



North Carolina Waterworks
Operators Association

GO WITH THE FLOW

Training Tomorrow's Water Professionals Today

July 2019
Volume 22, Number 2

Proposed Senate Bill 536

Pending legislation to improve viability of the water and wastewater systems of certain units of local government by requiring local government commission approval of grant applications; to require certain water and wastewater systems to undergo a review of infrastructure management, organizational management, and financial

management; to create the viable utility reserve to provide grant money for local government units; to create a monthly surcharge to fund the viable utility reserve; to provide a statutory process for merger and dissolution of water and wastewater systems established under 11 chapter 162A of the general statutes; to promote the importance of interlocal agreements to the operation of water and wastewater systems; and to study sub-basin transfers and 14 historical charters. For more information go to:

<https://www.ncleg.gov/Bill-LookUp/2019/S536>

The purpose of GO WITH THE FLOW is to keep you, the operator, informed of some of the training opportunities that are available for your certification needs (new and renewal). The Training/Meetings calendar will be updated quarterly as information about new training opportunities becomes available. Events may be scheduled by: NCWOA, Public Water Supply Section, State Laboratory of Public Health, and other sources. This newsletter may also contain information on new regulations, news from the Certification Board, and important need-to-know resource contacts.

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NCWOA Awards

Outstanding Operator of the Year / Certified Operator of the Year
Lab Analyst of the Year / Educator of the Year

Submission deadline: July 31, 2018

You can download applications on our website at www.ncwoa.com
(under forms)



NC AWOP team evaluated the contact time at the City of Morganton water treatment plant in January 2019

Contact Time Disinfection

*by Kimberly Barnett, P.E.
Public Water Supply Section, Division of Water
Resources - NCDEQ*

Contact time (CT) disinfection is the water treatment industry standard for primary disinfection. When water is exposed to the surface, it also has been exposed to surface contamination, whether from animals or humans and there is the potential for biological contamination. The primary reason we know disinfection of microbiological contaminants is effective is application of the method for determining CT. Disinfection is a critical component of a multi-barrier approach to drinking water treatment.

HISTORY OF DISINFECTION

Disinfection of water by chlorine first occurred in Chicago in the early 1900s. Disinfection kinetics were determined by Chick in 1908 who recognized that there was a chemical reaction that caused microbial inactivation (Chick, 1908). It quickly spread in large cities in the United States due to the dramatic reductions in typhoid fever associated with its use. By 1918, 1000 cities were employing chlorine as a disinfectant (Race, 1918).

Amendments were made to the Safe Drinking Water Act in 1989 that required all surface water facilities to achieve at least a 99.9 percent (3 Log) removal-inactivation of *Giardia lamblia* cysts and a 99.99 percent (4-log) removal-inactivation of viruses. The new requirements for conventional treatment and disinfection were called the Surface Water Treatment Rule (SWTR). EPA determined that conventional treatment if operated properly could achieve a 2.5 log physical removal of *Giardia* and a 2-log physical removal of viruses. The remaining 0.5-log for *Giardia* and 2-log for viruses is achieved through inactivation by disinfection.

Disinfection kinetics were studied before the promulgation of the SWTR to determine the rate at which disinfectants could inactivate different microorganisms including but not limited to *E. Coli*, *Giardia Lamblia*, *Entamoeba histolytica*, *Naegleria* cysts, Poliovirus 1, and *Giardia muris*. These experiments found that plotting disinfection concentration and time to achieve percent inactivation was possible. Furthermore, it was found that solids content, pH, and temperature had a significant impact on disinfection inactivation (AWWA, 1999). CT is defined as the concentration of disinfection in the water times the time the water is in contact with the disinfectant (prior to the distribution entry point).

DETERMINING CONTACT TIME IN NORTH CAROLINA

North Carolina uses EPA methods and guidance to determine if the water is treated properly. The CT ratio must be greater than 1 to achieve inactivation through disinfection. The CT ratio is obtained by dividing CT required by CT achieved. Given that EPA determined a well operated conventional treatment plant could achieve a 2.5 log physical removal of Giardia and a 2 log physical removal of viruses, then disinfection (CT) must achieve at a minimum an additional 0.5 log inactivation of Giardia and 2 log inactivation of viruses. The CT ratio must be greater than 1 to achieve inactivation through disinfection. The CT ratio is obtained by dividing CT required by CT achieved.

