



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES

Johnson City Environmental Field Office
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July 15, 2024

The Honorable Dennis Deal
Mayor
e-copy: mayor@churchhilltn.gov
City of Church Hill
PO Box 366
Church Hill, Tennessee 37642

RE: **Notice of Violation**
Compliance Evaluation Inspection (CEI)
Sanitary Sewer Overflow Non-Sampling Inspection (SSO)
City of Church Hill Wastewater Treatment Plant (WWTP)
NPDES Permit #TN0021253
Hawkins County

Dear Mayor Deal,

On June 11, 2024 Ms. Brianne Begley, Mr. Corey Click, Ms. Sandra Vance, and Mr. Zachary Porter of the Tennessee Department of Environment and Conservation, Division of Water Resources (the division), performed a routine compliance inspection at the above referenced facility to evaluate compliance with National Pollutant Discharge Elimination System (NPDES) permit TN0021253. The division would like to thank Mr. Jerry Simpson, Mr. Ken Johnson, and Mr. Kenny Light for their time and assistance during the inspection. Please see sections below for details regarding the inspection.

I. Permit

NPDES permit TN0021253 was recently reissued on May 17, 2024 with an effective date of June 1, 2024 and is set to expire on May 31, 2029. The previous permit had an effective date of June 1, 2019 and expired on May 31, 2024. The current and previous permits authorize the discharge of treated domestic, commercial, and industrial wastewater from Outfall 001 to the Holston River at mile 136.5. Since the inspection focused on records covered under the effective date of the now expired permit, references in this report will be to sections in the previous permit. Based on field observations made during the inspection, the permit generally appeared to be consistent with the facility operations.

II. Records/Reports

Various records and logbooks were evaluated as part of the inspection including: laboratory bench sheet records from November 2022, August 2023, and April 2024; monthly operation reports (MORs) from November 2022, August 2023, and April 2024; discharge monitoring reports (DMRs) and MyTDEC Forms SewerOverflow/Release/Bypass/Upset Event Reports from the period of March 2022 – April 2024; laboratory equipment calibration/certification records from 2022 – 2024; biosolids records from August 2023; and pump station logs from July 2023-June 2024 were reviewed. Part 1.0 of NPDES permit TN0021253 contains monitoring, reporting, and documentation requirements. In addition, records documenting laboratory analyses, including proper quality assurance and quality control (QA/QC), must be maintained to satisfy permit parts 1.2.3. and 2.1.4. Deficiencies pertaining to applicable requirements are noted in other pertinent areas of this report or are discussed below.

1. Part 1.2.4. of NPDES permit TN0021253 details requirements the permittee must document with each measurement or sample taken. In addition, Part 1.2.3. of the permit requires pollutant analyses be performed in accordance with methods specified in Title 40 CFR Part 136. Based on review of laboratory bench sheets from November 2022, August 2023, and April 2024, some of the required information was incorrect or missing. The bench sheets documenting the pH, dissolved oxygen (DO), total suspended solids (TSS), and settleable solids (SS) results contained analyses method numbers that included the editorial revision date of 2017. In addition, the bench sheets reviewed documenting the carbonaceous biochemical oxygen demand (CBOD₅) results did not contain an editorial revision date. It should also be noted the pH method appears to be “STD Method#4500H-G 2017”, which is incorrect. Church Hill must revise analysis method numbers (including the correct editorial revision date) to match the approved method version as listed in 40 CFR Part 136. Please note that recent updates to 40 CFR Part 136 became effective June 17, 2024.
2. Part 1.0 of NPDES permit TN0021253 details monitoring and reporting requirements. Based on documentation reviewed during the inspection, there were a few instances observed of results not reported or seem to be reported incorrectly on the August 2023 MOR. The influent and effluent TSS results from 8/10/2023 are not on the MOR. The influent TSS result from 8/3/2023 seems to be calculated incorrectly and does not match the reported value on the MOR. In addition, the influent ammonia results are not recorded on the MOR from 8/28 – 8/30/2023. Church Hill must review this documentation and revise and resubmit as necessary.
3. The April 2024 Daily Flow Sheet had no initials or times recorded for the influent or effluent flows. Per NPDES permit part 1.2.4.e., “For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: a. The exact place, date and time of sampling or measurements; b. The exact person(s) collecting samples or measurements.”

