INSPECTION REPORT

OF THE

LA VERGNE PUBLIC WATER SYSTEM
DRINKING WATER TREATMENT PLANT
LA VERGNE, TENNESSEE

By

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ENFORCEMENT AND COMPLIANCE ASSURANCE DIVISION
WATER ENFORCEMENT BRANCH
DRINKING WATER ENFORCEMENT SECTION

November 8 – November 10, 2021

Introduction

A Drinking Water inspection to evaluate compliance with the Safe Drinking Water Act (SDWA) was performed at the La Vergne Public Water System (PWS), PWS ID: TN0000386 in La Vergne, Tennessee on November 8 – 10, 2021. The inspection was conducted under the authority of Section 1445(b)(1) of the Safe Drinking Water Act (SDWA).

An entrance briefing was held on November 8, 2021 where U.S. Environmental Protection Agency (EPA) inspectors presented their credentials and discussed the purpose of the onsite inspection. Personnel from Tennessee Department of Environment and Conservation (TDEC) were also present at the time of the inspection. Following the briefing EPA, TDEC, and La Vergne PWS staff visited the intake, toured the two treatment trains, and observed the Supervisory Control and Data Acquisition (SCADA) system as well as laboratory procedures. PWS staff, EPA, and TDEC visited the distribution system assets and began document review on November 9, 2021.

On November 10, 2021, EPA inspectors completed the document review, and an exit briefing was conducted prior to departure. A preliminary list of observations was presented at the exit briefing.

Purpose

In FY20, the EPA began a National Compliance Initiative (NCI) with the goal of reducing noncompliance with drinking water standards at community water systems. One of the goals of the NCI is to support the Agency's Strategic Plan, which calls for a 25 percent reduction in the number of community water systems that are out of compliance with health-based standards by the end of FY 2022.

As part of the NCI, our Region has worked with each State Primacy Agency to identify, prioritize, and address a subset of community water systems with known, ongoing noncompliance with the federal SDWA.

La Vergne PWS had significant deficiencies found by the State in the past three sanitary surveys performed. The State addressed these issues via letter with a request for written response from the water system. As such, La Vergne was targeted for an inspection.

The PWS has worked with the State to address and correct these deficiencies and has had more favorable results on each subsequent sanitary survey in the past four years. During the inspection, EPA discussed the strategies the PWS used to correct issues from the previous sanitary surveys and steps taken to prevent these issues in the future.

Participants

La Vergne Public Water System:

Jeremy Buskus – Water Department Supervisor, City of La Vergne
Mike Dietz – Utilities Manager, City of La Vergne

Dwayne Lowry – East Region Senior Technical Manager, Inframark
Danny Campbell – Project Manager, Inframark

Tennessee Department of Environment and Conservation:
Thomas Killion – Environmental Scientist, Division of Water Resources
Ryley Hynes – Environmental Scientist, Division of Water Resources

EPA:
Rebecca Quiñones – Senior Enforcement Officer
Whitney Lehrer – Inspector in Training

Facility Description

La Vergne PWS is located at 700 Bon Aqua Drive, La Vergne, TN 37086. Inframark, a contractor for the City of La Vergne, is responsible for the operation and maintenance of the water treatment plant (WTP), flushing program, cross connection control program, distribution water quality sampling, and booster pump operation. They also serve as the first point of contact for customer complaints. The distribution system operation and maintenance, as well as booster station and tank maintenance, is conducted by the City of La Vergne. The City implements the valve exercise program, which was last completed in 2018. The system has 13,332 service connections and serves an estimated population of 36,396 persons. One metered and valved interconnection with the City of Smyrna is maintained for emergency use only. Designed to be able to produce 8.99 million gallons per day (MGD), the system typically processes 3.36 MGD, as of the most recent sanitary survey. The system is staffed and operated 24-hours per day, typically on 12-hour shifts. There is a total of 5.15 million gallons of storage in the distribution system, with an additional 1.45 million gallons of storage at the WTP. A generator onsite, which is tested every Wednesday, provides backup power in case of an emergency and is maintained by Thomson Cat.

