



September 29, 2016

Mr. Mark Hahn  
Public Water Supply Section  
 Mooresville Regional Office  
North Carolina Department of Environmental Quality  
610 East Center Avenue, Suite 301  
 Mooresville, North Carolina 28115

Subject: Response to Notice of Deficiency  
Iron Concentration  
Charlotte Water – South Summit Avenue  
WSF ID#: D01  
Water System No.: NC 01-60-010  
Mecklenburg County, NC

Mr. Hahn:

This report is required by the referenced Notice of Deficiency (NOD) from Public Water Supply Section (PWS) dated May 17, 2016 and received by Charlotte Water (CLT Water) on May 17, 2016 via email.

The NOD letter required CLT Water to control iron in the distribution system such that the concentration of iron is below 0.3 mg/L. CLT Water was required to submit a written “Plan of Action” to permanently control iron in the water distribution system. The “Plan of Action” was submitted on June 13, 2016 and approval received by CLT Water from PWS on June 20, 2016 by email. In addition, PWS requested that CLT Water submit weekly analytical results for iron in and around the South Summit Avenue area.

Please find attached the quarterly report on the progress of action items listed in the South Summit Avenue action plan. As stated in the NOD, quarterly written status reports are due by the final day of each calendar quarter.

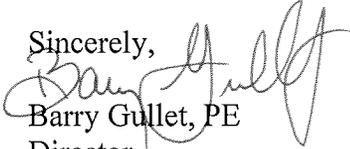
CLT Water has made the determination, after analyzing the water quality sampling and conducting a through engineering evaluation, to replace the 1,400 foot segment of water main along South Summit Street and to connect Calvert Street to this segment. By connecting Calvert Street the dead end line will be eliminated and not require continuous flushing.

The attached report and addendums will supply more detail on the efforts of CLT Water to eliminate or reduce iron in the distribution system and in the South Summit Street area.

As stated in the approved "Plan of Action" and based on the information in the attached report CLTWater is requesting that the "Plan of Action" be considered complete and the Notice of Deficiency satisfied effective September 30, 2016.

If you have any questions or require further information, please contact Tim Downs at phone numbers: office 704-432-4766; cell 704-634-5410; fax number 704-432-3794 or via email at [tdowns@charlottenc.gov](mailto:tdowns@charlottenc.gov) .

Sincerely,



Barry Gullet, PE  
Director  
Charlotte Water

Attachments: Quarterly Report and related attachments

Cc: Mr. R.W. (Bob) Midgette, P.E. Operations Branch Head, Public Water Supply Section  
Ms. Angela Lee, Chief of Operations, Distribution ORC - Charlotte Water



## South Summit Avenue Plan of Action Quarterly Report

### History:

Charlotte Water (CLTWater) submitted a Plan of Action on June 8, 2016, in response to the Notice of Deficiency (NOD) issued by NC Department of Environmental Quality Public Water Supply (PWS) Section on May 17, 2016. As directed by the NOD, the plan addresses control of iron in the water distribution system and control of iron in the South Summit Street area. The NOD also directed Charlotte Water to submit quarterly written status reports on the progress of actions to monitor and resolve the water quality issues in and around South Summit Avenue. In addition, the weekly sampling test results requested in the NOD were submitted by email to PWS.

The following is the quarterly report required by the NOD and will address progress on each of the action items as presented in the Plan of Action.

### Action Item: Control of Iron in Distribution System

Charlotte Water has implemented the approved Plan of Action and will continue to control iron concentrations by continuation of efforts to reduce the amount of galvanized steel and unlined cast iron pipe in the system, by educating water system users such as fire departments and contractors about how they can help avoid activities that could trigger high iron incidents, and by responding to red water complaints from customers.

To control iron in the distribution system, Charlotte Water has:

- Continued a proactive water distribution **rehabilitation program** that prioritizes remediation based on water quality and structural integrity.
  - 1) FY16 total expenditures were \$10,915,000
  - 2) FY17 expenditures thus far are \$1,053,000.
- Continued capital programs to identify and **replace galvanized steel** pipe.
  - 1) FY16 total galvanized pipe replaced was 34,133 linear feet.
  - 2) FY17, to date, 3,794 linear feet replaced.
- Continued a water main rehabilitation program to **clean and line unlined cast iron** pipe.
  - 3) FY16 total replacement was 25,065 linear feet
  - 4) FY17, to date, total replacement is 3,384 linear feet.
- Continued to promptly **investigate water quality complaints** by communicating with customers, dispatching water quality technicians, sampling as appropriate and flushing water mains as needed.
  - 1) All water quality complaints have been investigated and resolved by CLTWater's drinking water laboratory staff. Please see attached technical water complaint benchmarking chart.
  - 2) All complaints are tracked and documented in the Banner Billing System. Please see



attached example report.

