



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Report Title: Clean Water Act Compliance Inspection Report
Inspection Date(s): 06/28/2022
Regulatory Program(s): National Pollutant Discharge Elimination System (NPDES)
Type of Activity: Wastewater
Facility Name: South Charleston Wastewater Treatment Works
Permittee(s): South Charleston Sanitary Board
Facility Address: S. Charleston Wastewater Treatment Works
1701 Bowne Ave
Charleston, WV 25103
Latitude: 38.36475 **Longitude:** -81.671225
Permit Number: WV0023116
NAICS Code: 221320 **SIC:** 4952
Receiving Waters: Lower Kanawha River
Unique Project #: 3E22WN058A

Facility Representative(s)*: **Point of Contact**

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Unique Project#: 3E22WN058A

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Appendix A	Facility Permit
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I. Introduction

On June 28, 2022, inspectors from the U.S. Environmental Protection Agency (“EPA”) Region III (hereinafter, the “EPA Inspection Team”) conducted an inspection of South Charleston’s Wastewater Treatment Facility (hereinafter, “the Facility”). Representatives from West Virginia Department of Environmental Protection (“WVDEP”) also attended the inspection. The purpose of the inspection was to observe compliance with the Clean Water Act (“CWA”) and to verify compliance with the Facility’s National Pollutant Discharge Elimination System (“NPDES”) Permit No. WV0023116 (hereinafter, the “Permit”), and applicable State and Federal regulations.

A. Inspection Opening Conference

The EPA Inspection Team arrived at the Facility at approximately 10:30 AM (EDT) for the inspection. The EPA Inspection Team met with the Facility representatives. Monica Crosby displayed her credentials to Landin Harper and Peter Craghead at the outset of the inspection and explained the purpose of the inspection was to review compliance with the Permit. The EPA Inspection Team explained that any information that the Facility deemed to be confidential business information (“CBI”) should be identified to the EPA Inspectors during the inspection and it would be handled as CBI according to EPA’s CBI procedures. Table 1 outlines the individuals that participated in the inspection.

Table 1. Inspection Attendee List

Name	Affiliation	Contact Information
U.S. EPA Region III		
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Facility Representative		
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Peter Craghead	Operator -S. Charleston WWTW	Phone: (304) 552 - 0860 Email: pcraghead@dow.com

B. Weather and Precipitation Conditions

During the inspection, weather was overcast and slightly damp. National Oceanic and Atmospheric Administration (NOAA) National Weather Service precipitation data for the date of the inspection and 5 days prior are provided in Table 2 below:

Table 2. Precipitation Data

Station Name	Date	Precipitation Amount (inches) ¹
CHARLESTON YEAGER AIRPORT, WV USW00013866	6/23/2022	0.02
CHARLESTON YEAGER AIRPORT, WV USW00013866	6/24/2022	0.00
CHARLESTON YEAGER AIRPORT, WV USW00013866	6/25/2022	T ²
CHARLESTON YEAGER AIRPORT, WV USW00013866	6/26/2022	0.28
CHARLESTON YEAGER AIRPORT, WV USW00013866	6/27/2022	0.74
CHARLESTON YEAGER AIRPORT, WV USW00013866	6/28/2022	0.00

¹ Source: NOAA National Climatic Data Center (<http://www.ncdc.noaa.gov/>).

² 'T' values in the Precipitation Amount category indicate a "trace" value was recorded

C. Summary of the Facility

The Permit for the facility was originally issued on February 12, 2007 but was then superseded on December 8, 2011. The Permit was reissued February 1, 2012, and was set to expire on December 7, 2016, but has since been administratively continued (refer to Appendix A).

The South Charleston Sanitary Board owns, while South Charleston Wastewater Treatment Works ("WWTW") operates and maintains:

