

SECTION .1600 - WATER QUALITY STANDARDS

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History Note: Statutory Authority G.S. 130-166.43, -166.45;
 Eff. January 1, 1977;
 Readopted Eff. December 5, 1977;
 Amended Eff. January 1, 1978;
 Repealed Eff. September 1, 1979.

- .1608 LIMIT FOR IRON AND MANGANESE
- .1609 CORROSION CONTROL

History Note: Statutory Authority G.S. 130-166.43, -166.45;
 Eff. January 1, 1978;
 Repealed Eff. September 1, 1979.

.1610 PURPOSE

The purpose of this Section is to implement the provisions of the North Carolina Drinking Water Act.

History Note: Authority G.S. 130-166.43;
 P.L. 93-523; 40 C.F.R. 141;
 Eff. September 1, 1979.

.1611 CONSTRUCTION

This Section shall be construed as enabling the State of North Carolina to undertake primary responsibility for the enforcement of the federal act.

History Note: Statutory Authority G.S. 130-166.43;
 P.L. 93-523; 40 C.F.R. 141;
 Eff. September 1, 1979.

.1612 SITING REQUIREMENTS

(a) Any person constructing or modifying a public water system shall to the extent practicable, avoid locating all or part of a new or expanded facility at a site which:

- (1) is subject to a significant risk from earthquakes, floods, fires or other disasters which could cause a breakdown of the public water system or a portion thereof; or
- (2) except for intake structures, is within the floodplain of a 100-year flood or is lower than any recorded high tide where appropriate records exist.

(b) Additional requirements concerning the siting of raw water intakes shall be found in 10 NCAC 10D .1802.

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History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. March 31, 1980.

.1613 MAXIMUM MICROBIOLOGICAL CONTAMINANT LEVELS

The maximum contaminant levels for coliform bacteria applicable to community water systems and non-community systems, are as follows:

- (1) When the membrane filter technique pursuant to .1622(a) of this Section is used, the number of coliform bacteria shall not exceed any of the following:
 - (a) one per 100 milliliters as the arithmetic mean of all samples examined per month pursuant to .1622(b) or (c) of this Section,
 - (b) four per 100 milliliters in more than one sample when less than 20 are examined per month, or
 - (c) four per 100 milliliters in more than five percent of the samples when 20 or more are examined per month.
- (2) When the fermentation tube method and 10 milliliter standard portions pursuant to .1622(a) of this Section are used, coliform bacteria shall not be present in any of the following:
 - (a) more than 10 percent of the portions in any month pursuant to .1622(b) or (c) of this Section;
 - (b) three or more portions in more than one sample when less than 20 samples are examined per month; or
 - (c) three or more portions in more than five percent of the samples when 20 or more samples are examined per month.
- (3) When the fermentation tube method and 100 milliliter standard portions pursuant to .1622(a) of this Section are used, coliform bacteria shall not be present in any of the following:
 - (a) more than 60 percent of the portions in any month pursuant to .1622(b) or (c) of this Section,
 - (b) five portions in more than one sample when less than five samples are examined per month, or
 - (c) five portions in more than 20 percent of the samples when five or more samples are examined per month.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1614 MAXIMUM CONTAMINANT LEVELS FOR TURBIDITY

The maximum contaminant levels for turbidity are applicable to both community water systems and non-community water systems using surface water sources in whole or in part. The maximum contaminant levels for turbidity in drinking water, measured at a representative entry point(s) to the distribution system, are:

- (1) one turbidity unit (TU), as determined by a monthly average pursuant to .1623 of this Section except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the department **OLW** the higher turbidity does not do any of the following:

- (a) interfere with disinfection,
 - (b) prevent maintenance of an effective disinfectant agent throughout the distribution system, or
 - (c) interfere with microbiological determinations.
- (2) Five turbidity units based on an average for two consecutive days pursuant to .1623 of this Section.

History Note: Authority G.S. 130-166.43;
 P.L. 93-523; 40 C.F.R. 141;
 Eff. September 1, 1979.