III. Facility Site Review, Self-Compliance Program, and Operations & Maintenance and Sanitary Sewer Overflows

A walk-through evaluation of the WWTP, evaluation of sampling, and evaluation of the collection system were performed.

- A. Facility Site Review, Self-Compliance Program, and Operations & Maintenance

Parts 1.2.1., 2.1.4., and 2.3.6. of the NPDES permit contain requirements for representative sampling, proper operation and maintenance of facilities and systems, and prohibition of bypasses, respectively. The following deficiencies were noted.

1. The recycle pump for the reclaimed water was inoperable since the shaft was broken. This prevents effective sludge management since the belt filter press must use reclaimed water due to City water not having enough pressure for the press. The pump has been repaired three times in the past three years. A VFD drive is planned to be installed. Per NPDES permit part 2.1.4.a., “The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit.” The recycle pump must be placed back into operation for effective sludge management. Per WWTP personnel, the pump is planned to be repaired the week of June 11, 2024.
2. A time paced sample was being collected every hour by the effluent composite sampler. Effluent composite samples must be proportioned by flow. Also, the composite sampler had two thermometers that showed a temperature of 10^o Celsius. Per NPDES permit part 1.2.1., “Samples and measurements taken in compliance with the monitoring requirements specified above shall be representative of the volume and nature of the monitored discharge.... The sample aliquots must be maintained at ≤ 6 degrees Celsius during the compositing period.” and part 1.2.3. c., “Composite samples must be proportioned by flow at time of sampling....” The wire is broken between the effluent flow meter and the sampler. The division acknowledges that the distance between the flow meter and sampler is lengthy. Also, frost on the refrigerator coils indicated the defrost function was not working in the unit. However, the effluent composite sampler must collect a flow-proportioned sample and the temperature maintained at ≤ 6^o Celsius to meet permit requirements. Please be advised that this was noted in the previous January 19, 2023 inspection report. The City’s February 10, 2023 response stated, “In reference to Part III: 2. The samplers have been changed to flow sampling instead of time.”
3. The effluent composite sample was being collected at a manhole that receives the oxidation ditch flow. Per NPDES permit part 1.2.1., “Effluent samples must be representative of the wastewater being discharged and collected prior to mixing with any other discharge or the receiving stream. This can be a different point for different parameters but must be after all treatment for that parameter or all expected change.” The CBOD and ammonia as N effluent samples must be collected after all treatment. As referenced in section III.A.2. above, this was noted in the previous January 19, 2023 inspection report. The City’s February 10, 2023 response stated, “In reference to Part III: 3. The effluent sampler’s location is in the process of being moved after the UV disinfection process.” Per WWTP personnel, the sampler is planned to be moved to the effluent flow location.
4. A time paced sample was being collected every hour by the influent composite sampler. Also, sampler tubing had debris in it. Influent composite samples must be proportioned by flow and sampler tubing must not have debris so a representative sample can be collected. Please note the regulatory references in section III.A.2. above. Additionally, at the time of inspection, both the influent ISCO 5800 and the effluent ISCO 4700 composite sampler screens were flashing a warning to change sample tubing. The division recommends the tubing be replaced on a

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monthly basis (or more frequently if signs of algal and/or bacterial growth are present) in order to ensure a representative sample collection in compliance with TN0021253 Part 1.2.1. See section III.A. item 4. above for associated deficiency.