The source water for the system is provided by J. Percy Priest Lake, which is managed by the U.S. Army Corps of Engineers. The reservoir is only used for recreation and has no homes located along the shoreline. Water is pumped from the reservoir through a thirty-inch pipe located eighteen feet below summer pool. The intake sits approximately 120 feet from the bank, and the area around the intake is fenced in with cameras on the property. Compressed air kept on site is used to clean the screens on the intake structure. Three high service pumps (HSPs) located at the intake can feed the source water to the treatment trains. One HSP operates at a time, while the other two pumps serve as redundancy.

The water treatment facility is comprised of two, virtually identical treatment trains, referred to as the New Plant and the Old Plant. The source water is pumped directly to the head of the treatment train at New Plant, where it is dosed with coagulant, sludge blanket aid polymer, and powder activated carbon (PAC). The flow is then split to the New Plant and the Old Plant via a splitter box. The water flows to the Superpulsator Solids Contact Clarifiers, two at each plant, to remove turbidity, color, TOC, and other contaminants. Each clarifier operates independently, creating redundancy for the system. The clarifiers are cleaned annually by the system. From there, the water moves through the Greenleaf cyclone filter unit, which is comprised of four

individual cells per unit made of twenty inches of anthracite, nine inches of sand, and three inches of torpedo sand. The filters are not connected to the SCADA system and are manually backwashed approximately every ninety-six hours. Once filtration has occurred, the water from the New Plant is recombined with water from the Old Plant that has been stored in a 450,000-gallon clearwell located underneath the Old Plant. As water is pumped to the 1 million-gallon clearwell, it is injected with chlorine, fluoride, and orthophosphate controlled by a dosing valve. The treated water is pumped to the distribution system from the 1 million-gallon clearwell by five HSPs. Two pumps are operated during the summer season, and only one during the winter season. Effluent from the treatment processes is managed in a lagoon onsite, which is cleaned monthly.

The Old Plant was constructed in 1990. Raw water and combined filter effluent turbidimeter sampling are done at this plant, as well as chlorine monitoring for water entering the 1 million-gallon clearwell and the distribution system. The raw water turbidity at 11:56 a.m. on November 8, 2021 measured 17.22 NTU. This facility houses Superpulsators 1 and 2 and Filters 1 – 4. Inspectors observed a backwash cycle of Filter 1, and following the backwash, a turbidity of 0.032 NTU was measured. The filters were replaced March 2021. The original 450,000-gallon clearwell is located beneath this plant and can be accessed through a hatch in the orthophosphate room at the plant. PWS staff stated that they do not open the clearwell hatch, so inspectors were unable to confirm if a sanitary seal is present around the perimeter of the hatch.