.1615 MAXIMUM CONTAMINANT LEVELS FOR ORGANIC CHEMICALS

The following are the maximum contaminant levels for organic chemicals. They apply only to community water systems. Compliance with maximum contaminant levels for organic chemicals is calculated pursuant to .1624 of this Section:

	<u>Level, milligrams per liter</u>
(1) Chlorinated hydrocarbons:	
<u>Endrin</u> (1,2,3,4,10, 10-hexachloro 6,7,-epoxy-1,4,4a,5,6,7,8,8a-octa- hydro-1,4-endo, endo-5,8 - dimethano naphthalene).	0.0002
<u>Lindane</u> (1,2,3,4,5,6-hexachloro- cyclohexane, gamma isomer).	0.004
<u>Methoxychlor</u> (1,1,1-Trichloro-2,2 - bis (p-methoxyphenyl) ethane).	0.1
<u>Toxaphene</u> [C(10)H(10)Cl(8) Technical chlorinated camphene, 67-69 percent chlorine].	0.005
(2) Chlorophenoxys:	
<u>2,4,D</u> , (2,4-Dichlorophenoxyacetic acid).	0.1
<u>2,4,5-TP Silvex</u> (2,4,5-Trichloro phenoxypropionic acid).	0.01
(3) Total trihalomethanes (the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform)).	0.10

History Note: Authority G.S. 130-166.43;
 P.L. 93-523; 40 C.F.R. 141;
 Eff. September 1, 1979;
 Amended Eff. September 30, 1980.

.1616 MAXIMUM CONTAMINANT LEVELS FOR INORGANIC CHEMICALS

(a) The maximum contaminant level for nitrate is applicable to both community water systems and non-community water systems. The levels for the other inorganic chemicals apply only to community water systems. Compliance with maximum contaminant levels for inorganic chemicals is calculated pursuant to .1625 of this Section.

(b) The following are the maximum contaminant levels for inorganic chemicals other than fluoride:

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<u>Contaminant</u>	<u>Level, milligrams per liter</u>
Arsenic-----	0.05
Barium-----	1.
Cadmium-----	0.010
Chromium-----	0.05
Lead-----	0.05
Mercury-----	0.002
Nitrate (as N)-----	10
Selenium-----	0.01
Silver-----	0.05

(c) When the annual average of the maximum daily air temperatures for the location in which the community water system is situated is the following, the maximum contaminant levels for fluoride are:

<u>Temperature</u>		<u>Level, milligrams per liter</u>
<u>Degrees Fahrenheit</u>	<u>Degrees Celsius</u>	
53.7 and below-----	12.0 and below-----	2.4
53.8 to 58.3-----	12.1 to 14.6-----	2.2
58.4 to 63.8-----	14.7 to 17.6-----	2.0
63.9 to 70.6-----	17.7 to 21.4-----	1.8
70.7 to 79.2-----	21.5 to 26.2-----	1.6
79.3 to 90.5-----	26.3 to 32.5-----	1.4

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. December 19, 1979.

.1617 MAXIMUM CONTAMINANT LEVELS FOR RADIUM

The following are the maximum contaminant levels for radium-226, radium-228, and gross alpha particle radioactivity in community water systems:

- (1) combined radium-226 and radium-228--5 pCi/l;
- (2) gross alpha particle activity (including radium-226 but excluding radon and uranium)--15 pCi/l.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1618 MAXIMUM CONTAMINANT LEVELS FOR MAN-MADE RADIONUCLIDES

(a) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in community water systems shall not produce an annual dose equivalent to the total body or any internal organ greater than four millirem/year.

(b) Except for the radionuclides listed in Table A, the concentration of man-made radionuclides causing four mrem total body or organ dose equivalents shall be calculated on the basis of a two liter per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure" NBS HANDBOOK 69 as amended August 1963,

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U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 millirem/year:

TABLE A

Average annual concentrations assumed to produce a total body or organ dose of 4 mrem/yr.