5. The HACH SC200 dissolved oxygen (DO) meter screen at the oxidation ditch had “FAIL!” on the screen. Per WWTP personnel the probe has to be programmed and the DO is being manually checked with a DO meter. To ensure continual operation of the oxidation ditch, the DO probe must be functioning. Please note the regulatory reference in section III.A.1. above.
6. Clarifier no. 2 had noticeable brown pin floc and approximately half of the wastewater surface was covered with brown pin floc. The scum arm had difficulty skimming off all surface solids due to high flows entering the clarifier. This is indicative of solids/sludge not being properly managed in the WWTP partly due to the inoperable recycle pump (reclaimed water)/belt filter press issue. Please note section III.A.1. above about this issue. Also, note the regulatory reference in the same section.
7. Per WWTP personnel, the vac truck can suction liquid/solid material well. However, the truck has difficulty with jetting sewer lines. The vac truck must be made operational so it can effectively clear sewer lines. An inoperable vac truck can affect the operation of the collection system since sewer lines cannot be cleared of blockages. Please note section III.A.1. above for the regulatory reference.
8. Church Hill personnel was observed collecting influent and effluent grab samples at the time of inspection. Each grab sample was collected using a plastic cup attached to a PVC pipe that was stored outside at each location. Personnel stated they take the collection devices inside and wash them approximately once each week. Grab sample collection containers must be cleaned after each use in order to ensure a representative sample in accordance with TN0021253 Part 1.2.1.

B. Sanitary Sewer Overflows

Parts 1.3.5., 2.3.2., and 2.3.6. of the permit contain requirements for the reporting of overflows and bypasses. Facility DMRs and MyTDEC Forms reports for the period of March 2022 – April 2024 were reviewed. Eighteen pump stations in the collection system were visited during the inspection. The following deficiencies were noted. Also, please see a comment related to this program area in section VIII.

1. According to documents submitted through MyTDEC Forms and DMRs for the period of March 2022 – April 2024, six (6) overflows, two (2) releases, and three (3) bypasses were reported. As detailed in Parts 2.3.3. and 2.3.6. of NPDES permit TN0021253, overflows, releases, and bypasses are prohibited. Also, NPDES permit part 2.1.4. requires proper operation and maintenance of all facilities and systems (and related appurtenances) for collection and treatment.

2. The following pump station deficiencies were noted during the inspection. Note that these items must be addressed to ensure compliance with NPDES permit part 2.1.4. requirements for proper operation and maintenance of facilities and systems.
 - a. The Dorton's pump station's pump no. 2 was not in operation due to a burned-out float ball switch. The contact for the switch will be replaced. The float ball switches had grease on them. Also, the wet well does not have a lock.
 - b. The Vesta pump station's pump no. 1 was not in the tank.
 - c. The Old Union pump station's pump no. 1 was inoperable. The telemetry for the station is not good.
 - d. The Carters Valley pump station's float ball switch was not in operation.
 - e. The pump station at Indian Ridge had only one pump in operation. Also, the visual alarm and telemetry were not functional.
 - f. The Minors pump station's float ball switches needed to be cleaned. Also, the audible alarm was not functional, and the tank door's lock was twisted.
 - g. The Holliston Mills pump station's high-water alarm was not activating the alarm but starts pump no. 2. The visual and audible alarms are not functional. Also, the valve pit was full of rain water.
 - h. The Robin Hood pump station's pump no. 2 was inoperable. Also, the audible alarm was not functional.
 - i. The Hoffman pump station's visual and audible alarms were not functional. Also, the control panel door was not locked.
 - j. The Greenland pump station had an excess of grease buildup around float ball switches.
 - k. The Seavers pump station alarms did not respond to float ball switches testing.

IV. Effluent/Receiving Waters

The treatment plant effluent and the receiving stream, the Holston River at mile 136.5, were observed during the inspection. Both the effluent and receiving stream were observed to be clear with no visible foam, solids, sheen, or odor on June 11, 2024. Signage required by Part 3.5. of NPDES permit TN0021253 was present at the outfall. No deficiencies were noted in this program area.

V. Flow Measurement

Parts 1.1 and 1.3. of NPDES permit TN0021253 require continuous flow measurement for Outfall 001 to be monitored and recorded daily. Flow measurement is continuous with ultrasonic level meters at the influent and effluent 9” Parshall flumes. Flow metering system calibration records performed by FC^x Services from 2022 – 2024 were available for review. No deficiencies were noted in this program area.

