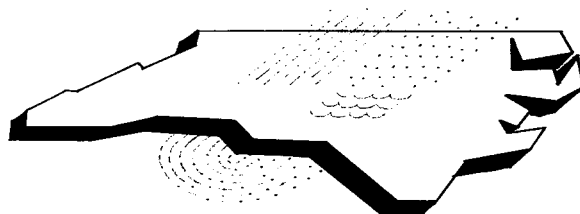




Safe Drinking Water Guide

for owners of non-transient, non-community
Public Water Systems using groundwater
in North Carolina

including child day care centers, adult day care centers,
schools, factories, and businesses



*Water Resources Research Institute
of The University of North Carolina*



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<http://www2.ncsu.edu/ncsu/CIL/WRI/NTNCguide.pdf>

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including child day care centers, adult day care centers,
schools, factories, and businesses

A non-transient, non-community (NTNC) Public Water System is not a community system and regularly serves at least 25 of the same people for more than six months per year. This publication is meant to be a general guide on broad areas of responsibility and core principles of safe system operation for prospective and current owners of NTNC Public Water Systems that use groundwater. It cannot be relied upon for regulatory compliance. Only personnel of the N. C. Public Water Supply Section can provide regulatory advice.

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Start-up Responsibilities of the Owner of a Non-transient, Non-community (NTNC) Public Water System

It is the responsibility of the owner of any Public Water System to meet all the regulatory requirements for the water system. The regulatory responsibilities of the owner of a NTNC Public Water System include:

- Give written notice to the N.C. Public Water Supply Section (PWSS) of intent to construct, alter, or expand a system.
- Obtain approval of the N.C. PWSS when siting a well to serve the system. Before a well meant to serve an NTNC Public Water System is drilled, a representative of the PWSS must investigate the well site(s) to make sure that the well can be placed on the site to meet requirements of Rules Governing Public Water Systems (the Rules). The Rules specify site size, separation distances between the well and sources of potential contamination, and drainage features. The rules also specify that the area within 100 feet of the well shall be owned or controlled by the person supplying the water.
- Obtain approval of the N.C. PWSS of plans and specifications for the system. Any construction, alteration or expansion of a system that affects water pressure, the quality of the water, operating units, or water treatment processes requires prior approval of engineering plans, reports and specifications. These documents must be prepared and sealed by a professional engineer licensed to practice in the State of North Carolina, must include items specified in the Rules, and must be submitted at least 30 days before the time you wish to have them approved. Wells must produce enough water to meet the needs of the system as defined by the Rules. Analyses must demonstrate that the water meets water quality standards in the Rules or that it is being treated to meet standards. Systems must meet all requirements of the N.C. Plumbing Code and the design criteria specified in the Rules, which include water pressure requirements.
- Obtain approval of the N.C. PWSS of the water system management plan. The water system management plan must document the ability of the owner to finance, operate, and manage the system in accordance with the Rules. It must include items specified in the Rules and must be submitted at least 60 days prior to the time you wish to have it approved. All NTNC Public Water Systems with more than 100 service connections must have a certified distribution operator in responsible charge of the distribution system. NTNC systems that have five or more testable backflow prevention assemblies must have an operator in responsible charge for the cross-connection-control facilities who holds a valid Grade Cross-Connection-Control Certificate.
- Prepare an Operation and Maintenance Plan and an Emergency Management Plan. These plans do not have to be submitted to the PWSS but must be completed before you can obtain approval to begin construction, alteration, or expansion. An important part of the Operation and Maintenance plan is the sample siting plan—that is a diagram showing the sites where compliance monitoring samples will be taken. These documents should be kept on site at the system and should be referred to when taking samples and completing monitoring reports.
- On an on-going basis, assure that monitoring required by N.C. Rules Governing Public Water Systems is conducted and the results are reported to the N.C. PWSS according to the required schedule. An owner may choose to carry out the monitoring program him/herself. However, if the water supply must be treated on an on-going basis, the owner must hire a Certified Water Treatment Facility Operator to operate the system. The owner may choose to take training, pass an exam, and become a Certified Water Treatment Facility Operator him/herself. Any non-transient system that began operation on or after January 1, 1972, must disinfect on an ongoing basis. Details on requirements of the monitoring program follow.

