Evaluation Form for Corrosion Control Treatment (CCT) For Small / Medium Systems

MAIL TO: Lead and Copper Rule Manager
Compliance Services Branch
Public Water Supply Section
1634 Mail Service Center
Raleigh, North Carolina 27699-1634

A. PWS General Information

Date: 4/29/17

1. Water System Name: Durham County Rougemont Water System

2. Water System No.: NC4032018

3. Contact Person: Name: Stephanie Brixey
   Mailing Address: 5926 NC Hwy 55 E
   Durham, NC 27713
   Telephone: 919-560-9034
   Email: sbrixey@dconc.gov

4. Population Served: 65

5. Person Responsible for Preparing this Form:
   Name: Stephanie Brixey Signature: Stephanie Brixey
   Telephone: 919-560-9034
   Email: sbrixey@dconc.gov
   Agency (if other than system contact): _____

B. PWS Technical Information

1. Lead/Copper Monitoring Results from Monitoring Period with Exceedance:

Monitoring Period: From January 1 to June 30 year 2017

First-draw Tap Water Monitoring Results:

Lead:	Minimum concentration =	<0.001 mg/L
	Maximum concentration =	0.022 mg/L
	90th percentile =	0.0041 mg/L
Copper:	Minimum concentration =	0.64 mg/L
	Maximum concentration =	2.8 mg/L
	90th percentile =	1.98 mg/L

2. Source Water Lead and Copper:

2a) Untreated Supply

	Water Sources				
	1	2	3	4	5
Lead Concentration in mg/L:	0.0022				
Copper Concentration in mg/L:	0.0106				

2b) Treated Supply (at Entry Point)

	Entry Point				
	1	2	3	4	5
Lead Concentration in mg/L:	0.0022				
Copper Concentration in mg/L:	0.0189				

3. Water Quality Parameter (WQP) Monitoring Results:

3a) Entry Point WQP Monitoring Results (treated supply). Two WQP samples should be collected per Entry Point (on different days, illustrating normal water system operation). Copy this sheet as necessary for additional entry points. Please record both sets of results per Entry Point into the table.

	Entry Point					
Parameter	#1		#2		#3	
pH units:	6.37	7.4				
Temperature, °C:	21					
Alkalinity, mg/L as $CaCO_3$:	90.6	89.9				
Calcium, mg/L as Ca:	21.2	19.2				
Conductivity, Φmho/cm @ 25° C:	210	193				
Orthophosphate*, mg/L as PO_4:	0.15	0.14				
Silica*, mg/L as SiO_2:						

* Report only if PWS currently uses this inhibitor

3b) WQP Distribution System Monitoring Results (provide minimum and maximum values if multiple samples are collected). Indicate whether the result is a field or laboratory measurement.

Parameter	Field	Lab
pH: 6.68 su minimum = _____ maximum = _____	☒	☐
Temperature: 21 °C minimum = _____ °C maximum = _____ °C	☒	☐
Alkalinity: 94.6 mg/L as $CaCO_3$ minimum = _____ mg/L as $CaCO_3$ maximum = _____mg/L as $CaCO_3$	☐	☒
Calcium: 21.6 mg/L as Ca minimum = _____ mg/L as Ca maximum = _____mg/L as Ca	☐	☒
Conductivity: 222 Φmho/cm @ 25° C minimum = _____ Φmho/cm @ 25° C maximum = _____Φmho/cm @ 25° C	☐	☒
Orthophosphate*: 0.43 mg/L as PO_4 minimum = _____ mg/L as PO_4 maximum = _____mg/L as PO_4	☐	☒
Silica*: minimum = _____ mg/L as SiO_2 maximum = _____mg/L as SiO_2	☐	☐

* Report only if PWS currently uses this inhibitor

3c) Untreated and Treated Water Quality:

Identify water source(s) by source type (wells, river, lake, purchased, etc):

Source No. 1 well

Source No. 2 _____

Source No. 3 _____

NOTE: If you currently use ONLY groundwater and chlorination, you may skip completing the table. ALL other system MUST complete the table for untreated and treated water quality comparison.

Complete the table below for all sources, including typical untreated (source water) and treated (entry point) water quality data. The treated data will be the same information as included in section 3a (average the results for each Entry Point to arrive at one value per parameter per entry point). This information will be used to identify any significant differences between your source water and treated water. Copy this sheet for additional sources.