<u>Radionuclide</u>	<u>Critical Organ</u>	<u>pCi per liter</u>
Tritium	Total Body	20,000
Strontium-90	Bone Marrow	8

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1619 CONCENTRATION OF IRON

The requirements of this Rule apply only to community water systems. A community water system which has an iron concentration in excess of 0.30 mg/l shall provide approved treatment to control the water quality. Analysis of samples shall be made on an as needed basis determined by the department. Such need basis shall include, but not be limited to, addition of a new well or other raw water source, approval of a new community water system, approval of an existing system not previously approved, or problems and complaints of water quality normally associated with iron concentration.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1620 CONCENTRATION OF MANGANESE

The requirements of this Rule apply only to community water systems. A community water system which has a manganese concentration in excess of 0.05 mg/l shall provide approved treatment to control the water quality. Analysis of samples shall be made on an as needed basis determined by the department. Such need basis shall include, but not be limited to, addition of a new well or other raw water source, approval of a new community water system, approval of an existing system not previously approved, or problems and complaints of water quality normally associated with manganese concentration.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. September 9, 1980.

.1621 CORROSION CONTROL

The requirements of this Rule apply only to community water systems. Control and adjustment of pH shall be provided for water with pH below 6.5. Most waters are corrosive in varying degrees at pH 6.5 and slightly above, and such waters should have pH adjustment.

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History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1622 MICROBIOLOGICAL CONTAMINANT SAMPLING AND ANALYSIS

(a) Suppliers of water for community water systems and non-community water systems shall analyze for coliform bacteria for the purpose of determining compliance with .1613 of this Section. Analyses shall be conducted in accordance with the analytical recommendations set forth in STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, American Public Health Association, 14th Edition, pp. 913-937, except that a standard sample size shall be employed. The standard sample used in the membrane filter procedure shall be 100 milliliters. The standard sample size used in the 5 tube most probable number (MPN) procedure (fermentation tube method) shall be 5 times the standard portion. The standard portion is either 10 milliliters or 100 milliliters as described in .1613(2) and (3) of this Section. The samples shall be taken at points which are representative of the conditions within the distribution system.

(b) The supplier of water for a community water system shall take coliform density samples at regular time intervals, and in number proportionate to the population served by the system. In no event shall the frequency be less than as set forth below:

Population Served	Minimum Number of Samples Per Month
25 to 1,000	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 9,400	10
9,401 to 10,300	11
10,301 to 11,100	12
11,101 to 12,000	13
12,001 to 12,900	14
12,901 to 13,700	15
13,701 to 14,600	16
14,601 to 15,500	17
15,501 to 16,300	18
16,301 to 17,200	19
17,201 to 18,100	20
18,101 to 18,900	21
18,901 to 19,800	22
19,801 to 20,700	23
20,701 to 21,500	24
21,501 to 22,300	25
22,301 to 23,200	26
23,201 to 24,000	27

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24,001 to 24,900-----	28
24,901 to 25,000-----	29
25,001 to 28,000-----	30
28,001 to 33,000-----	35
33,001 to 37,000-----	40
37,001 to 41,000-----	45
41,001 to 46,000-----	50
46,00 to 50,000-----	55
50,001 to 54,000-----	60
54,001 to 59,000-----	65
59,001 to 64,000-----	70
64,001 to 70,000-----	75
70,001 to 76,000-----	80
76,001 to 83,000-----	85
83,001 to 90,000-----	90
90,001 to 96,000-----	95
96,001 to 111,000-----	100
111,001 to 130,000-----	110
130,001 to 160,000-----	120
160,001 to 190,000-----	130
190,001 to 220,000-----	140
220,001 to 250,000-----	150
250,001 to 290,000-----	160
290,001 to 320,000-----	170
320,001 to 360,000-----	180
360,001 to 410,000-----	190
410,001 to 450,000-----	200
450,001 to 500,000-----	210
500,001 to 550,000-----	220
550,001 to 600,000-----	230
600,001 to 660,000-----	240
660,001 to 720,000-----	250
720,001 to 780,000-----	260
780,001 to 840,000-----	270
840,001 to 910,000-----	280
910,001 to 970,000-----	290
970,001 to 1,050,000-----	300
1,050,001 to 1,140,000-----	310
1,140,001 to 1,230,000-----	320
1,230,001 to 1,320,000-----	330
1,320,001 to 1,420,000-----	340
1,420,001 to 1,520,000-----	350
1,520,001 to 1,630,000-----	360
1,630,001 to 1,730,000-----	370
1,730,001 to 1,850,000-----	380
1,850,001 to 1,970,000-----	390
1,970,001 to 2,060,000-----	400
2,060,001 to 2,270,000-----	410
2,270,001 to 2,510,000-----	420
2,510,001 to 2,750,000-----	430
2,750,001 to 3,020,000-----	440
3,020,001 to 3,320,000-----	450
3,320,001 to 3,620,000-----	460