Regulations Governing Siting and Construction of Public Water Supply Wells and Operation of Public Water Systems in North Carolina

Construction of all water supply wells are subject to North Carolina Well Construction Standards (15A NCAC 2C .0100), administered by the Groundwater Section of the N.C. Division of Water Quality. They must be constructed by a well contractor certified by the N.C. Well Contractors Certification Commission.

Find information about well standards and well contractors certification on the N.C. Groundwater Section website at:
<http://gw.ehnr.state.nc.us/>.

Siting and construction of wells that serve non-transient Public Water Systems are also subject to N.C. Rules Governing Public Water Systems. **Sites for Public Water System wells must be approved before construction.**

The N.C. Rules Governing Public Water Systems are available on the N.C. Public Water Supply Section website at:
<http://www.deh.enr.state.nc.us/pws/rules/contents.htm>

Water supply systems are also governed by the N.C. Plumbing Code, which is enforced by city and county inspectors. Engineering plans, reports and specifications for construction of any Public Water System must be prepared, signed and sealed by a Professional Engineer licensed by the State of North Carolina. Upon completion of construction, an Applicant Certification Form and the Engineer's Certification must be submitted to the State for final approval. Final approval is required before the system is placed into service or made available for human consumption.

Any Public Water System that treats its water is required to have a Certified Water Treatment Facility Operator. Owners of systems may undergo training and become certified as Treatment Operators, Distribution System Operators, or Cross-Connection Control Operators.

Information about operator certification requirements is available on the N.C. Public Water Supply Section website at
<http://www.deh.enr.state.nc.us/pws/Certification%20Board/forms%20page.htm>.

Certified operators can be contacted through the North Carolina Waterworks Operators Association at:
<http://www.geocities.com/ncwoa>.

Monitoring Responsibilities of the Owner/Operator of a Non-transient, Non-community (NTNC) Public Water System

An “operator in responsible charge (ORC)” of a Public Water System requiring treatment is the person who conducts residual chlorine and other required tests, and reports the results to the N.C. PWSS on a monthly basis. An operator must hold a valid certificate issued by the North Carolina Water Treatment Facility Operators Certification Board (that is, must be a Certified Operator) The operator may also conduct other required monitoring, or the owner may conduct sampling him/herself. An owner may become a Certified Operator and conduct tests for chlorine residual as well as other required monitoring. Even if an owner employs an operator, the owner is ultimately responsible for providing safe drinking water and meeting regulatory requirements. The owner and operator must work together to ensure that the water system provides safe drinking water and meets all applicable rules. Water samples must be analyzed by a State Certified Laboratory, and the results must be received by the N.C. PWSS from the Certified Lab on the 10th of the month following the date of analysis, unless the sample exceeds allowable limits in which case results must be faxed within 24-48 hours, depending on the contaminant.

Thousands of different contaminants harmful to human health could find their way into drinking water systems. Testing for all possible contaminants would be impractical. The U.S. EPA sets priorities for contaminant monitoring based on national occurrence data and health effects for specific contaminants. Two kinds of contaminants are monitored: **acute** and **chronic**. **Acute** contaminants pose an immediate health risk if consumed. Acute contaminants are tested at all public water supplies. Nitrate and E. coli are examples of acute contaminants. **Chronic** contaminants could cause ill health if they are consumed at relatively low concentrations over extended periods of time. Examples are disinfection by-products and copper. Chronic contaminants are monitored only at community and nontransient systems because people served by these systems may consume the water for extended periods of time.