The EPA Disinfection Profiling and Benchmarking Guidance Manual dated August 1999 and the EPA LT1ESWTR Disinfection and Profiling Technical Guidance Manual dated May 2003 are free resources. The two manuals explain how to determine CT required and they have tables based on log removal, highest temperature, lowest temperature, and lowest chlorine residual for the day.

The EPA manuals also explain how to determine CT achieved based on the chlorine residual and T10. The T10 is the residence time for 10 percent of the water as it moves through the disinfection treatment process facilities. Tracer studies are completed to determine the T10. For example, if 2 mg/L of tracer study chemical is added after the filters, then the T10 is the time it takes for water with 0.2 mg/L concentration of tracer chemical to reach the end of the disinfection process facilities. All water plants in NC are required to have a valid tracer study. If modifications are made to the water plant which would change the hydraulic residence time through the disinfection treatment process facilities, then a new study is required to be completed and submitted to the Public Water Supply Section Regional office for review and approval.

SUMMARY

Contact time (CT) is an important measure of finished water quality and ensuring that water is safe. CT Ratios are required to be calculated daily to ensure proper disinfection. In the past 100 years since disinfection was first practiced, the water industry has made tremendous strides in reducing long term health risks associated with the use of disinfectants by reducing the concentration of Disinfection by

Products (DBPs). Disinfection contact time protects against acute microbiological contaminants that can cause immediate health effects up to and including death. Much research went into determining CT inactivation and it is still the primary measure for determining the effectiveness of disinfection.

Bibliography

American Water Works Association. *Water Quality and Treatment (5th Edition)*, McGraw-Hill, Inc., New York, 14.22-14.30, 1999.

Chick, H. "An Investigation of the Laws of Disinfection." *Journal of Hygiene*, 8:92-157, 1908.

EPA LT1ESWTR Disinfection and Profiling Technical Guidance Manual, EPA 816-R-03-004, May 2003.

EPA Disinfection and Profiling and Benchmarking Guidance Manual, EPA 815-R-99-013, August 1999.

Race, J. *Chlorination of Water*. Wiley, New York, 1918.

FORTILINE WATERWORKS: NORTH CAROLINA

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DEEP



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Wilmington: 910-386-4221

844-792-7473 (PIPE)
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NCWOA Upcoming Workshops & Training Events with Proposed Agendas

All NCWOA seminars listed on pages 4-5 are for 6.0 contact hours and are pre-approved by the NCWTFOCB for treatment and distribution operators. Some of the seminars will also qualify for 6.0 wastewater contact hours. Individuals that attend an entire seminar will receive a Certificate of Attendance for 6.0 contact hours. Please see each individual seminar agenda or description for details. Seminar agendas and locations are tentative and may be subject to change.

Small Systems Seminar

August 20, 2019 in Waynesville - 8am - 4pm

The morning session will consist of:

- Administration - Records & Operators
- Rules & Regs
- Maintaining Viable Operations
- GW Rule Requirements
- SW Rule Requirements

- GW Treatment Options & Costs
- SW Treatment Options & Costs
- Distribution & Collection Systems - Maintaining the System, Emergency Response & Mutual Aid, Emergency Repairs & Public Notification

Certificates for 6 Contact hours for all DRINKING WATER and WASTEWATER certifications

The afternoon session will consist of:

Remote Lab Tech Day

August 28, 2019 in Raleigh

8:00- 8:30	Registration & Welcome	Bryant, City of Raleigh
8:30 - 9:15	Customer Complaints: How Do We Handle Them? Drew Foy, City of Hickory	11:30 – 12:30 Lunch (provided on-site)
9:15 – 9:45	Powdered Activated Carbon Optimization Study for Taste and Odor Reduction Rachel Monschein & Erin Lee, Town of Cary	12:30 – 1:15 Chemical Waste Disposal / TBD
9:45 – 10:00	Break	1:15 – 2:45 Tour: EM Johnson WTP
10:00 – 10:45	Controlling Algae: "Shade Balls" and EMJ Plant Upgrade Project Mike Hughes, City of Raleigh	2:45 – 3:00 Break
10:45– 11:30	Corrosion Control Study Project: EM Johnson Water Plant Chuck McCall, CDM Smith & Marcus	3:00 – 3:45 Dealing With a Disasters Eric Hatcher, CFPWA
		3:45 – 4:00 Question and Answer Section
		4:00 Certificates for 6 Contact hours for all DRINKING WATER and WASTEWATER certifications