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3,620,001 to 3,960,000-----	470
3,960,001 to 4,310,000-----	480
4,310,001 to 4,690,000-----	490
4,690,001 or more-----	500

(c) The supplier of water for a non-community water system shall sample for coliform bacteria in each calendar quarter during which the system provides water to the public. If the department, on the basis of a sanitary survey, determines that some other frequency is more appropriate, that frequency shall be the frequency required under these regulations. Such frequency shall be confirmed or changed on the basis of subsequent surveys.

(d) The supplier of water shall sample more frequently when:

- (1) Coliform bacteria in a single sample exceeds four per 100 milliliters [.1613(1) of this Section] at least two consecutive daily check samples shall be collected and examined from the same sampling point. Additional check samples shall be collected daily, or at a frequency established by the secretary, until the results obtained from at least two consecutive check samples show less than one coliform bacterium per 100 milliliters;
- (2) Coliform bacteria occur in three or more 10 ml portions of a single sample [.1613(2) of this Section], at least two consecutive daily check samples shall be collected and examined from the same sampling point. Additional check samples shall be collected daily, or at a frequency established by the secretary, until the results obtained from at least two consecutive check samples show no positive tubes.
- (3) Coliform bacteria occur in all five of the 100 ml portions of a single sample [.1613(3) of this Section], at least two daily check samples shall be collected and examined from the same sampling point. Additional check samples shall be collected daily, or at a frequency established by the secretary until the results obtained from at least two consecutive check samples show no positive tubes.

(e) The location at which the check samples were taken pursuant to (d)(1), (2), or (3) of this Rule shall not be eliminated from future sampling without approval of the department. The results from all coliform bacterial analyses performed pursuant to (b) or (c) of this Rule, except those obtained from check samples and special purpose samples, shall be used to determine compliance with the maximum contaminant level for coliform bacteria as established in .1613 of this Section. Check samples shall not be included in calculating the total number of samples taken each month to determine compliance with .1622(b) or (c) of this Section.

(f) When the presence of coliform bacteria in water taken from a particular sampling point has been confirmed by any check samples examined as directed in (d)(1), (2), or (3) of this Rule, the supplier of water shall report to the department **CLW** within 48 hours.

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(g) When a maximum contaminant level set forth in (1), (2) or (3) of .1613 of this Section is exceeded, the supplier of water shall report to the department and notify the public as prescribed in .1631 and .1633 of this Section.

(h) Special purpose samples, such as those taken to determine whether disinfection practices following pipe placement, replacement, or repair have been sufficient, shall not be used to determine compliance with .1613 or .1622(b) or (c) of this Section.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. December 19, 1979.

.1623 TURBIDITY SAMPLING AND ANALYSIS

(a) The requirements of this Rule shall apply only to public water systems which use water obtained in whole or in part from surface sources.

(b) Samples shall be taken by suppliers of water for both community water systems and non-community water systems at a representative entry point(s) to the water distribution system at least once per day, for the purpose of making turbidity measurements to determine compliance with .1614 of this Section. The measurement shall be made by the Nephelometric Method in accordance with the recommendations set forth in STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, American Public Health Association 14th Edition, pp. 132-134, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 295-298, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1974.