VI. Laboratory

Part 1.2.3. of NPDES permit TN0021253 requires pollutant analyses be performed in accordance with methods specified in Title 40 CFR Part 136; and Part 2.1.4. requires additional laboratory controls and appropriate quality assurance procedures. Routine updates to Part 136 became effective June 17, 2024. The division has prepared guidance documents regarding appropriate QA/QC for several common analyses. The current guidance documents are available online at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/fleming-training-center/resource-center.html#tabtop-49ed96baa5084b09b1997a473e49545b-1> (Note: Click on “Operators” then “Wastewater Treatment Information”)

Pace Analytical performs permit required laboratory analysis for total nitrogen, total phosphorus, total ammonia nitrogen (as N), and the Static 48-Hour Acute Toxicity (using *Ceriodaphnia dubia* and *Pimephales promelas*) testing. Church Hill WWTP personnel perform all other permit required analyses on site. Laboratory analyses performed onsite were observed. The following deficiencies were noted in this program area.

1. The pH buffer 10 solution was observed to be expired as of November 2023. Chapter 7, Part C. of the United States Environmental Protection Agency *NPDES Compliance Inspection Manual* (EPA 305-K-17-001, Interim Revised Version, January 2017) requires laboratory personnel to discard standards and reagents after recommended shelf-life has expired.
2. Church Hill STP lab personnel do not analyze an initial or continuing calibration verification (ICV/CCV) with each batch of pH sample analyses. TN0021253 Part 1.2.3. requires the permittee to use methods in accordance with Title 40 CFR Part 136, and *Standard Methods for the Examination of Water and Wastewater* (SM) 4020 B.1. and Table 4020:I. requires additional QC checks with a pH standard whose value is bracketed by calibration standards.
3. Church Hill STP lab personnel stated that seed is not utilized in the CBOD₅ test. Bench sheets reviewed during the inspection also show that seed is not utilized in the CBOD₅ test. SM 5210-2016 B.5.e. states “seed all samples to which nitrification inhibitor has been added.” Note that the Church Hill lab will also need to begin setting up seed control bottles and calculate the associated seed correction factor to be incorporated into the final CBOD₅ calculation.
4. Church Hill STP lab personnel stated that during CBOD₅ set-up, the order of operations is as follows: nitrification inhibitor is added to the BOD bottle first, nutrient pillow contents added next, followed by the influent or effluent sample, and lastly the bottle is filled with dilution water. SM 5210-2016 B.5.c.2) requires the lab to first fill the BOD bottle approximately two-thirds full with dilution water and/or sample, add seed suspension, nitrification inhibitor, and then fill the remainder of the BOD bottle with dilution water. The order of operations as laid out in SM must

be followed to produce valid NPDES data and prevent any negative impact to the microorganism population, which must be present to oxidize biodegradable organic matter in the sample.

5. The LDO probes used in the CBOD analysis were calibrated using water saturated air, however a dissolved oxygen table was not consulted and neither an ICV nor CCV, as required by 40 CFR 136.7, were performed. As stated above, NPDES permit TN0021253 part 2.1.3. requires the permittee to conduct adequate laboratory controls and QA/QC procedures and part 1.2.3. states parameters must be determined following methods in Title 40 CFR part 136.
6. Based on CBOD₅ bench sheets provided for review, there were numerous occasions in November 2022, August 2023, and April 2024 when effluent samples did not deplete at least 2.0 mg/L. According to SM 5210-2016 B.6.a., "...[o]nly bottles...whose DO depletion is ≥ 2.0 mg/L and residual DO is ≥ 1.0 mg/L after 5 d of incubation are considered to produce valid data..." These failures in QC acceptance criteria were not noted on the November 2022, August 2023, or April 2024 DMRs or MORs submitted to the division.
7. Based on laboratory equipment calibration records available for review, it appears the working weights used to check the balance were last calibrated in 2016. According to Table 9020:I in SM 9020-2015 B. working weights should be recertified with reference weights annually.
8. The April 25, 2024 CBOD₅ bench sheet indicated the dilution water blanks depleted more than 0.2 mg/L. SM 5210-2016 B.6.c. details that the dilution water quality check must not exceed 0.2 mg/L.

VII. Sludge Handling/Disposal (or Biosolids Handling/Disposal)

Parts 1.1 and 3.3. of NPDES permit TN0021253 contain requirements for sludge and/or biosolids management practices. The sludge handling/disposal practices at the WWTP were observed during the inspection. Two aerobic digesters and a belt filter press are used to process the sludge. According to Mr. Simpson and August 2023 sludge disposal records, biosolids are land applied. The following deficiency was noted in this program area.