- 1.) A wastewater collection system and an existing 3.0 million gallons per day (MGD) activated sludge wastewater treatment plant ("WWTP"). The WWTP serves a population of approximately 30,000 persons in the City of South Charleston, the Green Valley service area, and its environs. Treated effluent discharges through Outlet No. 201 into Outlet No.1 and then to the Kanawha River at Mile 56.2.
- 2.) A wastewater collection system designed to serve a population of approximately 3,100 persons in the Green Valley area, and environs, and convey wastewater to the City of South Charleston's WWTP, Outlet No. 201, with ultimate treatment and discharge to the Kanawha River through Outfall No. 001 at Mile 56.2.
- 3.) A disposal system for the direct discharge of treated industrial wastes, process wastewater, and sanitary wastes from the Union Carbide Chemical Company, South Charleston Plant, a subsidiary of Dow Chemical Company, and sewage for some limited residents of the City of South Charleston by activated sludge biological treatment via Outlet No. 101 into Outlet 001 and then to the Kanawha River at Mile Point 56.2.
- 4.) Disposal systems and best management practices for the discharge of untreated storm water runoff through Outlet No. 002 to the Kanawha River, and Outlet Nos. 003, 004, and 007 to Joplin Branch of the Kanawha River.

Under the meaning of Section 502(7) CWA, 33 U.S.C. § 1362(7), the Kanawha River is considered a navigable water of the United States.

II. Facility Activity

As part of the Inspection process, the EPA Inspection Team visually observed both the Facility's industrial and municipal wastewater treatment trains in the presence of the Facility's Chief Operators.

The municipal treatment train consists of:

- A mechanical bar screen and comminutor;
- Two (2) grit removal chambers;
- Two (2) primary clarifiers;
- Two (2) aeration chambers;
- Two (2) secondary clarifiers; and
- Two (2) chlorine contact chambers.

The industrial treatment training consists of:

- A mechanical bar screen;
- Two (2) grit removal chambers;
- Two (2) primary clarifiers;
- Three (3) equalization tanks
- One aeration basin;
- Two (2) flocculation tanks; and
- Two (2) secondary clarifiers.

The municipal treatment train is comprised of a mechanical bar screen, two (2) grit removal chambers, two (2) primary clarifiers with a volume of 277,000 gallons and a surface area of 3,200 square feet each, two (2) aeration chambers with a volume of 1.25 million gallons, two (2) secondary clarifiers with a volume of 430,000 gallons and a surface area of 4,780 square feet each, and two (2) chlorine contact chambers with a volume of 60,000 gallons each, and all requisite appurtenances. The industrial treatment train is comprised of a lift station, two (2) grit removal chambers, two (2) primary clarifiers with a volume of 277,000 gallons and a surface area of 3,200 square feet each, three (3) equalization tanks, one (1) aeration basin with a volume of 6.5 million gallons, two (2) flocculation tanks, and two (2) secondary clarifiers with a volume of 637,827 gallons and a surgace area of 7,088 square feet each.

The observations from the inspection are described in detail below in the Observations section. Photographs were taken during the inspection by Edward Simas and are provided in Appendix B.

As part of the Inspection process, the Facility operators explained the operations and layout of the Facility, which is divided into two main components: industrial ("Industrial side") and municipal ("Municipal side"). During the Inspection, Facility representatives explained that the only flow received on the Industrial side is that from its neighbor, DOW Chemical Company. Facility Representatives also explained that Outlet 101 is comprised of all treated industrial flow, whereas Outlet 201 is comprised of all treated municipal flow. Outlet 101 and Outlet 201 come together to form Outfall 001, which discharges directly into the lower Kanawha River (Appendix B, Photograph 1). It was explained that due to Outfall 001 being located in the River,

the Facility is not able to collect a representative sample at the actual outfall. Thus, the Facility collects its sample at a point when the two outlets come together but before flow reaches the river ([Appendix B, Photographs 2 and 3](#)).

The EPA Inspection Team began their Facility walk-through on the Industrial side, beginning at the industrial grit chambers ([Appendix B, Photographs 4 and 5](#)). During the Inspection, Facility representatives explained that the grit chamber is comprised of a vortex separator that separates grit from water and then screws the grit up until it lands in the adjacent dumpster. All the accumulated sludge is taken to Holtz Impoundment ([Appendix B, Photographs 6 and 7](#)).

From the weirs on each of the grit chambers, flow comes together and then separates again into one of the two primary clarifiers ([Appendix B, Photograph 8](#)). Each of the primary clarifiers has a volume of 277,000 gallons and a surface area of 3,200 square feet ([Appendix B, Photograph 9](#)). The effluent of the clarifiers goes over the weirs and then is pumped to the other side of the plant for equalization where it will bake in a high pit to kill any fecal before it goes to aeration and then the river ([Appendix B, Photograph 10](#)). The equalization tanks were not observed as part of the inspection.