- Complete a **Water Distribution System Master Plan** - this is currently underway to analyze system hydraulics. See attached water quality initiatives spreadsheet for activities.
- Continued operation of the distribution system by controlling tank levels and flushing to **reduce water age**.
  - 1) Programmable flushing devices have been deployed throughout the distribution system to help reduce the residence time of treated water. Most of these flushers are programmed for a.m. and p.m. flushing intervals at a rate of approximately 100 gallons per minute to ensure good turnover throughout the day. The effluent flow from these devices is not metered. Adequate distribution system turnover and lower residence times help ensure water quality remains optimal. In particular, limiting residence time aids in lowering the potential for increased TTHM formation, while helping reduce red water complaints and ensuring chlorine residuals are maintained at target concentrations. In addition, reducing the operating range within our distribution storage tanks and clearwells also helps limit water age.
  - 2) There are 15 programmable flushing devices located at strategic points in the system.
- Continued to evaluate the water distribution system to determine need and location for additional automatic **flushing** equipment.
  - 1) CLTWater is participating in the Partnership for Safe Water's - Water Distribution System Optimization Program. The program consists of four phases. Phase I demonstrates commitment by the utility and its operators. Phase II establishes baseline system conditions through an annual data collection program. Phase III conducts a comprehensive assessment of the systems operations in three performance areas. Phase IV optimizes performance based on goals set for the three performance areas.
  - 2) CLTWater has completed the Partnership for Safe Water's Phase III self-assessment. Water Quality Preservation, Hydraulic Reliability and Physical Security were assessed using the following performance indicators: Disinfectant Residual, Pressure Management and Main Break Frequency, respectively.
  - 3) The above evaluations were used to determine the need for automatic flushing stations. To date automatic flushing stations have been added to 15 locations.
- Continued to use proper methods, best management practices and modern technologies to manage the water distribution system including replacement and rehabilitation of water pipe with **more corrosion resistant materials** such as cement lining, epoxy and the use of PVC pipe.



- 1) All proper methods, best management practices and modern technologies required by the CLTWater engineering group are contained in the online "Design Manual" which is updated as needed.
- 2) There is a standing Charlotte Water group known as the "Methods and Materials Committee" which is comprised of engineering and operational staffs that meet to evaluate the use of more corrosion resistant materials and that review all materials for CLTWater specifications.
- 3) Specifications and standards are included in all contracts for replacement and rehabilitation.

**Action Item: Control of Iron in South Summit Avenue Area**

To further control iron concentrations in the drinking water in the South Summit Avenue area, Charlotte Water performed the following activities:

- Determined the boundaries of concern referred to in the NOD as the South Summit Avenue area. The decision was made to use an upstream location and a downstream location in addition to a sampling site on South Summit to establish a complete picture of the water quality in the area.
- Evaluated additional rehabilitation needs in the South Summit Avenue area. This included reviewing any customer complaints, analyzing water quality data and water system operation.
- Exercised each water distribution valve in the South Summit Avenue area to confirm operability and to ensure valve was in the correct position.

**Action Item: Weekly Analytical Results for Iron**

Charlotte Water utilized its' state-of-the-art independently certified water quality laboratory along with trained laboratory and field operations staff to collect samples and analyze drinking water quality in the field and in the laboratory.

To ensure the continuous delivery of high quality drinking water to customers in the South Summit Avenue area, CLTWater monitored water quality on a weekly basis at the following strategic locations in the target area using the following protocol.

- On a weekly basis, Charlotte Water staff performed field tests for iron on drinking water samples collected from the following three distribution system locations:
  1. South Summit Avenue
  2. Grandin Road
  3. Calvert Street
- If any site had a field test iron concentration of greater than 0.30 mg/L, an additional sample was collected at that site and a certified analysis for iron concentration was performed. Moreover,



CLTWater Operations staff was contacted for immediate consultation and water quality remedial actions were taken. These steps included at a minimum flushing and additional testing.

- Samples were initially taken by removing a meter service on each of the above streets but permanent sampling stations were added on July 1, 2016 to obtain water samples directly from the mains.