1. According to NPDES permit TN0021253 Part 3.3. "[a]ny facility that land applies non-exceptional quality biosolids must obtain an appropriate permit from the division in accordance with Chapter 0400-40-15." According to documentation reviewed during the inspection, 9 tons of sludge was hauled to a land application site described as the Davis Farm in Carters Valley on August 23, 2023. However, based on available documentation, it appears Church Hill's biosolids state operating permit (SOP) (TNB021253) expired on August 15, 2019. Church Hill must obtain an appropriate permit to land apply non-exceptional quality biosolids.
2. A secondary clarifier is being used as digester since sludge cannot be processed by the belt filter press The recycle pump (reclaimed water) is not operating. Please reference section III.A.1. above. The WWTP sludge must be managed properly to prevent the WWTP from improperly operating. Please note the regulatory reference in section III.A.1. above.

VIII. Additional Comments and Recommendations

Miscellaneous additional comments and recommendations noted during the inspection are discussed below. The following items were not considered violations of permit requirements at the time of the inspection but may become so in the future if they are not addressed.

1. Flow measurement documentation from November 2022, August 2023, and April 2024 was reviewed during the inspection. There were some discrepancies observed between the August 2023 MOR and a flow measurement bench sheet. The influent flows from 8/8 – 8/11 2023 and the influent and effluent flow from 8/31/2023 differed from the MOR and the bench sheet. Please review this information and revise the MOR as necessary. The division recommends that at least a couple of people review documentation reported on MORs and DMRs to avoid potential errors.
2. As noted in section III.B.1 above, Church Hill self reported several overflow events. Most of these events were properly documented and reported as required by NPDES permit TN0021253. However, the August 2023 DMR documents a wet weather overflow, while there are documents of events from August 2023 available on MyTDEC Forms showing two dry weather releases and a bypass, there is no documentation showing a wet weather overflow report from August 2023 in MyTDEC Forms. Church Hill personnel corrected the August 2023 DMR and MyTDEC Forms submissions prior to issuance of this report.
3. One of the two influent screens was in operation. Screen no. 2 was not in operation since a bearing went out. The screen was being repaired during the inspection. Screen no. 1 is planned to be rebuilt (new cogs/bearings) after repairs on screen no. 2 are complete. Also new cutoff valves have been installed on the lines to the screens. The division strongly recommends that screen no. 1 be refurbished to prevent operation failures.
4. The influent Ultrasonic Flow/Level Meter screen was blank. Please verify if the screen is operable.
5. The no. 1 aerobic digester blower was not in operation since a bearing went out in it. The blower was sent off for repair one week ago.
6. Vegetation was observed on the rotor covers in the oxidation ditch. WWTP personnel indicated that the plants have been sprayed. Vegetation was also on the inner baffle and scum arm of clarifier no. 2. The division recommends controlling/removing the vegetation to prevent it from affecting operation in the future.
7. A noise from “brush” (rotor) no.2 in the oxidation ditch was indicative of a loose blade per WWTP personnel. The division recommends checking the blade to prevent operational difficulty of the “brush” (rotor).
8. In the WWTP’s electric room (has eight (8) VFD drives), the incoming main breaker panel door was open. Per WWTP personnel, there is concern the breaker will not function if the breaker is cut off and the door is closed. Also, WWTP personnel indicated an electrician needs to check on the breaker. The division strongly recommends having the breaker checked/repared to prevent a possible shutdown of the WWTP. Please provide an update on the breaker issue.