Maximum Contaminant Level (MCL) and Action Level (AL)

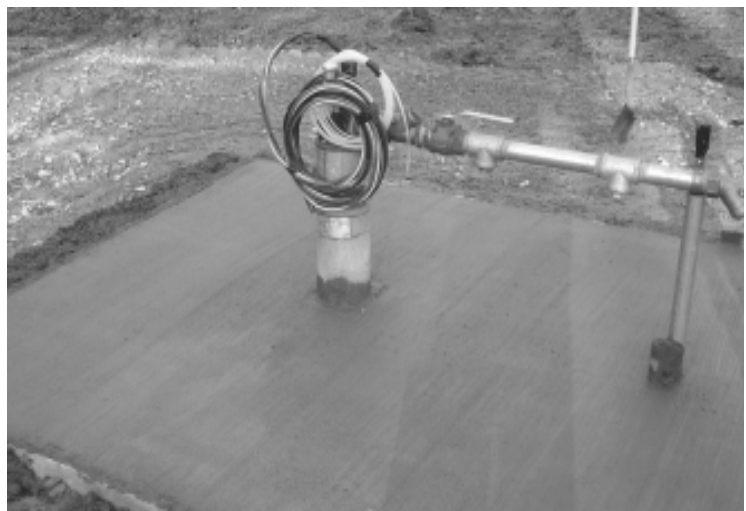
EPA sets a maximum contaminant level (MCL) for each regulated contaminant. The MCL is the greatest amount of a particular contaminant allowed in drinking water.

Some contaminants, such as lead, are assigned an action level (AL) instead of an MCL. An AL is a contaminant concentration that—if reached in a certain percentage of samples—requires specified actions by the public water supply.

continued

Drilled well

Water supply wells are typically drilled. Constructing a drilled well involves drilling a hole, installing steel or plastic casing, and grouting around the casing to prevent surface water or undesirable shallow groundwater from getting into the well. N.C. well construction rules require that the well casing be completely sealed and maintained at least 12 inches above land surface. The N.C. PWSS requires that the casing extend at least 6 inches above the slab. The slab must be a minimum of 4 inches thick and have no cracks. Photo courtesy of Heater Utilities, Inc.



Contaminants and monitoring requirements

Acute contaminants

■ **Bacteriological.** As an indication of whether disease-causing bacteria and viruses may have gotten into the water supply, NTNC Public Water Systems serving fewer than 1,000 persons must monitor for the total coliform group of bacteria quarterly. Samples must be taken at sites which are representative of water throughout the distribution system according to the Sample Siting Plan. Systems serving 25-1,000 people must take one routine sample per quarter.

If a sample tests positive for coliform bacteria, then “repeat” samples must be taken with 24 hours of the time your laboratory notifies you of the positive sample. One repeat sample must be taken at the tap where the original positive sample was taken. One repeat sample must be taken between the point of entry and the tap where the positive sample was taken (nearer to the source). One repeat sample must be taken between the tap where the positive sample was taken and the end of the distribution system (further from the source). The fourth sample may be taken anywhere in the system, which will be nearer to or further from the source. All repeat samples must be taken on the same day.

If any of the repeat samples are positive, then the system is considered as exceeding the MCL for coliform bacteria. If any of the repeat samples test positive for total coliform only (none for *E. coli* or fecal), then a notice of such must be given to the users within 30 days. If any of the results test positive for *E. coli* or fecal as well, then the public notice of such must be done within 24 hours. Five routine samples must also be taken in the month following a positive sample.

Minimum disinfectant residual for systems that must disinfect. When samples are taken for total coliforms, the residual disinfectant concentration must be also measured at the same points where coliform samples are taken. These measurements must be reported. If chlorine is the disinfectant being used, free chlorine must be reported. If chlorine and ammonia are used as the disinfectant, combined chlorine residuals must be reported.

■ **Nitrates/Nitrites:** Nitrates and nitrites are chemical compounds that contain nitrogen and oxygen. In the body, nitrates are converted to nitrites, which interfere with the oxygen-carrying ability of blood. Reduction of the blood’s ability to provide oxygen to the body can result in a number of health problems, including shortness of breath and blueness of the skin. Babies and unborn children are most vulnerable to problems from high levels of nitrate. If babies’ formula is prepared using water containing high levels of nitrates, they could become very ill in just a short period of time and could even die. Pregnant women should also be concerned about the effect of high levels of nitrates on their unborn children. Nitrates can get into well water from agricultural fields where fertilizers are used and from nearby septic systems.