#### **Action Item: Reporting**

As required in the NOD, this quarterly status report is being submitted to the North Carolina Public Water Supply Section (PWS) to provide updates on the Action Plan and the activities that have resulted.

- Date and results of water quality monitoring are in the attached ongoing data spreadsheet that was updated and submitted weekly,
- Efforts to monitor and resolve customer complaints through the following activities:
  - 1) Two neighborhood meetings have been conducted.
  - 2) A website has been established in which all data and communications with the neighborhood are made available.
  - 3) All testing result data is emailed to the list of neighbors with the original complaints and to the neighborhood association.
  - 4) The 2015 annual drinking water quality report was released early in June 2016 to ensure all residents received the report and could be confident in the quality of the drinking water.
- Distribution system operations and maintenance.
  - 1) CLTWater field operations has conducted water quality testing in addition to the sampling requested by the NOD to ensure proper operation of the distribution lines in this area.
  - 2) All valves in the area were re-checked for proper position for flow through the distribution lines of concern.
  - 3) As a result of the testing a flushing station was added to the Calvert Street line, due to it being a dead end line with few customers, to improve the overall quality of the drinking water.
- Weekly test results from the three listed sites, including date and time of analysis, were compiled and submitted weekly to the North Carolina Public Water Supply Section (PWS) by Charlotte Water. See attached spreadsheet.

#### **Measuring Success**

Charlotte Water suggested that at the conclusion of a full quarter (3 months) where all weekly monitoring results of samples taken from the target area are of iron concentrations equal to or less than 0.3 mg/L, success is achieved and the Action Plan activities specifically targeting the South Summit Street



area can cease following PWS agreement. On June 20, 2016 PWS replied, via email, that they concurred with the Plan of Action submitted on June 13, 2016.

The weekly sampling that was requested in the NOD began on June 7<sup>th</sup> and a total of 60 iron samples were taken and submitted to PWS weekly in an ongoing spreadsheet.

The results are summarized in the following comments:

- During June 2016 one sample result, of 15 samples collected, had an iron result of 0.48 mg/l which was above the secondary standard of 0.30 mg/l. As required by the Plan of Action a second sample was taken and tested at the certified laboratory of CLTWater. The second iron result was <0.05 mg/l and it was thought that the removal of the meter caused tuberculated iron to break loose from the main.
- To address the problem of removing meter services and disturbing the main on a continual basis three (3) new permanent sampling stations were installed at locations on each of the target streets on July 1, 2016. The addresses of the sampling locations changed slightly as indicated on the sample result spreadsheet but remained on the same street.
- The new quarter began on July 1, 2016 and ended on September 30, 2016 with a total of 49 iron samples being collected and tested. On July 5<sup>th</sup> testing yielded an iron result of 0.33 mg/l just 0.03 mg/l over the 0.30 mg/l secondary standard. Upon flushing for a few extra minutes the second sample, taken and tested in field, had results of 0.03 mg/l. Following the Action Plan a third sample was taken and tested in CLTWater's certified laboratory with a result of <0.05 mg/l. CLTWater has evaluated the results and based on the two additional samples taken, which were below the secondary standards, it has been determined that the initial result of 0.33 mg/l was due to the new installation of the sampling station. In addition all samples taken on Grandin Road after July 5<sup>th</sup> have been below the standard and there have not been any documented complaints from customers along this street before or after issuance of the NOD.
- After taking in consideration the submitted sampling results described above and after evaluation of the line by the rehabilitation engineering group it has been determined that the South Summit Street distribution line will be replaced. Please see the attached approved plans for the line replacement. CLTWater will notify PWS once the new line segment has been installed. PWS may also track the progress of the replacement project on the public web site. A public meeting, with the residents of the South Summit neighborhood, will be held before the start or soon after, to discuss details and answer questions about the line replacement.

As stated in the "Plan of Action", and based on the information in the summary above which shows slightly elevated iron only when the line is disturbed and with the decision to replace the South Summit Street line, Charlotte Water is requesting that the Plan of Action activities be considered complete and terminated effective September 30, 2016.



Attachments:

- Weekly sampling spreadsheet;
- PWS NOD Letter;
- CLTWater NOD Response and Action Plan;
- CLTWater FY16 Annual Water Report;
- South Summit Street line replacement plans;
- Complaint Resolution documents;
- Water Quality Initiatives