Following equalization, flow moves into the six-million-gallon industrial aeration basin ([Appendix B, Photograph 11](#)). Facility representatives explained that the aeration basin is equipped with six (6) blowers, each with 96 diffusers, and that the number of blowers running is dependent on temperature. At the time of the inspection, five (5) blowers were running ([Appendix B, Photograph 12](#)). Facility representatives stated that the pipes in the aeration basin are repaired twice a year. The blowers in the aeration basin are on an annual maintenance schedule that involves completely replacing one blower while repairing the other. This is a continuous cycle where each year a different blower is replaced, and the others are repaired. Additionally, phosphoric acid is used as a drip feed in the aeration basin, the amount of which is added is dependent on lab results. At the time of the inspection, the mixed liquor suspended solids (MLSS) appeared to be light brown in color and with no distinct odors.

From the aeration basin, flow is sent to a flocculation tank where it is mixed with polymer and then split off into one of the three (3) secondary clarifiers. Facility representatives explained that the industrial wastewater doesn't settle as well as the municipal side, so polymer is added to help sludge settle ([Appendix B, Photographs 13 and 14](#)). During the inspection, the EPA Inspection Team was informed that while the Industrial side of the Facility has three (3) secondary clarifiers, only two are used at a single time. ([Appendix B, Photographs 15 and 16](#)). Facility representatives stated that a vac-truck comes in once or twice a week to suck out any accumulated sediment and takes it to Holtz Impoundment. It was further explained that Friday and Saturday dayshift are used for cleaning the weirs on the Industrial side clarifiers, and Friday and Saturday nightshift are used for cleaning the weirs on the Municipal side clarifiers.

Following secondary clarification, the Industrial side flow meets the treated Municipal side flow and exits to the river through Outfall 001, without any additional disinfection. Facility representatives explained that between the clarifiers, the high pH generated by the equalization tanks, and the aeration basin settling out the pH, additional disinfection was found to be unnecessary. The Municipal side of the Facility uses chlorine as a disinfection method.

The Inspection then continued with a walk-through of the Municipal side of the Facility,

beginning with the headworks. The headworks consisted of a mechanical bar screen, a lift pump, and two vortex-type grit chambers, as seen on the Industrial side, with all collected grit being screwed up and placed in an adjacent dumpster. During the Inspection, Facility representatives stated that the installation of a mechanical bar screen has significantly reduced bypass events and that the city comes weekly to empty the dumpsters (Appendix B, Photographs 17 and 18).

Flow then leaves the grit chambers where it comes together, before separating into one of the two primary clarifiers. During the inspection, it was also explained that grit will settle at the bottom of these clarifiers where it will then get pumped to the head tank and mixed with lime to form sludge before it goes through a pipe to DOW and is taken to Holtz Impoundment. This is also true for the industrial's primary clarifiers. Facility representatives explained that sludge sampling is taken at the head tank, after everything has been mixed with lime (Appendix B, Photographs 19 and 20).

From primary clarification, flow moves towards the aeration basin. Facility representatives explained that the aeration basin is equipped with blowers that run on a timer of two (2) hours on, three (3) hours off. When asked for the reasoning behind this schedule, Facility representatives stated that due to the municipal waste having maintained a desirable level of dissolved oxygen with three hours off, coupled with the municipal influent bringing in fewer pollutants, the blowers on the Municipal side do not need to run as frequently. (Appendix B, Photograph 21). The blowers were off at the time of the inspection. Facility Representatives explained that while the Municipal side technically has a second aeration basin, the Facility utilizes it as an overflow tank during heavy storms and high flow, allowing them to gradually feed flow back and avoid overloading the system (Appendix B, Photograph 22).

Once over the weirs of the aeration basin, flow moves towards secondary clarification (Appendix B, Photograph 23). It was explained that the Facility aims to keep the sludge blanket in the secondary clarifier on the Municipal side between two (2) and four (4) feet. The sludge blanket on the Industrial side, however, is maintained between one (1) and two (2) feet due to its fluctuating flow.