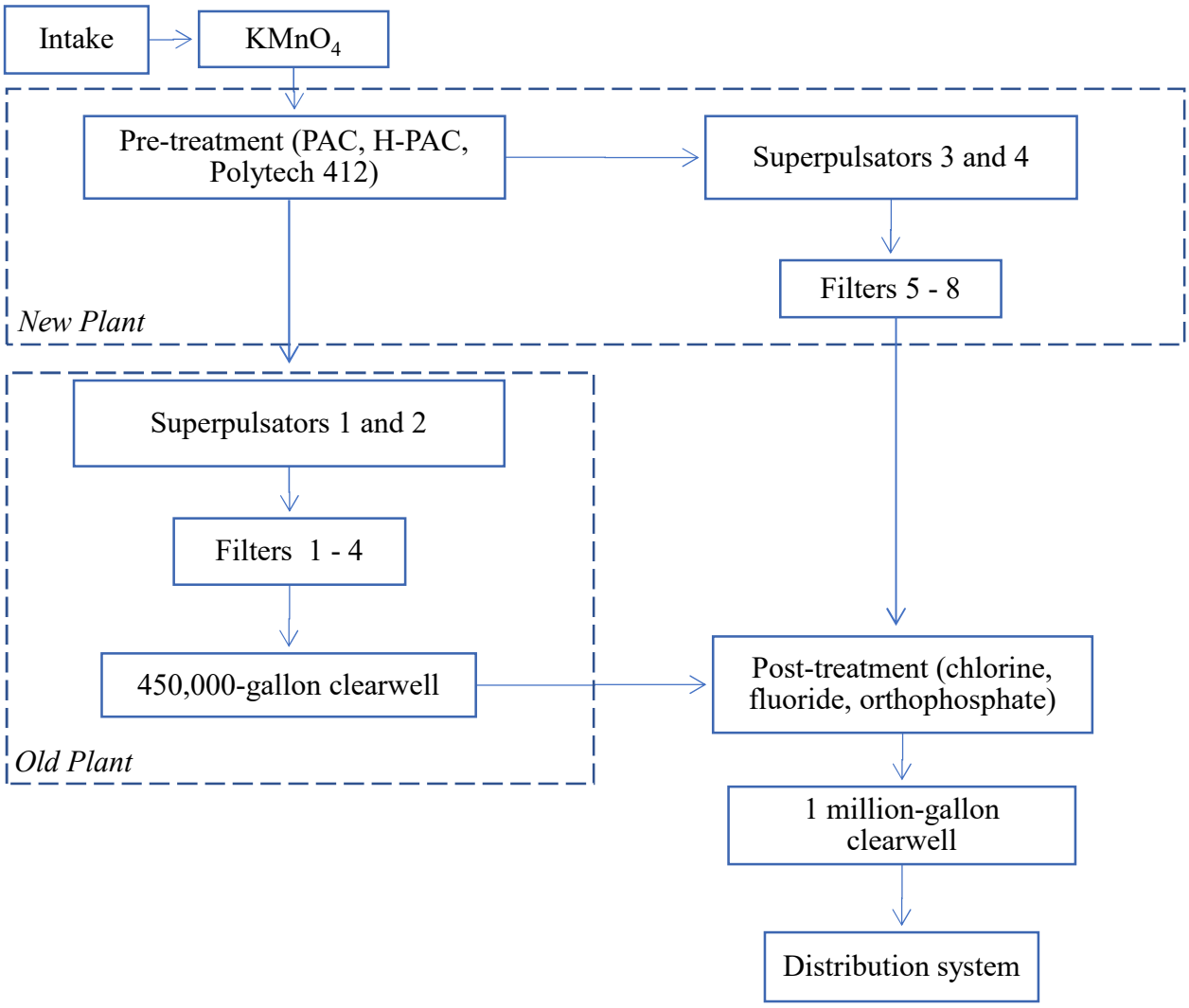
The New Plant was constructed in 2003. This facility houses Superpulsators 3 and 4 and Filters 5 - 8. The media in the filters was last replaced December 2020. At 11:29 a.m. on November 8, 2021, the turbidity at Filters 5, 6, 7, and 8 at the New Plant were 0.028 NTU, 0.050 NTU, 0.029 NTU, and 0.026 NTU, respectively.

The system also maintains limited use of a Pall Membrane unit, located in the Old Plant, to process water from the onsite lagoon. Water is decanted from the lagoon, dosed with chlorine to oxidize manganese, and run through the Pall unit. Solids are discharged to the sanitary sewer, and the finished water is combined with the finished water from the treatment trains. Use of the Pall Membrane unit is extremely limited based on lagoon water level, backwash cycle for filters, and other factors. The unit has not been used in two months, and the system is working with the State to pursue alternative options to reuse or discharge the lagoon water.

Potassium permanganate ($KMnO_4$), powdered activated carbon (PAC), Harcros 8323 (H-PAC), Polytech 412, sodium hypochlorite (chlorine), hydrofluosilicic acid, and orthophosphate are used during the treatment process. Bulk storage of potassium permanganate is housed in a separate room at the New Plant. It is batched to a day tank at the intake, where it is dosed by a peristaltic pump to manage high manganese levels in the raw water. PAC is housed in a separate room at the New Plant and is fed via a hopper to manage taste and odor issues. H-PAC acts as the coagulant, and the polymer Polytech 412 is the blanketing aid. Both are stored in day tanks at the New Plant. Sodium hypochlorite, the disinfecting agent used by the system, is held in a separate room at the Old Plant. The chlorine is stored in two bulk tanks and is divided into two day tanks for dosing via peristaltic pump. Hydrofluosilicic acid acts as the fluoridation agent. It is contained in a bulk storage tank and a day tank, located in a separate room at the Old Plant, and fed by peristaltic pump. For corrosion control, orthophosphate is fed by a peristaltic pump from a

day tank in a separate room at the Old Plant. The orthophosphate room also contains a bulk storage container for orthophosphate, citric acid for the clean-in-place protocol for the Pall Membrane, and the hatch to the 450,000-gallon clearwell.