Water & WW Operations

October 29, 2019 in Greensboro

Topics to include filter assessment, Pumps, PFAS and more.....

Improving Efficiencies - System.Facilities.People

Dec 10, 2019 in Raleigh - 8am - 4pm

The morning session will consist of:

Water Efficiencies

- Electrical
- Pumps & Motors
- Soft Starters

Water Loss

- Metering

Capacity Development

- Growth & Expansion issues

The afternoon session will consist of:

Leadership/Supervision

- Motivation of the Workforce
- Generational Supervision issues

HR Practices

Certificates for 6 Contact hours for all DRINKING WATER and WASTEWATER certifications

NCWOA Upcoming Workshops & Training Events with Proposed Agendas

All NCWOA seminars listed on pages 4-5 are for 6.0 contact hours and are pre-approved by the NCWFOCB for treatment and distribution operators. Some of the seminars will also qualify for 6.0 wastewater contact hours. Individuals that attend an entire seminar will receive a Certificate of Attendance for 6.0 contact hours. Please see each individual seminar agenda or description for details. Seminar agendas and locations are tentative and may be subject to change.

Fall Certification School

September 23-27, 2019 in Raleigh ([Fall School Brochure - coming soon](#))

Advanced Day 2019

September 25, 2019 in Raleigh ([Registration in Fall School Brochure - coming soon](#))

The morning sessions will include:

Regulatory Update on Source Water Protection/The Science Behind Emerging Contaminants/Treatment Techniques for Emerging Contaminants

The afternoon sessions will include:

Using Alert Systems & Social Media to Communicate with our Customers/Effective Communication

Certificates for 6 Contact hours for all DRINKING WATER and WASTEWATER certifications

For more information and online registration, please visit our website at www.ncwoa.com

NCWOA SEMINAR REGISTRATION FORM

Deadline for entry is receipt at least 4 business days before a seminar. Space is limited - First Paid, First Accepted

Please Print or Type

NAME (First, MI, Last): _____ Nickname (For Tag) _____

SOCIAL SECURITY # (last 4 digits): XXX-XX-_____ EMPLOYER: _____

MAILING ADDRESS _____

CITY: _____ COUNTY: _____ STATE: _____ ZIP: _____

WORK PHONE: _____ Ext: _____ FAX: _____

EMAIL ADDRESS: _____

NC WATER TREATMENT CERTIFICATE # (OPERATOR ID #): _____ NCWOA MEMBER # : _____

NC WATER TREATMENT CERTIFICATE TYPE: ☐ AS ☐ BS ☐ CS ☐ AW ☐ BW ☐ CW ☐ DW ☐ AD ☐ BD ☐ CD ☐ DD ☐ CC/BF ☐ None

NC WASTEWATER CERTIFICATION # (OPERATOR ID #): _____, _____, _____

NCWOA MEMBER PRICE IS \$55.00 (Must put your INDIVIDUAL NCWOA membership number on the line above to qualify)

NON-MEMBER PRICE IS \$105.00 (**2019 NCWOA membership included in this price.)

Small Systems Seminar - August 20, 2019 in Waynesville** Cost \$ _____

Remote Lab Tech Day - August 28, 2019 in Raleigh** Cost \$ _____

Water & WW Operations - October 29, 2019 in Greensboro Cost \$ _____

Improving Efficiencies - System.Facilities.People - December 10, 2019 in Raleigh Cost \$ _____

Please make checks payable to "NCWOA" or "North Carolina Waterworks Operators Association." We do NOT accept Purchase Orders. Credit Card payments may be mailed, faxed, or scanned but NOT called in. A confirmation letter/receipt and map will be mailed to each attendee once full payment is received.