- For surface water sources, include data for each raw water source and finished water quality information from each treatment plant (entry point).
- For groundwater sources, water quality information from each well is acceptable, but not necessary, if several wells have similar data. Include a water quality summary for each well field or grouping of wells with similar quality.

Include available data for the following:

Parameters	Source No. 1		Source No. 2		Source No. 3	
	Untreated	Treated	Untreated	Treated	Untreated	Treated
pH, units	6.75	6.37				
Temperature, °C	16	21				
Alkalinity, mg/L as $CaCO_3$	91.2	90.6				
Calcium, mg/L Ca	21.8	21.2				
Conductivity, Φmho/cm @ 25° C	214	210				
Orthophosphate, mg/L as PO_4	0.15	0.15				
Silica, mg/L as SiO_2						
Total dissolved solids, mg/L	105	97				
Hardness, mg/L as $CaCO_3$	89.6	86.3				
Chloride, mg/L	<5.0	6.7				
Sulfate, mg/L	<5.0	<5.0				
Iron, mg/L	<0.040	<0.040				
Manganese, mg/L	0.0014	0.0015				
Disinfectant Residual	0	1.5				

4. Existing Conditions:

Is any treatment used? ☒ yes ☐ no

If treatment is used, is more than one source used at a time? ☐ yes ☒ no

Identify treatment processes used (differentiate by source as necessary):
Basic chlorination and corrosion inhibitor feed

List all chemicals normally fed:
Sodium hypochlorite
Zinc orthophosphate – (Mid South Chemical Co.) MCT 5072

List all chemicals occasionally fed (include any seasonal chemicals):

5. Planned Changes:

Has the system already funded and/or submitted plans to change sources or treatment processes in the near future (1-2 years) that are not included in the CCT process? ☐ yes ☒ no
If so, please list all the planned changes and provide details below. Attach additional sheets if necessary.

6. Present Corrosion Control Treatment:

None ☐	
Inhibitor ☒	Date initiated: 9/1/2016
Present dose at treatment plant: 1.3 mg/L as PO_4 or SiO_2	
Residual Range in Distribution System: Maximum 1.73 mg/L as PO_4 or SiO_2 Minimum 0.75 mg/L as PO_4 or SiO_2	
Brand name: MCT 5072	
Chemical Type: liquid zinc orthophosphate	
Has it been effective? Please comment on your experience. We are still evaluating the effectiveness within the Rougemont system.	
pH/alkalinity adjustment ☐	Date initiated: _____
pH Target: Range: _____ standard units	
Alkalinity Target: Range: _____ mg/L as $CaCO_3$	
Chemical/Method: _____	
Has it been effective? Please comment on your experience.	
Calcium adjustment ☐	Date initiated: _____
Calcium Target: Range: _____ mg/L as Ca	
Chemical/Method: _____	
Has it been effective? Please comment on your experience.	

6. Present Corrosion Control Treatment continued...

Has the system performed any corrosion control studies and/or desktop evaluations (including completion of any previous 141-C forms)? ☐ yes ☒ no

If yes, complete the following:

Date(s) of evaluation: From _____ to _____
Evaluation conducted by system personnel? ☐ yes ☐ no
If no, by whom? _____
Briefly describe the results of the study:

Evaluation results attached? ☐ yes ☐ no

What treatment changes were recommended?

Were treatment changes implemented? ☐ yes ☐ no
If yes, have corrosion characteristics of the treated water changed? ☐ yes ☐ no
How has change been measured? (check all that apply)

- ☐ WQP Values (Entry Point and Distribution System)
- ☐ Lead/Copper Tap Water Results
- ☐ Frequency/Type of customer complaints
- ☐ Other: _____

If change was measured through observing WQPs or Lead/Copper results, please briefly describe those results below:

7. Distribution System:

Does the distribution system contain lead service lines? ☐ yes ☒ no
(not including lead goosenecks and/or lead-based solder)

If your system has lead service lines, mark below the approximate number of lines which can be located from existing records. ☐ None ☐ Some ☐ Most ☐ All

Is the distribution system flushed? ☐ Rarely ☒ Sometimes ☐ Frequently

8. Historical Information:

Is there a history of water quality complaints? ☒ yes ☐ no

If yes, then answer the following:

Are the complaints documented? ☒ yes ☐ no

For the categories of complaints listed below, denote:

1 for some complaints in this category
2 for several complaints in this category
3 for severe complaints in this category

Categories of complaints:

Taste and odor	1
Color	____
Sediment	1
Other (specify below)	____

9. Treatment Constraints for Simultaneous Compliance:

Optimal corrosion control treatment means the selection and operation of corrosion control treatment that minimizes lead and copper concentrations at users' taps, while ensuring the treatment does not cause the water system to violate any other State or national primary drinking water regulations. Water systems have several options for researching which treatments will affect their simultaneous compliance, including the EPA's Guidance Manual for Selecting Lead and Copper Control Strategies (Revised in 2003) and the Water Research Foundation's "Decision Tool to Help Utilities Develop Simultaneous Compliance Strategies" (particularly the tables on pages 3 through 5). Additional references are listed on Form 141-C - Instructions. Please indicate below which constraints to treatment may apply to your PWS. Use the following codes:

NOTE: If your system uses ONLY groundwater and chlorination, you may skip this section.

1 Minimal constraint = Some potential impact, extent is uncertain.
2 Significant constraint = Additional treatment modifications required beyond CCT.
3 Severe constraint = Significant capital improvements required to operate option.
4 Very severe constraint = Option is infeasible (must provide explanation below).

Constraint	Treatments			
	pH/Alkalinity adjustment	Calcium adjustment	Inhibitor	
			PO_4	SiO_2
A. Regulatory				
SOCs/IOCs	1	1	NA	2
SWTR: Turbidity	1	1	NA	2
Total Coliforms	1	1	NA	2
SWTR/GWR Disinfection	1	1	NA	2
Disinfection Byproducts	1	1	NA	2
Radionuclides	NA	NA	NA	NA
B. Functional				
Taste & Odor	1	1	NA	2
Wastewater Permit	NA	NA	NA	NA
Aesthetics	1	1	NA	2
Operational	1	1	NA	2
Other	NA	NA	NA	NA

If you list ANY treatments as infeasible (option 4), please provide a brief explanation below, or attach additional information related to the decision:

10. Evaluation:

Do other similar water system facilities exist with successful corrosion control? ☒ yes ☐ no

If yes, identify their corrosion control treatment method.

- ☐ None
- ☒ pH/Alkalinity adjustment
- ☐ Calcium adjustment
- ☒ Inhibitor
  - ☒ Phosphate based
  - ☐ Silica based

Briefly describe their corrosion control treatment chemicals and/or processes (include the Water System Name and Water System No.):

1. Amber Acres – NC0392236 Use orthophosphate and do pH adjustment. They have no copper and lead results exceeding the action levels so the treatment they are using and the feed rates set are working.
2. Cedar Terrace Apts. – NC0319132 Use polyphosphate and do pH adjustment. They have had cooper results above the action level in the past year.

11. Recommendation/Proposed Treatment:

If you do not complete this section using the options listed, the form will be deemed incomplete!
Please note that a combination of multiple treatment options may be required to optimize corrosion control.

11a) The corrosion control treatment method installed or being proposed is:

☐ Option 1: pH/Alkalinity adjustment
Target pH is _____ units
Target alkalinity is _____ mg/L as $CaCO_3$
Chemical/Method used _____

☐ Option 2: Calcium adjustment
Target calcium concentration is _____ mg/L Ca
Chemical/Method used _____

☐ Option 3: Inhibitor
☐ Phosphate based
Brand name/Chemical type _____
Target dose _____ mg/L
Target residual _____ mg/L as PO_4
☐ Silica based
Brand name/Chemical type _____
Target dose _____ mg/L
Target residual _____ mg/L as SiO_2

☒ Option 4: Adjust current corrosion control treatment (e.g. increase inhibitor dose, increase pH using same chemical, etc.).
Describe the changes to be made by attaching additional information detailing why the exceedance occurred, and how this option will be implemented to optimize your treatment:

The zinc orthophosphate dosage rate was increased slightly but will be increased some more to try and resolve the copper/lead corrosion that is occurring.

11b) List your proposed operating guidelines for the appropriate parameters:

Parameter	Operating Value/Range
orthophosphate	1.0 – 3.0 mg/l as PO4
_____	_____
_____	_____
_____	_____

Rationale and guidance used for the proposed corrosion control treatment is:
☐ Discussed in the enclosed report
☒ Briefly explained below

4 ml/min of a 3.75% solution, current dose is 1.3 mg/l but propose to increase to 1.5 mg/l which should allow for greater corrosion control.

Note: The information provided in this section are the values/ranges that the system will be held accountable for under the WQP monitoring requirements of section 141.87 of the Rule.

12. Additional Comments:

Please provide any additional comments that will assist in determining optimal corrosion control treatment for your PWS. You may attach additional sheets as necessary.