D H E C
PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

March 28, 2012

Town of Denmark
Attn: Dr. Gerald Wright
4768 Carolina Highway
Denmark, SC 29042

RE: Sanitary Survey
System # 0510002

Dear Dr. Wright:

On March 21, 2012, a follow-up sanitary survey was conducted on the public water system serving the Town 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 Town of Denmark public water system received an overall rating of **Unsatisfactory.** 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) 641-7670.

Sincerely,

Travis Fuss
Water Manager
EQC Region 5- Aiken

cc: Marty Chaney, Bureau of Water- Compliance
Daniel Malonza, Bureau of Water- Enforcement

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
REGION 5 EQC

SANITARY SURVEY REPORT

Town of Denmark
Water System # 0510002
Bamberg County

Introduction

The South Carolina Department of Health and Environmental Control recently conducted a follow-up sanitary survey of the Town of Denmark Public Water System. This survey consisted of a review of the Department files and an on-site inspection by Department personnel on March 21, 2012. The following persons participated in the on-site inspection:

Travis Fuss	SCDHEC - Region 5 EQC, Aiken
Daniel Malonza	SCDHEC- Bureau of Water
Dr. Gerald Wright	Town of Denmark, Mayor
Heyward Robinson	Town of Denmark, Administrator
Jimmie Shepherd	Town of Denmark
Tim Freeman	Town of Denmark
Heyward Robinson	Town of Denmark
William Rose	Consultant

System Description

The Town of Denmark owns and operates a groundwater facility and associated potable water distribution system that serves approximately 3800 by approximately 1501 service connections. The Cox Mill Well has an iron bacteria treatment system, which consists of an injection of HaloSan tablets into the well twice daily while the well is idle. Treatment contact lasts for 60 minutes, and treated water is then available for further disinfection as it is pumped into the distribution system. Information on the system's wells is given in the table below.

Well Information

	Type	Horsepower	Yield (gpm)	Regulated Capacity (TGD)	Treatment
Well One Brooker Center	NOT IN SERVICE				
Well Two Voorhees	Turbine	60	330 gpm	316.80	Gaseous Chlorine
Well Three Legare Street	NOT IN SERVICE				
Well Four Cox Mill	Turbine	50	350	336.00	Gaseous Chlorine Iron Bacteria Removal (HaloSan)
Well Five Acacia Street	Submersible	40	403	386.88	Gaseous Chlorine
Well Six W. Voorhees	Submersible	40	325	312 .00	Gaseous Chlorine

Three (3) elevated storage tanks with a total volume of approximately 475,000 gallons serve the Town of Denmark public water system. However, the City Hall Tank was taken offline in late 2008/ early 2009 and was physically disconnected from the system in late 2011. An emergency connection exists with the Town of Bamberg.

Storage Capacity

Tank	Capacity (gallons)
City Hall Elevated Tank (offline)	100,000
Nibco Elevated Tank	250,000
Voorhees Elevated Tank	125,000

Currently, the Town of Denmark public water system has the following operators:

Operator	License	Certification #	Class
Tim Freeman	Treatment	6651	D
	Distribution	1830	G
Jimmie Shepherd	Treatment	7449 (lapsed)	T
	Distribution	931 (lapsed)	G
Travis Clark	Treatment	8674 (lapsed)	T
JP Robinson	Treatment	2418	D
	Distribution	1831	G

Findings and Recommendations

1. The system was upgraded to a **Satisfactory** rating for Chemical Feed. The purpose of this item it to ensure that the water system's chemical feed system is properly installed, maintained, and housed to provide adequate treatment, to prevent the potential for contamination, and to provide operator and public safety. Chemical feed lines at all wells have now been labeled to include contents and the direction of flow. In addition, the Town of Denmark is now more familiar with the function of the HaloSan iron bacteria removal system at the Cox Mill Well. They hired an outside resource to train current staff on the treatment system. The Town also purchased and is now using a HaloSan residual test kit to monitor the system.