The flow of water at La Vergne PWS as follows:



The functionality of the SCADA system was also observed while onsite. The system monitors pH on the SCADA, but also performs benchtop pH testing, as they do not rely on the SCADA for fully accurate reporting. Pump stations, rapid mixers, chemical feed rate, valve status, filter status, Superpulsator status, and clearwell levels are all monitored on the SCADA. The PWS also cycles the distribution system tanks from 95 percent to 75 percent using the SCADA to limit disinfection byproduct formation. The Pall Membrane unit is monitored on the SCADA system for oversight purposes. Currently, there are no alarms programed into the SCADA system that would call an operator if an issue occurred. Instead, a flashing alarm goes off in the administrative area of the Old Plant, which is staffed at all times.

The onsite laboratory is located at the Old Plant. The system has been certified to analyze

bacteriological samples for SM 9223B and has a dedicated laboratory space for testing. The system collects daily routine samples for turbidity, chlorine, combined filter effluent (CFE), individual filter effluent (IFE), pH, alkalinity, and hardness. Alkalinity, hardness, and pH are analyzed once per shift. The turbidity and pH meters are calibrated daily. The inspection team observed a laboratory staff member calibrate the pH meter and analyze a sample for pH and alkalinity at 3:53 p.m. on November 8. The resulting pH was 7.81 and alkalinity was 149 mg/L. All samples used for compliance monitoring are sent to Pace Analytical Laboratory, except for the in-house bacteriological testing.

The distribution system is comprised of four storage tanks with two booster pump stations. All tank sites were fenced-in, mowed, and had flaps on the overflow pipes. Sanders Concrete tank capacity is 2 million-gallons, Sanders Steel tank is 1 million-gallons, Sanford Knob is 2 million-gallons, and Lake Road/McFarlin is 150,000 gallons. The Sanders Concrete and Steel tanks are located at the same site in the distribution system. Sanders Steel tank was last painted approximately 5 years ago. Lake Road/McFarlin tank has a pH and chlorine analyzer onsite with results of 8.20 and 1.92 mg/L, respectively, at the time of the inspection.

The Mason Road booster pump station has four pumps available for use, but only two pumps maximum are run at a time. Two HSPs are located at the Waldron Road pump station. The chlorine analyzer onsite read 0.47 mg/L at the time of the inspection. The system stated that chlorine analyzer reading is based on the stagnant water in the pumps, not the true residual, since they have not been used since October 25, 2021. Lake Road pump station houses two HSPs. The booster pump stations have generators onsite that are tested weekly, and all are fenced in.

EPA inspectors visited the following sections of the PWS:

- Intake
- WTP #1 (Old Plant)
- WTP #2 (New Plant)
- Sanders Concrete tank
- Sanders Steel tank
- Sanford Knob tank
- Lake Road/McFarlin tank
- Mason Road pump station
- Waldron Road pump station
- Lake Road pump station

Personnel

Two Grade IV Certified Water Operators and Maintenance Technicians operate the WTPs. One operator is Grade II Distribution System Operator certified. Multiple operators are trained and certified to perform bacteriological testing and in-house laboratory analyses.

Operators are responsible to maintain certification and keep all records of training.

Documentation reviewed

Prior to the inspection, EPA inspectors reviewed the following documentation:

- Last three sanitary surveys performed by TDEC
- Violation history

While on site, EPA inspectors reviewed the following documentation:

- Sanitary Surveys and Responses 2011-2020
- Records of routine inspections, repairs, and schedule of preventative maintenance
- Operator Certification
- Process Control Management Plan
- February – September 2021 Monthly Operating Reports
- Operation and Laboratory SOPs
- Chemical Purpose/Inventory
- Calibration log for chlorine analyzers and turbidimeters
- 2017 and 2020 Lead and Copper Rule results and supporting documentation
- Bacteriological Sampling Site Plan and Results March 2021
- Laboratory logs
- Disinfection biproducts data
- Records of Emergency Management Plan
- Risk and Resiliency Assessment
- Tank Inspection Reports
- August – September 2021 Main Lines and New Meter Sets
- 2021 Customer Complaints
- 2021 Distribution System Hydrant Flushing Record
- Cross Connection Control Program
- Treatment plant diagram
- Distribution system map

Comments and Observations

Comments

Facility staff was welcoming and helpful during the inspection. Good communication was observed among all participants. The staff was accommodating and efficient at touring EPA inspectors around the WTPs and the distribution system.