(c) If the result of a turbidity analysis indicates that the maximum allowable limit has been exceeded, the sampling and measurement shall be confirmed by resampling as soon as practicable and preferably within one hour. If the repeat sample confirms that the maximum allowable limit has been exceeded, the supplier of water shall report to the department within 48 hours. The repeat sample shall be the sample used for the purpose of calculating the monthly average. If the monthly average of the daily samples exceeds the maximum allowable limit, or if the average of two samples taken on consecutive days exceeds five TU, the supplier of water shall report to the department and notify the public as directed in .1631 and .1633 of this Section.

(d) Sampling for non-community water systems shall begin within two years after the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.22, eff. June 24, 1977).

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. December 19, 1979.

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.1624 ORGANIC CHEMICALS OTHER THAN TTHM, SAMPLING AND ANALYSIS

(a) An analysis of substances for the purpose of determining compliance with 10 NCAC 10D .1615 (1) and (2) shall be made as follows:

(1) For all community water systems utilizing surface water sources, analyses shall be completed within one year following the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.24, eff. June 24, 1977). Samples analyzed shall be collected during the period of the year designated by the secretary as the period when contamination by pesticides is most likely to occur. These analyses shall be repeated at intervals specified by the secretary but in no event less frequently than at three year intervals.

(2) For community water systems utilizing only ground water sources, analyses shall be completed by those systems specified by the secretary.

(b) If the result of an analysis made pursuant to (a) of this Rule indicates that the level of any contaminant listed in 10 NCAC 10D .1615 (1) and (2) exceeds the maximum contaminant level, the supplier of water shall report to the department within seven days and initiate three additional analyses within one month.

(c) When the average of four analyses made pursuant to (b) of this Rule, rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the department and give notice to the public pursuant to .1631 and .1633 of this Section. Monitoring after public notification shall be at a frequency designated by the secretary and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(d) Analyses made to determine compliance with .1615(1) of this Section shall be made in accordance with "Method for Organochlorine Pesticides in Industrial Effluents," MDQARL, Environmental Protection Agency, Cincinnati, Ohio, November 28, 1973.

(e) Analyses made to determine compliance with .1615(2) of this Section shall be conducted in accordance with "Methods for Chlorinated Phenoxy Acid Herbicides in Industrial Effluents," MDQARL, Environmental Protection Agency, Cincinnati, Ohio, November 28, 1973.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. September 30, 1980;
December 19, 1979.

.1625 INORGANIC CHEMICAL SAMPLING AND ANALYSIS

(a) Analyses for the purpose of determining compliance with Rule .1616 of this Section are required as follows: **CLW**

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- (1) Analyses for all community water systems utilizing surface water sources shall be completed within one year following the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.23, eff. June 24, 1977). These analyses shall be repeated at yearly intervals.
- (2) Analyses for all community water systems utilizing only ground water sources shall be completed within two years following the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.23, eff. June 24, 1977). These analyses shall be repeated at three year intervals.
- (3) For non-community water systems, whether supplied by surface or ground water sources, analyses for nitrate shall be repeated at intervals determined by the department.

(b) If the result of an analysis made pursuant to (a) of this Rule indicates that the level of any contaminant listed in .1616 of this Section exceeds the maximum contaminant level, the supplier of water shall report to the department within seven days and initiate three additional analyses at the same sampling point within one month.

(c) When the average of four analyses made pursuant to (b) of this Rule, rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall notify the Department pursuant to .1631 of this Section and give notice to the public pursuant to .1633 of this Section. Monitoring after public notification shall be at a frequency designated by the secretary and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(d) The provisions of (b) and (c) of this Rule notwithstanding, compliance with the maximum contaminant level for nitrate shall be determined on the basis of the mean of two analyses. When a level exceeding the maximum contaminant level for nitrate is found, a second analysis shall be initiated within 24 hours, and if the mean of the two analyses exceeds the maximum contaminant level, the supplier of water shall report his findings to the department pursuant to .1631 of this Section and shall notify the public pursuant to .1633 of this Section.

(e) Analyses conducted to determine compliance with .1616, .1619, .1620, and .1621 of this Section shall be made in accordance with the following methods:

- (1) Arsenic-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 206.3 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Flameless Atomic Absorption, Graphite Furnace Techniques, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES pp. 206.2 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C.