To finish the Facility walk-through, the EPA Inspection Team observed the chlorine-contact chamber where sodium-hydroxide is used as the chlorine agent and sodium-bisulfite is used as the dichlorination agent. Facility representatives explained that the trickle-feed chlorine is automated based on flow and residual (Appendix B, Photograph 24). It is a continuous flow out of the contact chamber. At the time of the inspection, Facility representatives explained that the Facility has an additional chlorine contact chamber, but only one is used at a time, with the other one being used during cleaning or maintenance. Facility representatives stated that total residual chlorine (TRC) samples are taken a minimum of three times a day (Appendix B, Photographs 25-28).

III. Observations

The following section summarizes the EPA Inspection Team's observations relative to the Facility's Permit requirements, including the status of certain treatment units, operation and maintenance practices, and the Facility's monitoring and reporting documentation.

Effluent Limitations and Monitoring Requirements

Requirement:

Part A.001 of the Permit outlines discharge limitations and monitoring requirements for the Facility's permitted point of discharge, Outlet 001.

Part A.002 of the Permit outlines stormwater limitations and monitoring requirements for Outlet 002.

Part A.003 of the Permit outlines stormwater limitations and monitoring requirements for Outlet 003.

Part A.101 of the Permit outlines discharge limitations and monitoring requirements for Outlet 101.

Part A.201 of the Permit outlines discharge limitations and monitoring requirements for Outlet 201.

Observation #1:

Based on the Discharge Monitoring Reports (DMRs) provided by the Facility, the Facility has experienced thirty-eight effluent exceedances from January 2019 to the present. The parameters exceeded include biological oxygen demand, 5-day (BOD5), bromoform, toxicity -Ceriodaphnia chronic, and total fecal coliform.

Based on the DMRs provided by the Facility, eight (8) of these exceedances came from daily maximum violations of fecal coliform from Outlet 003, six (6) came from daily maximum violations of fecal coliform from Outlet 002, one (1) came from Outlet 201, and the rest of the twenty-three (23) exceedances came from Outlet 001. These exceedances are outlined in detail in Appendix C.

Toxicity Testing

Requirement:

Part C.08 of the Permit requires that the permittee conduct chronic toxicity tests, quarterly for Ceriodaphnia dubia and semiannually for Pimephales promelas on the effluent from Outlet No. 001

Observation #2:

In review of the Facility's eDMR data from January 2019 through June 2022, the Facility has been reporting Ceriodaphnia dubia and Pimephales promelas chronic toxicity results as required by the Permit. The chronic toxicity results from the January 2021 sample were above the Facility's permitted limit. The Facility sent notification as required and conducted resampling. The resampled results also came back above the toxicity limit. The Facility's sample from June 2021 was observed to be within their limit. There were no exceedances observed for Pimephales promelas chronic toxicity testing.

Stormwater Benchmark Monitoring

Requirement:

Part C.10 outlines the benchmark monitoring requirements for stormwater Outlets 002, 003, 004, and 007.

Observation #3:

At the time of the inspection, Facility representatives stated that benchmark monitoring is only being done for Outlets 002 and 003 as these outfalls experience high fecal coliform levels due to a frequenting geese population. Outlets 004 and 007 no longer require sampling since samples fell within benchmark limits for four consecutive months (Appendix B, Photographs 29 and 30).

Stormwater Pollution Prevention Plan (SWPPP)

Requirement:

Part C.13 of the Permit states, “The permittee shall continue to implement a storm water pollution prevention plan (SWPPP) for the site. The SWPPP shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with the activity. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with the activity at the facility and to assure compliance with the terms and conditions of this permit. A copy of the plan shall be retained at the site for review upon request.”

Observation #4:

An updated SWPPP is kept onsite and was provided to EPA electronically following the Inspection. The Facility’s SWPPP can be found in Appendix D.

Observation #5

During the Inspection, the EPA Inspection Team observed unopened bags of urea housed near the clarifiers. Facility Representatives stated that they’ll feed the clarifiers urea to help digest ammonia. The amount they add is dependent on the most recent lab results. The use of urea is not identified in the Facility’s SWPPP (Appendix B, Photograph 31).

Inflow and Infiltration

Requirement:

Part C.22 of the Permit states, “The City of South Charleston, Sanitary Board, shall continue to implement a program to identify and eliminate sources of inflow and infiltration. A written progress report shall be provided on a quarterly basis, as an attachment to the Discharge Monitoring Report, detailing what has been performed in relation to the implementation and accomplishments of the inflow and infiltration elimination program.

Failure of the permittee to comply with this requirement shall result in subsequent administrative and/or legal action, as may be necessary in order to obtain the compliance sought herein.”