2. The system was upgraded to a **Satisfactory** rating for Chemical Storage and Handling. The purpose of this item is to ensure that a sufficient supply of chemicals are available on-site and that these chemicals are properly stored and handled. The electrical problem at the Cox Mill Well has been rectified and chlorine cylinders are no longer stored in a manner that poses a public health risk.

3. The system maintained a **Satisfactory** rating for Chemical Injection Points. The purpose of this item is to confirm that chemical injection points are properly located to feed the chemical in a safe manner and do not interfere with other chemical additions. The chlorine injection point at the Voorhees Well has now been located and placed in a chemical feed vault. During the follow-up survey, however, it was found that the Cox Mill Well chlorine injection point was also

underground. As noted in the last survey, should problems associated with the chemical feed system arise in the future, or if maintenance requires excavation, the injection point should be placed and maintained within a vault box.

4. The system maintained a **Needs Improvement** 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. The Department continues to receive complaints regarding water quality, however the most recent analytical results show improvement in the levels of iron and manganese. The Department will continue to monitor the drinking water quality for long term success in providing more acceptable water to its customers.

   Please note this item is considered a Significant Deficiency Item pursuant to the Ground Water Rule.

5. The system was upgraded to a **Satisfactory** rating for Cross Connection Control. The purpose of this item is to ensure that a program is in place to identify and eliminate hazardous cross connections. The 5 testable backflow prevention devices that had not been tested at the time of the last survey or that failed initial testing have been repaired and tested to prove they are now working.

6. The system was downgraded to an **Unsatisfactory** rating for Valve/Hydrant Maintenance. The purpose of this item is to ensure that valves and hydrants are being maintained such that they can be located and operated as needed.

   At a minimum, the valve program should include:
   - An updated system map indicating the location and identification of all valves
   - A schedule for regular exercise and routine maintenance
   - Documentation of valve type, date of last exercise, number of turns to close, and a record of routine maintenance for each valve
   - Documentation that valves are being exercised in accordance with the plan and that necessary maintenance is being performed

   The hydrant program should include:
   - An updated system map indicating the location and identification of all hydrants
   - A schedule for flow testing and performing routine maintenance
   - Documentation of hydrant type, date of installation, and a record of maintenance work performed for each hydrant
   - Documentation indicating that maintenance and exercise are being performed in accordance with the plan

   The Valve/Hydrant Maintenance program is currently under review and revision by the water system. All hydrants have been located and mapped using global positioning system (GPS) technology. The written program is not complete, valves and hydrants have not been exercised except during flushing events.

7. The system was upgraded to a **Needs Improvement** rating for Flushing Plan. 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. Although the written program is not final and available for review, the water system has begun weekly flushing events across the system. A flushing worksheet has been designed and is being utilized to flush 5 rotating hydrants across the entire distribution system each and every week. The newly established flushing events have only taken place for 2 weeks but the system expects the flushing to help with stagnant and discolored water. The system is also planning one unidirectional system-wide flushing event per year with the first to take place in mid-April. The Department looks forward to evaluating the Flushing Program's success at the next survey.

8. The system received an **Unsatisfactory** 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. Hydrants must be flow tested at a minimum of once every three years. The minimum flow required for fire protection is 500 gpm. At the time of the follow-up survey, the hydrants had not been flow tested in three years. According to system personnel the hydrants were last tested in 2008.

9. The system maintained an **Unsatisfactory** rating for Leak Detection and Repair. The purpose of this item is to ensure that the system is actively searching for water line leaks and is using sanitary practices to repair leaks. During a complaint investigation performed in December 2011, 6 water leaks were found and brought to the Town's attention. Those leaks have since been repaired but it is necessary for the Town to take a more active approach in locating leaks via visual or audible inspection and fixing them as soon as possible. Leaks are generally recorded through work orders. It is recommended that the system generate a leak repair form that includes the date of the repair, the location, the size of the line, the disinfection method, the flushing procedure, and the resulting chlorine residual.