REFUNDS: We will issue a refund (minus a \$20 administrative fee), if the refund is requested, in writing, at least 7 business days prior to the event. Refunds will be made in the same manner as payment. Substitutions may be made. Please inform us, as soon as possible, of substitutions so that the appropriate certificates of attendance may be generated.

CREDIT CARD PAYMENT

Credit Card Type: ☐ Visa ☐ MC ☐ AmEx ☐ Discover

Name on Credit Card: _____

Credit Card Number: _____

Exp Date: Month _____ Year _____ Security Code from back of Card _____

Cardholder's Signature: _____

If cardholder is other than attendee, what email address should the CC receipt be sent to? _____

To ensure that you receive the emailed receipt, please add heather@ncwoa.com to your email address book.

NCWOA USE: Amount: _____ CK# _____ E \$ _____ Processed: _____

PLEASE SEND APPLICATION AND PAYMENT TO:

Heather Cagle, NCWOA Administrator
PO Box 5466
High Point, NC 27262
Phone: 252-764-2094 ext. 1
Fax: 252-764-2095
Email: heather@ncwoa.com

NEW ADDRESS

EFFECTIVE 01/01/19

Credit Card Payment
Cannot be Processed
Over the Phone

NCWOA Sectional Training

NCWOA sectional training meetings listed below are for 4.0 contact hours and are pre-approved by the NCWTFOCB for treatment and distribution operators. All sectional training is open to anyone regardless of your particular section. Training agendas and locations are tentative and may be subject to change.

All Sectional Training Meetings will take place from 10am - 3pm.

There will be two training sessions (10am-12noon and 1pm-3pm), you may attend one or both.

Sectional Trainings are open to anyone, however if you want contact hours you must be an active member or be prepared to pay the \$40 annual membership fee on-site.

Western Sectional Training

August 22, 2019 - Gorges State Park (2 credit hours only)

Topics: System tour, AWOP requirements

October 24, 2019 - Lenoir

Topics: Plant tour, Actiflow, Plant upgrades

Please RSVP to Brendan Kelley at (828) 890-2835 or BKelley@ashevillenc.gov

North Piedmont Sectional Training

August 15, 2019 - OWASA (Carrboro) - sponsored by Trinity Inc.

Topics: TOC vs THM, Emerging contaminants, Plant tour, Distribution

Please RSVP to Melanie Clark at (336) 627-1009 ext 101 or mclark@edennc.us

South Piedmont Sectional Training

August 29, 2019 - Kannapolis

Topics: Handling of process wastes & Distribution - flushing

Please RSVP to Tena Mullis at (704) 920-5163 or mullistm@concordnc.gov

If you are interested in
hosting or sponsoring
a sectional training
meeting please
contact
Heather Cagle at
(252) 764-2094
ext. 1 or
heather@ncwoa.com

Northeast Sectional Training

August 13, 2019 - Greenville Utilities Commission

Topics: Filter Assessment, Plant operations, Troubleshooting well houses, Distribution regs, Disinfection & DBP

October 15, 2019 - Winterville

Topics: Disaster preparedness, Certification Board rules & regs, Flushing

Please RSVP to Yama Jones at (252) 232-6061 or Yama.jones@currituckcountync.gov

Southeast Sectional Training

July 18, 2019 - Sanford

Topics: Plant optimization for TOC removal, Plant operations, Security, Inline instrumentation

October 17, 2019 - PWC (Fayetteville) (2 credit hours only)

Topics: Plant tour, Distribution inspections

Please RSVP to Robin Miller at robin.miller@faypwc.com



What's happening at your plant?

Are you going through an upgrade, adding some new features, starting a new process? Want to share your experience with other operators?

NCWOA would love to include an article in the Go With The Flow or if you are intersted in hosting a sectional training meeting please contact Heather Cagle at 252.764.2094 ext. 1 or heather@ncwoa.com.

Interested in Specialized Training?

NCWOA will bring the training to you!

Training specifically designed on subjects you request

6.0 hours of continuing education

Dual credit if requested

Great economical way to provide your operators with knowledge and expertise!



If interested please contact Mike Richardson or Don Price
at (252) 764-2094 or mike@ncwoa.com or don@ncwoa.com.