Nitrate. Sampling for nitrate must be done every year. Samples must be taken at the point where treated water from the well or well system enters the distribution system. If there is more than one entry point, samples must be taken at each. If nitrate is found above 5.0 milligrams per liter (mg/L), a second sample must be taken with 24 hours. If the average of the two samples is above 5.0 mg/L, then you must post public notice, notify the State, and initiate quarterly sampling. If four consecutive quarterly samples show nitrate concentrations below 5.0 mg/L, then you may apply to PWSS for annual monitoring.

Nitrite. Only a one-time baseline sampling for nitrite is required unless the first sample reveals a nitrite concentration of 0.5 mg/L or higher. The sample must be taken at the entry point. If there is more than one entry point, samples must be taken at each entry point. If the first sampling reveals nitrite concentration of 0.5 mg/L or higher, then you must sample quarterly until four consecutive samples show nitrite concentrations below 0.5mg/L. If the initial sample is above 1 mg/L, you must take a confirmation sample within 24 hours. If the average of the two samples is above 1 mg/L you must post public notice and notify the state.

Some Common Causes of Coliform Contamination and Corrective Actions

CAUSE	PREVENTION/CORRECTIVE ACTION
<p>Contaminated faucets or poor sampling technique can be sources of bacteria and falsely indicate contamination of the water supply</p>	<p>Make sure the faucet where you take the sample is clean by disinfecting it and then flushing it for approximately 5 minutes. Handle sample bottles carefully. Take care not to touch the inside of bottles and caps or to drop bottles or caps on surfaces where bacteria could be growing. If this happens contact your lab for another bottle</p>
<p>Backflow from lawn sprinklers, fire sprinklers, boilers and other non-system fixtures can introduce bacteria into the system.</p>	<p>Make sure proper backflow prevention is installed.</p>
<p>If well casing stops at, near or below ground level, surface water can enter the well through the well cap or vent.</p>	<p>Have a licensed well contractor to extend the well casing at least 12 inches above ground level. Make sure that the casing extends at least 6 inches above a four-inch thick slab.</p>
<p>Loose-fitting or damaged well caps or sanitary seals can allow bacteria to enter the water system.</p>	<p>Install new well caps or replace damaged sanitary seals. Construct well housing.</p>
<p>Replacing a submersible pump or making plumbing repairs or additions can introduce coliform contamination.</p>	<p>Always disinfect the well and plumbing after repairs or additions.</p>
<p>When plumbing fixtures are removed or not used and the associated water lines are left in place, dead ends are created. Water in dead ends becomes stagnant and sediment can accumulate, creating conditions favorable to bacterial growth. Water systems with very low water use can act like dead ends.</p>	<p>Periodically run water through seldom-used fixtures. For low use systems, flush the system by running a sprinkler or other fixture.</p>
<p>Poor well construction.</p>	<p>Have a Certified Well Contractor make well improvements.</p>

