



December 2, 2020

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

RE: Sanitary Survey
System # 0510002

Dear Dr. Wright:

On August 27, 2020, 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 **Satisfactory**. 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 (803) 533-5490.

Sincerely,

Kelly Chapin
Environmental Health Manager
Midlands - Orangeburg
1550 Carolina Avenue
Orangeburg, SC 29115

cc: Marty Chaney, Bureau of Water

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
ORANGEBURG ENVIRONMENTAL AFFAIRS OFFICE

SANITARY SURVEY REPORT

*City of Denmark
Water System # 0510002
Bamberg County*

Introduction

The South Carolina Department of Health and Environmental Control recently conducted a sanitary survey of the City of Denmark public water system. This survey consisted of a review of the system's files and an on-site inspection by Department personnel on August 27, 2020. The following persons participated in the on-site inspection:

Charles Michael Shugart	City of Denmark – Public Works Director
Travis Clark	City of Denmark
Jimmie Shepherd	City of Denmark
Kelly Chaplin	SCDHEC – Orangeburg Environmental Affairs Office
Robin Stone	SCDHEC – Orangeburg 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, not including the emergency connection with Bamberg Public Works of 1,015,680 gallons per day. Information on the system's wells is given in the table below.

Well	Type	Horse power (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	Disconnected				
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, and Well 4 – Cox Mill are no longer in service and have been physically disconnected from the 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 can run these wells during an emergency. In addition, the system maintains an emergency connection with Bamberg Public Works (System #0510001).

Two elevated storage tanks with a total volume of approximately 375,000 gallons serve the City of Denmark. The City Hall Tank was taken offline and physically disconnected from the system in 2011. The Bamberg County - Industrial Park Tank is currently valved off and no longer serves the Denmark water system. 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 (valved off)

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	T3889	T

Since the inspection was completed the systems operators have changed. Charles Shugart and Tim Freeman are no longer employed by the system. The City now employs Cedric Hudson as the operator of record.

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. Since the last survey, the wellhead piping at the active wells had been cleaned and repainted. 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 have these repairs made by the next sanitary survey to avoid this item rating being downgraded.

2. The system received a **Satisfactory** 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. The system has a comprehensive cross connection program in place for cross connections and all backflow prevention testing results were available during the inspection. At the time of the inspection the system was up to date on all their backflow testing.
3. 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 and the City of Denmark's hydrants are current on their testing.
4. The system received 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. It was noted on the previous survey that documents needed to be kept of all valve and hydrant maintenance that is done. This has since been implemented. Documentation of this maintenance was available at the time of the inspection. The City of Denmark has approximately 225 valves that are exercised once every three years. The current Standard Operating Procedures stated that valve maintenance is done annually, however during the inspection it was stated that it is only done every three years. The Standard Operating Procedures need to be updated to reflect what is being done.
5. 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. Starting in March, ending in July routine flushing was not done due to tanks being off-line for maintenance and repainting. The normal flushing schedule has since resumed. Since the previous inspection new flushing locations have been added near the colleges and the new hospital to improve disinfectant chlorine residuals.
6. The system received a **Needs Improvement** rating for Water Audit. The purpose of this item is to 1) ensure that the system has an audit program in place to account for the amount of water it distributes as consumed or lost and 2) uses its audit program to control its water loss. It was noted during the inspection that every month in 2018 – 2019 that was evaluated had an unaccounted water loss greater than 20%. The system needs to evaluate this to determine the cause of the discrepancies and develop a program to better account for pumped water.

7. The system received a **Needs Improvement** 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. During the survey, comprehensive inspection reports were available for the Nibco Tank and Voorhees Tank. At the time of the inspection the Voorhees Tank was off-line for renovation. The Voorhees Tank had been completely repainted. The Nibco Tank was scheduled for maintenance following the completion of the work on the Voorhees Tank. It was noted during the inspection that the Nibco Tank had a significant amount of lichen growing on it that should be addressed during the tank rehabilitation.

The drinking water line between Denmark and the Bamberg County – Industrial Park Tank has been valved off, and the City no longer uses the tank. By closing the valve for this line, the water system has valved off the current emergency connection to Bamberg Public Works. The City stated that they intend to create a new connection with Bamberg Public Works to maintain the emergency connection with that system. In addition, the City must permanently disconnect and cap the connection to the Bamberg County – Industrial Park Tank to protect the Denmark water system from this potential source of contamination. Please notify the Department when this work is done, a Department representative needs to be present to verify the disconnection.

8. 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 City currently collects five samples per month on a rotation that includes 15 sample locations.
9. The system received a **Satisfactory** rating for Corrections from Previous Survey. 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 Department acknowledges the efforts and improvements done over the past year to better the water quality supplied to customers. We look forward to seeing even more improvement to ensure the best water quality is supplied to customers.

Conclusions

The City of Denmark public water system received an overall Satisfactory rating. The Department would like to thank Charles Shugart, Travis Clark, and Jimmie Shepherd for their assistance in conducting the sanitary survey. The Department looks forward to working with the City in the future to ensure that the residents continue to receive the highest quality of drinking water.