   At the time of the survey, a full water audit was still not available for review. The system has done a basic water comparison of water sold versus water pumped, and reports water loss of approximately 42%. However, the water audit should include water used for flushing, fire fighting, leak loss, etc. This item has been mentioned on numerous previous inspection reports.

10. The system was upgraded to a **Satisfactory** rating for Storage Maintenance. The purpose of this item is to ensure the system's storage tanks are properly maintained to guarantee their good working condition. As requested by the Department, the Town Hall tank has been valved off from the distribution system and the concrete pad at the base of the Voorhees storage tank has been repaired. In addition, the Town hired a contractor to perform a comprehensive internal and external inspection of the Voorhees and Nibco tanks. A review of the inspection report from the contractor found a few deficiencies. According to Mr. Heyward Robinson, Administrator, the Town plans to follow-up on the recommendations. Please note that a failure to address items needing attention will result in a downgraded rating for Storage Maintenance at the next routine Sanitary Survey. The Department requests that the system provide a maintenance schedule of each tank detailing the actions to be taken.

11. The system was downgraded to an **Unsatisfactory** rating for Operation and Control. The purpose of this item is to ensure that the water system is operated in a manner that provides safe, reliable water to the customers. This rating is a direct result of high water loss and a continuing lack of a proactive approach to system operation and control.

12. The system was upgrade to a **Satisfactory** rating for Sample Siting Plan. The purpose of this item is to determine if the sample siting plan is adequate to ensure that there is no place in the distribution system where microbiological contamination could persist with little chance of detection. The system has reevaluated the bacteriological sampling locations and included a map of the distribution system. All areas of the distribution system appear to be covered in the plan and the five sample points are rotated every three months. Please note that the sample siting plan should continuously be evaluated to ensure that the dead-end lines or areas serviced by smaller sized lines are covered.

13. The system was upgraded to a **Satisfactory** rating for Monitoring/Record Keeping. The purpose of this item is to ensure that the water system is monitoring their treatment process and maintaining records that verify that they are checking equipment operation and drinking water quality on a routine basis. Since the last survey, the system is more knowledgeable of the HaloSan iron bacteria removal system and is more closely monitoring its operation. Daily well visits are being made by an operator of the appropriate grade, and the daily water analyses are being performed as required.

14. The system maintained an **Unsatisfactory** 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. Although some corrections and improvements have been made since the last survey, several remaining deficiencies listed in this report are items cited in the previous report. They include the Flushing Program, Operation and Control, Valve and Hydrant Maintenance, Leak Detection and Repair, Staffing, Procedures Manual, and Water Quality.

    Please note this item is considered a Significant Deficiency Item pursuant to the Ground Water Rule.

15. The system received an **Unsatisfactory** rating for Procedures Manual. The purpose of this item is to ensure that a water system maintains written procedures for the operation and maintenance of its system. At the time of the follow-up survey, no organized compilation was available. The system was in the process of developing a new procedures manual but it was not finished. According to the Town, a complete procedures manual will be available for review in a few weeks.

16. The system was downgraded to an **Unsatisfactory** rating for Staffing. The purpose of this item is to ensure that all water systems employ adequate staff to properly operate and maintain the system. The downgraded rating is a direct result of the failure to continuously manage the system proactively, correct previous deficiencies, and provide appropriate and organized documentation of maintenance activities. Although the Town has hired a Consultant to help develop procedures and help bring the system into compliance, staffing levels remain the same. A system of this size should employ at least one full-time operator of the appropriate grade or higher in addition to other staff, as needed, to ensure the system is being properly operated and maintained.

Conclusions

Due to the nature of the items listed above, and failure to address items noted in the previous survey and Consent Order, the Town of Denmark has been referred to the Department's Drinking Water Enforcement section for further review and resolution. The Department is committed to working with the water system to ensure that the residents of Denmark receive safe and reliable drinking water.