Findings listed in the 2020 Sanitary Survey performed by TDEC are in the process of being corrected by the PWS. Personnel changes have been made following repeated record falsification, and the system has implemented ethics training for all staff. Due to issues with the SCADA system, as noted in the 2020 Sanitary Survey, the system is in the process of upgrading the SCADA system and performs benchtop testing to confirm SCADA monitoring results.

Observations

1. **Observation**: TDEC identified an open line on top of the 450,000-gallon clearwell hatch, and it was unclear if the line provided an entry point to the clearwell.
   Comments: The system capped the open line while inspectors were onsite. TDEC will follow-up with system to confirm the status of the line.

2. **Observation**: Sanders Concrete tank exhibited moss growth on the exterior of the tank.
   Comment: Tank exteriors should be kept clean and free from vegetative growth to prevent cracking and spalling. The system advised that Sanders Concrete tank is scheduled to be painted during Fiscal Year 2022.

3. **Observation**: Sanders Concrete, Sanders Steel, and Sanford Knob tanks have deteriorated grout sealing at the base of each tank.
   Comment: Foundation seals need to be intact to prevent contamination of finished water.

4. **Observation**: Vegetative growth in the vertical plane was noted at Sanders Concrete and Steel tanks.
   Comment: The vertical plane should be kept free of vegetation to prevent damage to the tanks and entry of contaminants or animals to the finished water.

5. **Observation**: The 24-mesh screen on the overflow pipe at the Sanders Concrete tank was dislocated at the time of the inspection.
   Comment: Tank overflows must have appropriately attached screens to prevent contamination of the finished water. The system corrected the gap while inspectors were onsite.

6. **Observation**: PWS staff currently corrects errors on records by writing over the original entry.
   Comment: Staff should use one line to strike through the error and initial/date the change to maintain the integrity of the records.

7. **Observation**: Significant corrosion and deterioration was observed on the pumping equipment at the Lake Road pump station, most notably on the saddle of Pump #1.
   Comment: Maintaining pump equipment is necessary to ensure its integrity and safeguard water pressure in the distribution system.

8. **Observation**: The displays on the filter turbidimeters provide read-outs for two filters at a time and lacked labels that clearly designated the turbidity readings for each filter.
   Comment: The system updated the setup of the displays to identify the readings while inspectors were onsite.

9. **Observation**: A large number of ladybugs were present at Sanford Knob tank at the time of the inspection.
   Comment: The State advised the system to check roof vents for signs of intrusion and requested a copy of the next tank inspection report to confirm that the ladybugs did not pose a threat to the finished water.

Findings

1. **Finding**: The 2020 LCR sampling information maintained by the system did not have a consistent, descriptive labeling system for collected samples. Multiple samples collected had the same sample number and all collected samples were named "Kitchen Sink." The system currently does not have a way to attribute the analyzed sample results to the corresponding sampling location and would therefore be unable to alert the customer if a sample exceeded the Action Level for lead or copper as required in 40 CFR § 141.85. *(d) Notification of results - (1) Reporting requirement. All water systems must provide a notice of the individual tap results from lead tap water monitoring carried out under the requirements of § 141.86 to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the residence where the tap was tested).*
   Comment: The PWS must create a labeling system for sample collection that corresponds to the sampling location in order to comply with the notification of results requirement.

2. **Finding**: EPA inspectors noted that many of the customer collection forms for LCR sampling were missing critical information such as time of last use, date/time of collection, and signature of sampler as required in 40 CFR § 141.86. Without having the information on the form, it is not possible to determine if a sample has been collected properly. Additionally, the laboratory doesn't have a rejection policy and the results of those samples were included on the applicable monitoring period.
   Comment: The PWS must implement a review process to ensure that the sample collection forms contain all the applicable information and that samples were appropriately collected prior to sending them to the laboratory. Additionally, a rejection policy should be developed by the PWS to identify samples that need to be invalidated and resampled. Results from samples that have been improperly collected can't be used by the PWS.

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