Chronic contaminants

- **Inorganic chemicals.** Included in the inorganic group of contaminants are metals and other compounds known to have human health effects. Monitoring described here applies to antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, mercury, nickel, selenium, and thallium. At high levels some of these contaminants are acutely toxic. At lower levels they may contribute to health problems ranging from cognitive impairment to heart disease to osteoporosis. A NTNC Public Water System must collect one initial sample for analysis of these inorganic chemicals at each entry point. If there are no exceedances of MCLs established for the contaminants, then the system may sample for these inorganics once every three years thereafter. After three (3) three-year periods with no exceedances, the system may request to monitor every nine years. If the initial sample shows a concentration of an inorganic above the MCL, then quarterly monitoring must be initiated for that contaminant (Nitrate, nitrite, and total nitrate and nitrite as well as asbestos are inorganics. However monitoring requirements for these substances are different from the other inorganics and are described separately in this publication.)
- **Asbestos.** Asbestos is a fibrous mineral resistant to heat and most chemicals. It occurs in natural deposits and has been mined for use in over 3,000 products, including roofing materials, brake pads, and cement pipe often used in water distribution. Long-term exposure to asbestos above the maximum contaminant level has the potential to cause lung disease and cancer. NTNC Public Water Systems must take on initial sample to check for asbestos. If it is not detected above the MCL, sampling may be performed every nine years if a waiver is obtained from the State.
- **Lead & copper.** Lead and copper can enter water supplies from water system pipes and household plumbing. The amount of lead and copper that dissolves into the water increases with water temperature, corrosivity, and the time water stands idle in pipes. If lead is ingested in drinking water it can build up in the body over time. Too much lead can damage the brain, nervous system, blood cells, and kidneys. Lead in drinking water can be a particular problem for infants drinking formula made from tap water and for pregnant women. Health effects of drinking water with elevated levels of copper include vomiting, diarrhea, stomach cramps and nausea. The seriousness of these effects can be expected to increase with increased copper levels or length of exposure. NTNC Public Water Systems must monitor for lead and copper every six months for the first year. If 90th percentile concentrations are below the “action level” after the first year, the system may collect annual samples during June-September for two consecutive years. After two years of annual monitoring if 90th percentile concentrations have been below the action level, the system may reduce monitoring to every three years. If at any point, samples show 90th percentile concentrations above the action level, the system must increase its monitoring to every six months.
- **Volatile organic chemicals.** Volatile organic chemicals (VOCs) are found in paints, paint thinners, adhesives, solvents used in the mechanical industry, dry cleaning solvents, gasoline, and other industrial chemicals. Groundwater can be contaminated by VOCs by leaking underground or above ground storage tanks and improper disposal of waste products. Potential health effects from ingesting these compounds in drinking water over a long period of time are varied and range from cancers to nervous system and liver damage. Initially, NTNC Public Water Systems must monitor for VOCs for four consecutive quarters at each entry point. If there is no detection of any regulated VOC for all four consecutive quarters, then monitoring may be reduced to one sample annually. After three consecutive years with no detections, monitoring may be reduced to every three years. If at any time monitoring detects one of the regulated VOCs, then quarterly monitoring must begin.
- **Synthetic organic chemicals.** Man-made chemicals such as pesticides, herbicides, PCBs, and chemicals used in the manufacture of plastics are examples of synthetic organic chemicals (SOCs). Potential health effects from ingesting these chemicals in drinking water over a long period of time range from cancers to nervous system and organ damage. Initially, NTNC Public Water Systems must monitor for SOC for four consecutive quarters at each entry point. If no SOC is detected, monitoring may be reduced for systems serving fewer than 3,301 persons to one sample per entry point every three years. Systems serving 3,301 persons and more may reduce sampling to two

quarterly samples in one year every three-year compliance period for each entry point. In lieu of collecting four quarterly samples, groundwater systems serving fewer than 3,301 persons have the option of collecting one sample and then submitting a SOC Waiver Application. If at any point, SOCs are detected, quarterly monitoring must be initiated for that contaminant using the required method.

Effective January 1, 2004, for systems that must add a disinfectant to source water:

■ **Chlorine residual.** Although disinfection of source water eliminates microbial contamination, a balance must be struck between enough and too much disinfectant that lingers in the distribution system. When water is disinfected with a chlorine product (chlorine, chloramine, chlorine dioxide), reaction with matter in water consumes most of the chlorine, unless too much disinfectant has been used. Chlorine residuals above the allowable MCL can cause irritation of the eyes and nose. Chlorine residuals above the MCL may cause stomach discomfort. In some cases, including infants and children, anemia can result from consumption of water with high chlorine residuals. For NTNC Public Water Systems that use chlorine or chloramine disinfection, a Certified Water Treatment Facility Operator (or someone under the direct supervision of a Certified Water Treatment Facility Operator) must test for chlorine residual (free chlorine or combined chlorine) each month at the distribution site at the same time bacteriological samples are taken. Residuals above the Maximum Residual Disinfectant Level (MRDLs) of 4 mg/L for chlorine or chloramines requires posting of Public Notice and notification of the PWSS (see page 13).