Additional NCWOA Sponsored Training

Bacteriological Methods Workshop
July 23-25, 2019
November 6-8, 2019
Contact Michelle Rufus
(919) 807-8751

Math Review
Contact JD Monroe
(910) 947-5784

NCWOA Fall School
Sept. 23-27, 2019 in Raleigh
A, B, & C Surface
A, B, & C Well
Advanced Day, Sept. 25, 2019
Brochures coming soon

We Appreciate Our Corporate Sponsors!



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***Interested in sponsorship?
Multiple Opportunities Available***

Please contact:

Allen Daniels, Public Image Committee (252) 230-8424 Email: allen@waterguardinc.com

Heather Cagle, NCWOA Administrator (252) 764-2094 ext. 1 Email: heather@ncwoa.com

North Carolina Waterworks Operators Association

MEMBERSHIP APPLICATION

MISSION STATEMENT: To provide knowledge, skills & educational opportunities for drinking water professionals; develop working relationships with other water treatment organizations; project a positive image and communicate the importance of safe drinking water.



Membership Application

ANNUAL DUES ARE \$40.00 FOR 2019

First Name: _____ Middle Initial: _____ Last Name: _____

Nickname: _____ Social Security # (last 4 digits): xxx-xx-_____ If Renewal, what is your NCWOA Member #: _____

YOUR Individual Operator Certification #: (Issued by NCWTFOCB) _____

Certificate(s) Held:

____ A-Surface ____ B-Surface ____ C-Surface ____ A-Well ____ B-Well ____ C-Well ____ D-Well

____ A-Dist ____ B-Dist ____ C-Dist ____ D-Dist ____ Cross-Connection

____ Wastewater #'s

____ None Yet ____ You are not an Operator & do not plan to become Certified.

PLEASE SELECT YOUR PREFERRED ADDRESS (This is where confirmations & membership info will be sent.)

____ Home Address: _____

City: _____ State _____ Zip _____ County: _____

____ Employer Name: _____

MAILING Address: _____

City: _____ State _____ Zip _____ County: _____

Work Phone : _____ Ext: _____ Fax: _____

Home Phone: _____ Cell Phone: _____

Email Address: _____

How would you like to receive your issues of Go With The Flow? Postal Delivery _____ OR Email _____

How would you like to receive your Section Meeting notices? Postal Delivery _____ OR Email _____

NOTE: Memberships are based upon a calendar year. Membership cards will be mailed with receipt. These cards will contain your name, membership number, and membership expiration date.

NOTE: Please make checks payable to "NCWOA" or "North Carolina Waterworks Operators Association." We do NOT accept Purchase Orders. Credit Card payments may be mailed, faxed, or scanned but NOT called in

CREDIT CARD PAYMENT

Credit Card Type: ____ Visa ____ MC ____ AmEx ____ Discover

Name on Credit Card: _____

Credit Card Number: _____

Exp Date: Month ____ Year ____ Security Code from back of Card _____

Cardholder's Signature: _____

If cardholder is other than attendee, what email address should the CC receipt be sent to? _____

To ensure that you receive the emailed receipt, please add heather@ncwoa.com to your email address book.

NCWOA USE: Amount: _____ CK# _____ E S Processed: _____

PLEASE SEND APPLICATION AND PAYMENT TO:

Heather Cagle, NCWOA Administrator

PO Box 5466

High Point, NC 27262

Phone: 252-764-2094 ext. 1

Fax: 252-764-2095

Email: heather@ncwoa.com

NEW ADDRESS

EFFECTIVE 01/01/19

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: Cannot be Processed :
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Committee Members

2018-2019 Executive Committee

President

Jeff Isley
Email: Isley1062@aol.com

First Vice-President

Ken Loflin
OWASA
Phone: (919) 537-4232
Email: kloflin@owasa.org

Second-Vice President

Sam Molinas
Broad River Water Authority
Phone: (828) 286-0731
Email: smolinas@ncbrwa.com

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The East Group
Phone: (252) 758-3746 x 131
Email: michelle.clements@eastgroup.com