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9. Both return activated sludge (RAS) meters for the secondary clarifiers do not work. Per WWTP personnel, the sludge volume index operation test is used to indicate the RAS rate. Telescopic valves are used to manually adjust the RAS rate. The city should check the meters to see if they can be made operational. This would assist the operation of the WWTP.
10. The Trojan system UV 3000 B screen was blinking. One bank of lights was in operation, and new lights/sleeves were available for the other bank on the ultraviolet disinfection system. Per WWTP personnel, the electronics for the system are obsolete. The lab photometer is used to measure the UV penetration. The division strongly recommends the City prepare a plan to address the obsolete electronics to prevent disinfection issues if the system fails.
11. The April 2024 Lab Equipment Temperature & Calibration Log had no times recorded for the calibrations or when lab equipment temperatures were checked. The division recommends recording the times of calibrations and temperature checks.
12. Lab personnel were observed marking incorrect times on the bench sheet and advised to strike through the error and write the correct time above it, along with their initials and the date. The analyst stated they would prefer to re-write the bench sheet at a later time in order for it to look neat. The division strongly advises against the practice of re-writing analysis information as this increases the chances of transcription errors. Chapter 7, part D, of the United States Environmental Protection Agency *NPDES Compliance Inspection Manual* (EPA 305-K-17-001, Interim Revised Version, January 2017) requires laboratory personnel to “Define procedures for correction of data entry errors. Original data entries can be read and the individual(s) making the corrections are clearly identified.” The division recommends that analysts strike through an error with a single line and write the correction directly beside it, along with the analyst’s initials and the date of the correction.
13. At the time of inspection, lab personnel were observed setting up and reading Mallory settleometers as operational process control. After 30 minutes, the settleometers read 990 mL and 970 mL for the oxidation ditch and return activated sludge samples. These results are indicative of a heavy solids load in the plant which would prevent solids from settling properly in the secondary clarifier. See section III.A. items 1. and 6., as well as section VII. item 2. above, which are directly related to these lab results.
14. Lab personnel were observed opening and closing the drying oven door multiple times to add processed TSS filters individually, which resulted in the oven temperature dropping to 100°C by the time the last filter was added. The division recommends analysts add all filters at the same time to reduce the likelihood of the oven temperature falling outside of the required range of 103-105°C per SM 2540-2015 D.3.
15. While demonstrations of capability (DOC) were present, many of the forms lacked necessary information such as what concentration of standards had been used during the DOC, or the time of sample analyses. Title 40 CFR 136.7. requires DOCs for each analyst and Chapter 7, part C, of the United States Environmental Protection Agency *NPDES Compliance Inspection Manual* (EPA 305-K-17-001, Interim Revised Version, January 2017) requires enough information be included in the DOC to demonstrate that the laboratory personnel followed analytical methods specified in

the most current 40 CFR 136. Also please note the NPDES permit regulatory reference in section VI.2.above.

16. Some zeros (0s) were noted as reported on some instances for the effluent SS results on laboratory bench sheets and MORS reviewed. According to SM 2540-2015 F.b. the Imhoff cone usually has a practical lower measurement limit between 0.1 and 1.0 mL/L. Church Hill should check their Imhoff cone and note the lowest concentration it can read. If results are lower than the lowest concentration, it would be more appropriate to note the result with a < indicator, such as < 0.1 mL/L, instead of using a 0.

IX. Conclusion

Compliance with NPDES permit TN0021253 requirements helps ensure discharges that are protective of downstream fish and aquatic life and water quality. The division requests that you develop and submit, by August 16, 2024, a detailed action plan and proposed implementation schedule addressing the numbered items discussed in sections II., III., VI., and VII. above. Please also provide the update requested in section VIII.8. above. Thank you for your efforts to ensure permit compliance and to protect state water quality. If you have questions concerning this report, please contact Mr. Corey Click at (423) 426-6477 or via email at Corey.Click@tn.gov, or Ms. Sandra Vance at (423) 218-5876 or via email at Sandra.Vance@tn.gov.

Sincerely,



Dane Cutshaw
TDEC-Environmental Manager
Division of Water Resources
Johnson City Environmental Field Office

cc: Ms. Sandy Renner, Certified Operator, City of Church Hill (via email)
Mr. Jerry Simpson, Operator, City of Church Hill WWTP (via email)
Mr. Corey Click, DWR Environmental Consultant I, Johnson City EFO (via email)
Ms. Sandra Vance, DWR Environmental Protection Specialist, Johnson City EFO (via email)
Mr. Zachary Porter, DWR Environmental Scientist, Johnson City EFO (via email)
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