Chlorine dioxide is a strong disinfectant that quickly kills bacterial, viral and protozoan pathogens. However, chlorine dioxide is very reactive and creates a number of harmful by-products including chlorite. In addition, at high levels chlorine dioxide may have adverse health effects. Consumers, including infants and young children, who drink water containing chlorine dioxide in excess of EPA's standard (0.8 mg/L) could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of EPA's standard. Some people may experience anemia. Operators of systems using chlorine dioxide must test daily at each entry point to the system. If the chlorine dioxide residual at the entry point measures above the MRDL, then three samples must be taken at specific locations in the distribution system the following day. (These requirements are complex, and officials of the N.C. PWSS should be consulted.) If any of the distribution system samples are above the MRDL or if the entry point sample exceeds the MRDL the following day, then the system has an acute violation. Corrective action must be taken, consumers of the water must be notified in accordance with requirements for nonacute or acute violations, and the N.C. PWSS must be notified as soon as possible. If the chlorine dioxide residual at the entry point measures above the MRDL for two days in a row, but no samples taken within the distribution are above the MRDL, then the system has a nonacute violation of the MRDL. Corrective action must be taken to lower the concentration at the entry point, consumers of the water must be notified in accordance with requirements for nonacute violations, and the NCPWSS must be notified as soon as possible.

■ **Disinfection by-products.** When chlorine reacts with naturally occurring organic matter during disinfection, various compounds can be created. Long-term consumption of these compounds has been linked to adverse health effects. Chlorite exposure may cause nervous system effects and anemia in consumers. Chlorites may also cause nervous system effects in fetuses of pregnant women. Anemia may also occur. Long term consumption of trihalomethanes, haloacetic acids, and bromate has been linked to increased risk of cancer. Operators of NTNC Public Water Systems using chlorine dioxide must monitor for chlorite daily at each entry point and monthly within the distribution system. See appended monitoring summary table for more details.

Summary tables of monitoring requirements that were prepared by the N.C. PWSS for NTNC Public Water Systems using groundwater are appended to this publication.

Help with keeping your monitoring on schedule

The N.C. Public Water Supply Section provides an Internet (web) site to help you keep up with your required monitoring. Go to

<http://www.deh.enr.state.nc.us/pws/index.htm>

Scroll down and click on "Monitoring Schedule, Sampling Schedule, and Entry Point." Then follow the instructions to reach "Annual Statement PWS Lookup." Type in either your water system name or your ID number and click, "Get Report." You will see a table that lists all the contaminants you must monitor, the last date a sample was submitted, and the date the next sample must be submitted.

Expected New Requirements:

Focus on Pollution Prevention and Source Water Protection

■ **Source Water Assessments.** As required by the Safe Drinking Water Act Amendments, the N.C. PWSS is currently conducting Source Water Assessments for all Public Water Systems in the state. A Source Water Assessment will delineate the area around a public water supply well that contributes water to the well, inventory the potential contaminant sources within the delineated area, and assess the susceptibility of the well to contamination. The relative susceptibility level of "higher," "moderate," or "lower" is intended to help owners and operators of Public Water Systems using groundwater to understand the potential for contamination of their wells. Draft Source Water Assessment reports are expected to be made available to Public Water Systems for their review in late 2003. However, owners and operators of systems should be aware of two limitations of the reports. First, the fact that a potential contaminant source is identified in the contributing area of a well does not necessarily mean contamination is present. If potential sources are managed properly, contamination can be prevented. Second, potential contaminant inventories will be completed using statewide databases that include only certain large categories of contaminant sources and that cover broad areas. Therefore, these assessments may not capture local potential sources of contamination, such as septic systems, or contamination due to damaged system components. Owners and operators of Public Water Systems using groundwater are encouraged to conduct on-site inspection of areas around their wells to assess the threat of contamination. This principle will be emphasized in the new Ground Water Rule expected from EPA in 2003.

■ **Ground Water Rule.** The U.S. EPA has proposed a rule that specifies the appropriate use of disinfection of groundwater and addresses other components of Public Water Systems using groundwater to assure public health protection. The final Ground Water rule is expected to be issued in 2003. Some requirements will become effective three years after the final rule is issued, others will become effective at later dates. The Ground Water Rule requires State drinking water programs to conduct sanitary surveys of non-community Public Water Systems using groundwater every five years and to identify any significant deficiencies in the systems' well siting or their well protection efforts. The State must then provide systems lists of deficiencies and enforce their correction. States must also conduct one-time "hydrogeologic sensitivity assessments" of Public Water Systems that use groundwater and do not disinfect their source water to 4-log inactivation or removal of viruses. The assessment must identify the hydrogeologic characteristics of the aquifers where system wells are located. If wells are located in aquifers that EPA considers to be sensitive to microbial contamination, monthly monitoring for *E. coli*/fecal coliform bacteria in their source water will be required. If contamination is detected, corrective action will be required.