- 20460, 1979; or Spectrophotometric-SDDC, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 206.4 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979;
- (2) Barium-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES pp. 208.1 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Flameless Atomic Absorption, Graphite Furnace Techniques, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 208.2 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460; 1979;
- (3) Cadmium-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 213.1 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Flameless Atomic Absorption, Graphite Furnace Techniques, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 213.2 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979;
- (4) Chromium-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 218.1 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Flameless Atomic Absorption, Graphite Furnace Techniques, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES pp. 218.2 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Atomic Absorption, chelation-extraction, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 218.3 1-3, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460; 1979;
- (5) Lead-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 239.1 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Flameless Atomic Absorption, Graphite Furnace Techniques, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 239.2 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979;
- (6) Mercury-Manual Cold Vapor Technique, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 245.1 1-6, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Automated **GLW**apor

- Technique, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 245.2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979;
- (7) Nitrate-Brucine Colorimetric Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 427-429; or Cadmium Reduction Method, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 353.3 1-5, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Automated Cadmium Reduction, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 353.2 1-7, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 423-427; or Automated Hydrazine Reduction, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 353.1 1-5, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979;
- (8) Selenium-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 270.3 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Flameless Atomic Absorption, Graphite Furnace Techniques, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 270.2 1-3, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979;
- (9) Silver-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 144-162, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 272.1 1-2, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Flameless Atomic Absorption, Graphite Furnace Techniques, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 272.2 1-3, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979;
- (10) Fluoride-Electrode Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 391-393, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 340.2 1-3, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Colorimetric with Preliminary Distillation, METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 340.1 1-4, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979; or Automated Alizarin Fluoride Blue, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 614-618; or Modified Automated Alizarin Fluoride Blue, "Fluoride in Water and Wastewater Industrial Method, #129-71W," December, 1972, Technicon Industrial

Systems, Tarrytown, New York, 10591; or Automated Electrode Method, "Fluoride in Water and Wastewater Industrial Method #380-75WE" February 2, 1976, Industrial Systems, Tarrytown, New York; or Zirconium Eriochrome Cyanide R, "Methods for Collection and Analysis of Water Samples for Dissolved Minerals and Gases" USGS, Book 5, Chapter A1, pp. 90-93;

- (11) Iron-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, p. 144, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 110-111, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1974;
- (12) Manganese-Atomic Absorption Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, p. 144, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 116-117, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1974;
- (13) pH-Glass Electrode Method, STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, pp. 460-465, or METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, pp. 239-240, Environmental Protection Agency, Office of Technology Transfer, Washington, D.C., 20460, 1974.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. December 19, 1979.

.1626 ANALYTICAL METHODS FOR RADIOACTIVITY

(a) The methods specified in "INTERIM RADIOCHEMICAL METHODOLOGY FOR DRINKING WATER," Environmental Monitoring and Support Laboratory, EPA-600/4-75-008, USEPA, Cincinnati, Ohio 45268, or those listed below, are to be used to determine compliance with .1617 and .1618 of this Section except in cases where alternative methods have been approved in accordance with .1630 of this Section:

- (1) Gross Alpha and Beta Method 302 "Gross Alpha and Beta Radioactivity in Water," STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, American Public Health Association, New York, N.Y., 1975;
- (2) Total Radium-Method 304 "Radium in Water Precipitation," STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, American Public Health Association, New York, N.Y., 1975;
- (3) Radium-226-Method 305 "Radium-226 by Radon in Water," STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, American Public Health Association, New York, N.Y., 1975;
- (4) Strontium-89, 90-Method 303 "Total Strontium **GLW** Strontium-90 in Water," STANDARD METHODS FOR THE

EXAMINATION OF WATER AND WASTEWATER, 14th Edition, American Public Health Association, New York, N.Y., 1975;

- (5) Tritium-Method 306 "Tritium in Water," STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, American Public Health Association, New York, N.Y., 1975;
- (6) Cesium-134-ASTM D-2459 "Gamma Spectrometry in Water," 1975 ANNUAL BOOK OF ASTM STANDARDS, WATER AND ATMOSPHERIC ANALYSIS, Part 31, American Society for Testing and Materials, Philadelphia, PA (1975);
- (7) Uranium-ASTM D-2907 "Micro-quantities of Uranium in Water by Fluorometry," STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 14th Edition, American Public Health Association, New York, N.Y., 1975.

