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Healthy People. Healthy Communities

February 4, 2019

City of Denmark
Attn: Dr. Gerald Wright
4768 Carolina Hwy
Denmark, SC 29042

RE: Sanitary Survey – City of Denmark
Public Water System # 0510002

Dear Dr. Wright:

On January 15, 2019, a sanitary survey was conducted on the public water system serving the City of Denmark. The intent of the sanitary survey is to evaluate the public water system's ability to provide a continuous supply of safe drinking water to its customers.

The City of Denmark received an overall rating of **Needs Improvement**. Enclosed is a copy of the survey and a report, which includes a description of the public water system, specific findings made during the sanitary survey, and recommendations for correcting any deficiencies. This survey and the report should be kept on file for no less than ten (10) years and be made available to the public or DHEC upon request. It is requested that all parties responsible for the operation and maintenance of the water system review this report promptly.

If you have any questions or if I can be of any assistance, please call me at the numbers below.

Sincerely,

Crystal L Robertson

Crystal L Robertson
Bureau of Environmental Health Services
Aiken Environmental Affairs Office
(O) 803-642-1637
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robertc2@dhec.sc.gov

cc: Marty Chaney, Bureau of Water

SANITARY SURVEY REPORT

City of Denmark
Public Water System # 0510002
Bamberg County

Introduction

The South Carolina Department of Health and Environmental Control (Department) recently conducted a sanitary survey of the City of Denmark's public water system. This survey consisted of a review of the system's files and an on-site inspection by Department personnel on January 15, 2019. The following persons participated in the on-site inspection:

Charles Michael Shugart	City of Denmark – Public Works Director
Travis Clark	City of Denmark
Tim Freeman	City of Denmark
Jimmie Shepherd	City of Denmark
Josh Yon	SCDHEC – Aiken Environmental Affairs Office
Crystal Robertson	SCDHEC – Aiken Environmental Affairs Office

System Description

The City of Denmark owns and operates a groundwater facility and associated potable water distribution system that serves a population of approximately 3,500 residents and approximately 2,116 students and staff at Voorhees College and Denmark Technical College by 1,502 service connections. The system has a current rated capacity of 943,200 gallons per day. Information on the system's wells is given in the table below.

Well	Type	Horsepower (HP)	Yield (GPM)	Regulated Capacity	Treatment
Well 1 – Brooker Ctr	Disconnected				
Well 2 – Voorhees	Turbine	60	330	316.80 TGD	Gaseous Chlorine
Well 3 – Legare Street	Disconnected				
Well 4 – Cox Mill	Off-Line				
Well 5 – Acacia Street	Submersible	40	403	386.88 TGD	Gaseous Chlorine
Well 6 – W. Voorhees	Submersible	40	325	312.00 TGD	Gaseous Chlorine

Well 1 – Brooker Center and Well 3 – Legare Street are no longer in service and have been physically disconnected from the system. Well 4 – Cox Mill has been valved off and no longer feeds the Denmark water system. Treatment at all active wells consists of the addition of

gaseous chlorine for disinfection. The system has two 50-Kilowatt generators stationed at Well 5 - Acacia Street and Well 6 - W. Voorhees that are capable of running these wells during an emergency. In addition, the system maintains an emergency connection with Bamberg Public Works (System #0510001).

Three elevated storage tanks, with a total volume of approximately 575,000 gallons, serve the City of Denmark. The City Hall Tank was taken offline and physically disconnected from the system in 2011. Information on the system's tanks is given in the table below.

Location	Capacity (Gallons)
Nibco Tank	250,000
Voorhees Tank	125,000
Bamberg County - Industrial Park Tank	200,000

Currently, the City of Denmark's public water system operators are:

Name	License	Certification #	Class
Charles Shugart	Treatment	4873	A
	Distribution	907	D
Tim Freeman	Treatment	6651	D
	Distribution	1830	G
Travis Clark	Distribution	3889	D

Findings and Recommendations

1. The system received a **Satisfactory** rating for Protection from Contamination. The purpose of this item is to ensure that all ground water sources are properly protected from contamination due to surface water runoff, local ground contamination, and/or contamination due to animals or insects. The design standards for well construction require a 100-foot pollution free radius around all public supply well.