Public Notification Requirements

If your water system exceeds a Maximum Contaminant Level or fails to comply with monitoring requirements, you must notify the people your system serves. A public notice warns consumers of the water that your system is in violation of the Safe Drinking Water Act. There are specific required elements of a public notice. Templates are available on the PWSS website (see below). You should post the public notification at all drinking water taps. You may be required to provide another form of notification as well. If 30 percent or more of your water consumers are non-English speaking, then you must provide information in their language(s) that makes clear the importance of the notice and tells them how to obtain a translated copy of the notice.

In some cases, you may be required to provide an alternate source of safe drinking water until the problem with your system has been solved. If so, your public notice must identify a location where safe drinking water is available.

Public notices must be posted or hand delivered or mailed to consumers within 24 hours, 30 days, or one year depending upon the kind of violation. Violations are assigned to “tiers” and each tier has different notification requirements. For each tier, regulations establish a “violation awareness date” which starts the clock for the notification deadline.

Tier	Violation Awareness Date	Notification deadline
1	Date the analysis was completed	Within 24 hours of violation awareness date, post notice and initiate consultation with the N.C. PWSS
2	Within 2 days of the completion of the analyses	Post notice as soon as possible but within 30 days of violation awareness date
3	Date on the violation letter	Post notice within one year of violation awareness date

Within ten days after you post or send public notification, you must send a Public Notification Certification and a copy of your Public Notice to the PWSS Compliance Services Branch.

continued with violation tiers next page

A Public Notification Certification Form and templates for public notice can be downloaded in pdf and MSWord formats from the N.C. Public Water Supply Section website. Go to

<http://www.deh.enr.state.nc.us/pws/index.htm>.

Look under “Public Notices and Consumer Confidence Reports.”

(Violations letters will include a sample notice that includes a Public Notification Certification.)

Examples of National Primary Drinking Water Regulation Violations and Their Assigned Tiers

Tier 1 Violations

- Fecal coliform maximum contaminant level (MCL) violation or failure to test for fecal contamination after total coliform test is positive
- Nitrate/nitrite/combined nitrate and nitrite MCL violation or failure to take confirmation sample
- Chlorine dioxide maximum residual distribution level (MRDL) violation in distribution system or failure to take repeat samples in distribution system
- Exceedance of maximum allowable turbidity level resulting in an MCL or treatment technique (TT) violation, when the PWSS or EPA determines a Tier 1 notice is warranted, or where consultations did not take place within 24 hours after the system learned of the violation
- Special public notice for non-community water systems with nitrate exceedances between 10 mg/L and 20 mg/L, when allowed to exceed MCL (10 mg/L) by the PWSS
- Waterborne disease outbreak or other waterborne emergency
- Other situations as determined by the PWSS

Tier 2 Violations

- All other MCL, MRDL, and TT violations not identified as a Tier 1 notice
- Monitoring and testing procedure violations, when the primacy agency requires a Tier 2 (rather than Tier 3) notice
- Failure to comply with variance and exemption conditions

Tier 3 Violations

- All other monitoring or testing procedure violations not already requiring a Tier 1 or Tier 2 notice
- Operation under a variance and exemption
- Special public notices (i.e., exceedance of the fluoride secondary maximum contaminant level (SMCL); announcing the availability of unregulated contaminant monitoring results)

Keys to Operating a Safe Drinking Water System

- ✓ Know where your wells are and inspect them on a regular basis for deterioration, damage, or other problems.
- ✓ Develop and implement a wellhead protection plan for the area within 100 feet of your well in all directions. This plan should include:

- Educate your staff about the need for protecting the well head area and changing work practices that may introduce contaminants.

- Do not store paints, pesticides, other hazardous chemicals, or grass mowers, etc. in a well house or anywhere near a well. Do not clean pesticide sprayers, paint brushes, or other tools in the area of a well. Do not apply fertilizers in areas surrounding wells.