Treasurer

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City of Asheville – North Fork WTP
Phone: (828) 271-6105
Email: lcarreiro@ashevillenc.gov

Past President

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Phone: (252) 551-1561
Email: patricje@guc.com

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Pat Irwin
Dare County
Phone: (252) 475-5603
Email: pat.irwin@darenc.com

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Allen Daniels
Water Guard, Inc.
Phone: (252) 230-8424
Email: allen@waterguardinc.com

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Chris Smith
Fayetteville Public Works
Phone: (910) 223-4708
Email: chris.smith@faypwc.com

Chair – Western Section

Lowell Graves
Phone: (828) 396-1006
Email: lgraves@ci.lenoir.nc.us

Chair – North Piedmont Section

Steve Pope
Piedmont Triad Regional Water Authority
Phone: (336) 382-2373
Email: spope@ptrwa.org

Chair – South Piedmont Section

Tena Mullis
City of Concord
Phone: (704) 920-5163
Email: mullistm@concordnc.gov

Chair – Southeast Section

Del Coffman
Fayetteville Public Works
Phone: (910) 223-4706
Email: del.coffman@faypwc.com

Chair – Northeast Section

Yama Joines
Currituck County
Phone: (252) 232-6061 ext 6061
Email: Yama.Jones@currituckcountync.gov

Distribution Officer

TBD

2018-2019 Committees

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Board Director: Julius Patrick

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Julius Patrick
Sam Molinas
Ken Loflin
Jeff Isley

Professional Development Committees

Board Director: Ken Loflin

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Jeff Isley
Leslie Carreiro
Don Price
Steve Pope
Tena Mullis
Yama Jones
Lowell Graves
Del Coffman
Julius Patrick
Pam Gibbons
Allen Daniels
Dail Booth
James Merritt
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Mark Hahn (Co-Chair)
Lee Kiser
Del Coffman
Garrett Gilbert

Lab Analyst

Chris Goforth (Co-Chair)
Bernadine Wardlaw (Co-Chair)
Chad Flannagan (Co-Chair)
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Erik Ruff
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Steve Beale
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Dail Booth
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Julius Patrick
Tena Mullis
Steve Pope
Del Coffman
Sam Molinas
Ken Loflin
Lowell Graves
Yama Jones

Operator of the Year Award

Julius Patrick (Chair)
PWS Representative - Joey White
Chris Smith

Leadership Committees

Board Director: Sam Molinas

Nominating

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Tena Mullis
Yama Jones
Steve Pope
Lowell Graves
Del Coffman

Rules

Mack Edmisten (Chair)
Chris Smith
Jay Van Hoose

Heather Cagle, Administrator
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Important Phone Numbers & Websites

Main Phone # for Certification Board	919-707-9040	https://deq.nc.gov/about/divisions/water-resources/operator-certification/drinking-water-operator-certification/dw-operator-certification-wtfocb
PWS Section Chief	919-707-9078	
Linda Raynor, Compliance Services Branch	919-707-9095	
Robert Midgette, Operation Branch	919-707-9088	
Jay Frick, PWS – Protection & Enforcement Branch	919-707-9102	
Bethany Goodwin, PWS – Consumer Confidence Reports	919-707-9079	
Public Water Supply Offices:		www.deh.enr.state.nc.us/pws
<i>Central Office</i>	919-707-9100	
<i>Asheville</i>	828-296-4500	
<i>Mooreville</i>	704-663-1699	
<i>Winston-Salem</i>	336-776-9800	
<i>Raleigh</i>	919-791-4200	
<i>Fayetteville</i>	910-433-3300	
<i>Washington</i>	252-946-6481	
<i>Wilmington</i>	910-796-7215	
NC State Laboratory of Public Health	919-733-7308	
SDWA Hotline	800-426-4791	
EPA SDWA Website		www.epa.gov/safewater
EPA Microbial & DBP Data from Drinking Water Systems Website		www.epa.gov/enviro/html/icr
NC Waterworks Operators Association (NCWOA)	252-764-2094	www.ncwoa.com email: heather@ncwoa.com
NC Rural Water Association	336-731-6963	www.ncrwa.com
NC AWWA-WEA	919-784-9030	www.ncsafewater.org



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