   As noted in the previous survey, Well 2 - Voorhees Well has an active gravity sewer line within the 100-foot radius; however, it was determined by SCDHEC's Bureau of Water that the line poses very little threat to the well's water quality. The City of Denmark was not advised to relocate the sewer line at that time, but was asked to begin weekly inspections of the manholes immediately upstream and downstream of the well and to collect bacteriological samples of the well's raw water quarterly. The City of Denmark has complied with these requests and documentation of weekly inspections and quarterly samples were available for review during the survey. No issues have been noted. Please continue to conduct this routine monitoring and maintain the documentation.

As requested in the previous survey, the system has extended the protective concrete pad at Well 2- Voorhees Well to cover a minimum three-foot radius around the wellhead and sealed the cracks in the concrete pads at Well 5 – Acacia Street and Well 6 – W. Voorhees. As mentioned in the previous survey, the casing of Well 2 – Voorhees Well needs to be extended to a height at least 12 inches above the surface of the concrete pad. The City of Denmark should continue budgeting to upgrade the well by raising the casing to meet the current regulations.

2. The system was upgraded to a **Satisfactory** rating for Wellhead Piping. The purpose of this item is to ensure that the wellhead piping is configured in such a way as to minimize the potential for contamination of the source while also providing for proper testing and control of the well. During the previous survey, it was noted that two sample taps were located prior to the check valve at Well 4 – Cox Mill. The system has installed dual check valve assemblies upstream of the sample taps. In addition, an air release valve has been installed upstream of the check valve at Well 2 – Voorhees Well.

3. The system was upgraded to a **Satisfactory** rating for Chemical Injection Points. All vaults containing chemical injection points were covered and clean during the inspection. Please note, the system should continue to routinely inspect and maintain these vaults to ensure the injection points are readily accessible for inspection and maintenance.

4. The system maintained a **Satisfactory** rating for Water Quality. The purpose of this item is to ensure that a water system consistently produces water which complies with established water quality standards. Routine sampling continues to show that the City of Denmark's water meets the National Primary Drinking Water Standards. The Department conducted investigative sampling in January and December of 2018. After both events, the results and any recommendations were sent to the City of Denmark. The City has complied with the Departments recommendations and documentation was available for review during the inspection. Considering the history of discolored water complaints in Denmark, this item will continue to be closely evaluated during each subsequent Sanitary Survey.

5. The system received a **Needs Improvement** rating for Cross Connection Control. The purpose of this item is to ensure that the water system has a program in place to identify and eliminate cross-connections between the water system and possible sources of contamination. The system has 65 cross connections protected by testable backflow prevention devices. These devices are tested annually by Oneal Plumbing. Most passed testing in January 2019; however, several locations were not tested (i.e. Voorhees, CVS, Supersuds, and Subway). The system must follow-up and ensure these devices are tested annually. Please submit test results for each of these backflow prevention devices to the Department by March 4, 2019 (Fax 803-643-4027 or Email robertc2@dhec.sc.gov). In addition, the system has created a master list of all low hazard connections, such as residential in-ground sprinkler systems. The system should create a replacement schedule for these non-testable backflow prevention devices. Please submit this schedule to the Department by March 4, 2019 (Fax 803-643-4027 or Email robertc2@dhec.sc.gov).

6. The system received a **Satisfactory** rating for Fire Flow. The purpose of this item is to ensure that the water system can provide adequate flow to protect the integrity of their water system when fire protection is provided. As discussed during the survey, hydrants must be flow tested at a minimum of once every three years. All of the City of Denmark's hydrants were flow tested between October 2018 and December 2018. No concerns were noted.

7. The system maintained a **Satisfactory** rating for Valve and Hydrant Maintenance. The purpose of this item is to ensure that a system's valves and hydrants are being maintained such that they can be located and operated as needed. The City of Denmark has approximately 180 hydrants that are maintained in conjunction with Fire Flow testing. Maintenance needs were noted for each hydrant at the time of fire-flow testing. The system must address these maintenance needs and update the documentation by the next sanitary survey. The City of Denmark has approximately 225 valves. As recommended, the system has created a list of critical valves that are exercised annually, while all other valves are exercised every three years. Documentation showed that all valves were exercised during November and December 2018.

8. The system maintained a **Satisfactory** rating for Flushing Program. The purpose of this item is to ensure that the system's routine flushing program is adequate to help maintain a disinfectant residual throughout the system, as well as, to help prevent water quality issues associated with stagnant, discolored, and sediment laden water. Weekly flushing events are documented and the Department appreciates the system's efforts to improve water quality and reduce complaints through a rigorous flushing program. As noted above, investigative sampling events were conducted in January and December of 2018. Both events revealed low chlorine residuals at the sample site located on Voorhees Road. The Department recommends incorporating this area into your routine flushing program to maintain a chlorine residual throughout the system.