- Be sure that any new contamination sources (septic tanks, underground oil tanks, new building foundations) meet the separation distances defined in the N.C. Rules Governing Public Water Systems. If you cannot relocate existing contamination sources to meet separation distances, contact PWSS.

Details for developing a formal wellhead protection plan, which can be adapted for NTNC Public Water Systems, can be found in the North Carolina Wellhead Protection Guidebook at website: <http://www.deh.enr.state.nc.us/pws/wellhead/images/whpp.pdf>

- ✓ Make sure that well caps are intact and secure. If possible, replace older caps with a well cap that includes a compression gasket and screened vent.
- ✓ To prevent surface water or other contaminants from entering the well, make sure that the well casing extends at least **one foot** above the ground surface. Do not build up the surface area around wells to accommodate new bushes, shrubs, or other landscaping beds. Do not pave areas around wells.
- ✓ To prevent surface runoff from collecting near wells, direct surface and roof runoff away from wells.
- ✓ Eliminate dead ends in the plumbing system to prevent stagnant water that can deteriorate and affect water quality throughout the system.
- ✓ Always disinfect the well and plumbing system after repairs or changes. New pumps, new fixtures, new piping, or other plumbing changes can introduce bacterial contamination.
- ✓ Before you make changes to the water system, consult with the N.C. PWSS to determine if plan review is needed.

- ✓ Educate yourself about cross connections, and take all measures to prevent backflow. Cross connections may occur with lawn sprinkler systems, fire sprinklers, boilers, water softening equipment, and other water using devices. Backflow prevention devices should be installed at all cross connections. As of July 1, 2003, any system that has more than five testable backflow prevention assemblies must be operated by a Certified Operator who holds a valid Grade Cross-Connection Control Certificate.

**General information about cross connections and various control devices can be found at The Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California website at:
<http://www.usc.edu/dept/fccchr/introduction.html>
A manual is also available for purchase from this foundation.**

**Technical training on backflow and cross connection is offered by the N.C. American Water Works Association/Water Environment Association as part of its distribution/collection system training program.
Information on training programs of the NCAWWA/WEA is available at its website:
<http://www.ncawwa-wea.org/>**

- ✓ Make sure your system is operated by a Certified Water Treatment Facility Operator who can help you in case of an emergency that you cannot handle.
- ✓ Make sure your system is secure against vandalism and other threats. A NTNC Public Water System is not likely to be a target of terrorists, but security should be a priority.
 - Provide secure locks on well houses and well caps.
 - Limit access to components of your system as much as possible, but check with local fire ordinances before locking doors and gates. Post signs prohibiting entrance to unauthorized persons. Be vigilant for unfamiliar people on your premises and do not hesitate to ask for identification.
 - Inspect all components of your system daily for evidence of tampering.
 - If you use water treatment chemicals, check deliveries to see that containers have not been opened or tampered with. Do not accept unexpected deliveries or deliveries from vendors you do not recognize. Make sure chemicals are stored securely.
 - Make sure your records are in a secure place.

For details about monitoring requirements and other regulatory advice
consult with personnel of the N.C. Public Water Supply Section at the
Regional Offices of the N.C. Department of Environment and Natural Resources

Asheville Regional Office
2090 U.S. Highway 70
Swannanoa, NC 28778
828-296-4500

Fayetteville Regional Office
System Building, 225 Green St., Suite 714
Fayetteville, NC 28301-5094
910-486-1541

Mooresville Regional Office
919 North Main Street
Mooresville, NC 28115
704-663-1699

Raleigh Regional Office
Mail to: 1628 Mail Service Center, Raleigh, NC 27699-1628
Location: 3800 Barrett Drive, Raleigh, NC 27611
919-571-4700

Washington Regional Office
943 Washington Square Mall
Washington, NC 27889
252-946-6481

Wilmington Regional Office
127 Cardinal Drive Extension
Wilmington, NC 28405
910-395-3900

Winston-Salem Regional Office
585 Waughtown Street
Winston-Salem, NC 27107
336-771-4600



Division of Environmental Health
Public Water Supply Section
1634 Mail Service Center
Raleigh, NC 27699-1634
Phone: 919-733-2321 Fax 919-715-4374

<http://www.deh.enr.state.nc.us/pws/index.htm>