repair/replace flow meter) and record overflows from CSO Outfall 002.
- 4) Report Sewage Overflow (SSO) Reports to IDNR, following confirmation of sewage overflows or backups, in accordance with the City's SORP.
- 5) Ensure Annual Combined Sewer Overflow (CSO) Progress Reports are submitted to the EPA Region 7, by April 15 as required by paragraph 38 of the AOC.
- 6) Conduct the 'First Flush Study' in order to explore potential changes to the City's Long Term Control Plan (LTCP).
- 7) Coordinate with IDNR NPDES Permit staff to ensure CSO outfalls that have been separated are removed from the NPDES permit upon renewal of the permit.

Additional findings include: 8) the recommendation to incorporate the ERP technical assistance recommendations into LTCP revisions.

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Attachments:

1. Digital Photographs with Photo Log (27 pages)
2. City of Keokuk - Sewer Preventative Maintenance Plan and Sewer Overflow Response Plan (SORP) (42 pages)
3. Notice of Preliminary Findings (2 pages)
4. ERG Technical Assistance memorandum (9 pages)
5. North Side Cleaning Report (2 pages)

6. City of Keokuk NPDES Permit
7. CWA-07-2008-0053