9. The system received an **Unsatisfactory** rating for Storage Maintenance. The purpose of this item is to ensure that the water system's storage tanks are properly maintained to guarantee their good working condition. Specifically, Regulation 61-58 7.E states "*All elevated, hydropneumatic and ground storage tanks shall be inspected at a minimum of once a week for the purpose of checking on the security of the tank(s) and insuring that proper air/water ratios are being maintained in hydropneumatic storage tanks. Vent screens, hatches and other openings on atmospheric tanks must be inspected annually to ensure sanitary protection.*" The Department also recommends a comprehensive exterior and interior inspection of elevated storage tanks every three years at a minimum. An example log for weekly inspections is enclosed. The system must maintain documentation of weekly inspections for all three tanks to be reviewed during the next sanitary survey.

   As requested, the Voorhees and Nibco Tanks had comprehensive inspections in April 2018 by SE Diving Services, LLC. These inspection reports were sent to the Department immediately following the survey. The inspections confirmed some of the nuisance and maintenance problems noted in the previous survey. The system has addressed the concern of ants around the base of the Voorhees Tank; however, the regular presence of

buzzards was still evident at both tanks. In addition, pictures from the inspection reports indicated that the hatches were not locked and that the screens on the vents need to be replaced on both tanks. The system must develop a plan of action to address the recommendations made by SE Diving Services, LLC, as well as the continuing nuisance problems and any other maintenance issues. This plan must include a reasonable timeline for repairs and must be provided to the Department by March 4, 2019 (Fax 803-643-4027 or Email robertc2@dhec.sc.gov).

The Bamberg County – Industrial Park Tank is owned by Bamberg County; however, it serves the City of Denmark's public water system. This tank is in poor condition. As requested, the system has added a sample location in the area near the tank; however, it has not incorporated the tank into any of the City's Standard Operating Procedures, Emergency Procedures, or other documentation. During the survey, it was stated that Bamberg County had the tank inspected and cleaned in 2018; however, documentation was not available for review. Please provide these records to the Department by March 4, 2019 (Fax 803-643-4027 or Email robertc2@dhec.sc.gov).

Following the inspection, the City of Denmark administration indicated that the City intends to keep the Industrial Park Tank online because its capacity is needed for fire protection purposes. The City of Demark must make the maintenance of this tank a priority and must immediately begin working with the tank owner, Bamberg County, to determine the roles and responsibilities for the tank. The City must develop a separate plan of action for this tank detailing how the City will address the problems with the tank and establish a reasonable timeframe to accomplish this. This plan must be submitted to the Department by March 1, 2019 (Fax 803-643-4027 or Email robertc2@dhec.sc.gov). In addition, the tank must be incorporated into all operating procedures and plans for the water system.

10. The system received a **Satisfactory** rating for Sample Siting Plan. The purpose of this item is to ensure that there is no place in the distribution system where microbiological contamination could persist indefinitely with little chance of detection. The system currently collects five samples per month on a rotation that includes 15 sample locations. The sample siting plan was updated following the 2018 survey, and all samples are being collected according to the plan.

11. The system received a **Satisfactory** rating for Emergency Plan. The purpose of this item is to ensure that the system has a current and readily accessible plan addressing who to contact and arrangements that would be necessary in the event that there is an emergency involving the facility or distribution system. The City of Denmark should routinely update their plan as changes occur. The contact information in the plan was updated following the 2018 survey; however, some contact information is again outdated. Please update the contact information for your chemical suppliers and be sure all contact information is updated as needed.

12. The system received a **Needs Improvement** rating for Corrections from Previous Surveys. The purpose of this item is to make sure that water systems return to compliance after deficiencies have been documented on previous sanitary surveys. The deficiencies listed in

this report are items sited in the previous report and include Cross Connection Control and Storage Maintenance.

Please note this item is considered a Significant Deficiency Item pursuant to the Ground Water Rule. An "unsatisfactory" rating of this category will result in an overall "unsatisfactory' rating and a subsequent referral to the Department's Drinking Water Enforcement section.

Conclusions

The City of Denmark public water system maintained an overall **Needs Improvement** rating. Due to the significance of the items noted, **a follow-up inspection will be conducted within four months to ensure progress.** The Department would like to thank Charles Shugart, Tim Freeman, Travis Clark, and Jimmie Shepherd for their assistance in conducting the sanitary survey. The Department looks forward to working with the water system in the future to ensure that the residents continue to receive the highest quality of drinking water.