Observation #6:

Based on information cited in WVDEP’s March 2021 Inspection Report, as well as through review of the Facility’s eDMR data from March 2021 through July 2021, the Facility has not been submitting I/I reports as attachments to its DMR. At the time of the Inspection, the Chief Operators stated that the submission of I/I reports is the responsibility of the City of South Charleston Sanitary Board and could not speak to the submission of these reports.

Sewage Sludge Management Reports

Requirement:

Permit Part D.1 requires the Permittee to monitor and report monthly on a Sewage Sludge Management Report form which includes the quantity and quality of sewage sludge produced.

Permit Part D.3 requires the Permittee to submit a Sewage Sludge Monitoring Report form semiannually.

Observation #7:

In review of the Facility’s eDMR data from January 2019 through July 2022, the Facility has been submitting both sludge management and sludge monitoring reports, as required by the Permit. According to the submitted reports, the Facility has not sent any loads to the landfill with under 20% solids.

Operation and Maintenance

Requirement:

Part II.1 of the Permit states, “The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit.”

Observation #8

The EPA Inspection team observed an orange substance floating through the Industrial side grit chamber and into the clarifiers ([Appendix B, Photograph 32](#)). Facility representatives stated the orange substance was limescale coming from DOW Chemical Co. and that it was a re-occurring problem for this Facility. Facility representatives stated that the clarifiers are skimmed monthly, cleaned once a year, and given an acid wash every four and a half years to help combat this problem.

Observation #9

At the time of the inspection, there was orange limescale observed throughout the aeration basin (Appendix B, Photograph 33). Facility Representatives informed the EPA Inspection Team that filter bags were placed prior to flow going towards the secondary clarifiers, as a precautionary measure to prevent limescale from reaching the secondary clarifiers.

Observation #10:

During the inspection, the baffle wall of the Industrial aeration basin was observed to be rusting and breaking off in multiple areas (Appendix B, Photograph 34). Scum and algae were observed to be growing in different areas along the basin weir (Appendix B, Photographs 35 and 36).

Observation #11:

At the time of the inspection, there were visible solids observed to be flowing over the Industrial side's secondary clarifier weir. Facility representatives stated that for the Industrial side of the Facility, there is no additional form of disinfection following secondary clarification (Appendix B, Photograph 39).

Observation #12:

The Municipal side's aeration basin was observed to have a moderate amount of sediment escaping the weirs. The MLSS leaving the aeration basin was observed to be light brown in color and with little clarity (Appendix B, Photograph 38).

Observation #13

The Municipal side's secondary clarifier was observed to be overloaded with solids and pin-floc observed to be flowing over the clarifier weirs. (Appendix B, Photograph 39 and 40). The Facility informed the EPA Inspection Team that the secondary clarifier struggles with solid accumulation and that the Facility is considering using the vac-truck on the secondary clarifier.

Observation #14:

During the inspection, the EPA Inspection Team observed algae to be growing in the Municipal side's overflow tank (Appendix B, Photograph 41).

IV. Records Review

The EPA Inspection Team conducted a records review to evaluate the Facility's compliance with the Permit. Most of the records and reports required by the Permit were available for review onsite and after the inspection. The Facility's electronic Discharge Monitoring Reports (eDMRs) were obtained electronically and reviewed offsite after the onsite inspection. The Facility had copies of these reports, as well as all its required attachments, onsite and housed in

binders according to year. The following records were reviewed:

- The Facility Permit;
- eDMR data during the period of April 01, 2019, through March 31, 2022;
- Sewage Sludge Management Records (April 01, 2019, through March 31, 2022);
- Sewage Sludge Monitoring Records (April 01, 2019 through March 31, 2022);
- and the Stormwater Pollution Prevention Plan (SWPPP).

V. Closing Conference

At the conclusion of the onsite inspection, the EPA Inspection Team conducted a closing conference with the site representatives and shared preliminary observations. The EPA Inspection Team reiterated to the site representatives that all preliminary observations discussed were not compliance determinations. Any and all preliminary observations shared were subject to further investigation by EPA upon the additional review of records and documentation. Additional observations may be contained in this inspection report that were not identified at the time of the closing conference after EPA reviewed additional materials following the inspection. The inspection concluded at approximately 1:00 PM (EDT).