(b) When the identification and measurement of radionuclides other than those listed in (a) of this Rule is required, the following references are to be used, except in cases where alternative methods have been approved in accordance with .1630 of this Section.

- (1) PROCEDURES FOR RADIOCHEMICAL ANALYSIS OF NUCLEAR REACTOR AQUEOUS SOLUTIONS, H.L. Krieger and S. Godd, EPA-R4-73-014; USEPA, Cincinnati, Ohio, May 1973;
- (2) HASL PROCEDURE MANUAL, Edited by John H. Harley, HASL 300, ERDA Health and Safety Laboratory, New York, N.Y. 1973.

(c) For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100 percent at the 95 percent confidence level ($1.96*$ where * is the standard deviation of the net counting rate of the sample):

- (1) To determine compliance with .1617(1) of this Section the detection limit shall not exceed 1 pCi/l. To determine compliance with .1617(2) of this Section the detection limit shall not exceed 3 pCi/l.
- (2) To determine compliance with .1618 of this Section the detection limits shall not exceed the concentrations listed in Table B:

TABLE B
DETECTION LIMITS FOR MAN-MADE BETA
PARTICLE AND PHOTON EMITTERS

Radionuclide	Detection Limit
Tritium-----	1,000 pCi/l
Strontium-89-----	10 pCi/l
Strontium-90-----	2 pCi/l
Iodine-131-----	1 pCi/l
Cesium-134-----	10 pCi/l
Gross Beta-----	4 pCi/l
Other radionuclides-----	1/10 of the applicable CLW

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(d) To judge compliance with the maximum contaminant levels listed in .1617 and .1618 of this Section, averages of data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. March 31, 1980.

.1627 MONITORING FREQUENCY FOR RADIOACTIVITY

(a) Monitoring requirements for gross alpha particle activity, radium-226 and radium-228 in community systems:

(1) Initial sampling to determine compliance with .1617 shall begin within two years of the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.26, eff. June 24, 1977) and the analysis shall be completed within three years of the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.26, eff. June 24, 1977). Compliance shall be based on the analysis of an annual composite of four consecutive quarterly samples or the average of the analyses of four samples obtained at quarterly intervals:

(A) A gross alpha particle activity measurement may be substituted for the required radium-226 and radium-228 analysis, provided that the measured gross alpha particle activity does not exceed 5 pCi/l at a confidence level of .95 percent ($1.65 \times$ where * is the standard deviation of the net counting rate of the sample). In localities where radium-228 may be present in drinking water, the department may require radium-226 and/or radium-228 analyses when the gross alpha particle activity exceeds 2 pCi/l;

(B) When the gross alpha particle activity exceeds 5 pCi/l, the same or an equivalent sample shall be analyzed for radium-226. If the concentration of radium-226 exceeds 3 pCi/l the same or an equivalent sample shall be analyzed for radium-228.

(2) Suppliers of water shall monitor at least once every four years following the procedure required by (a)(1) of this Rule. At the discretion of the secretary, when an annual record taken in conformance with (a)(1) of this Rule has established that the average annual concentration is less than half the maximum contaminant levels established by .1617 of this Section, analysis of a single sample may be substituted for the quarterly sampling procedure required by (a)(1) of this Rule:

(A) More frequent monitoring shall be conducted when ordered by the department in the vicinity of mining or other operations which may contribute alpha particle radioactivity to either surface or ground water sources of drinking water;

- (B) A supplier of water shall monitor in conformance with (a)(1) of the Rule within one year of the introduction of a new water source for a community water system. More frequent monitoring shall be conducted when ordered by the department in the event of possible contamination or when changes in the distribution system or treatment processing occur which may increase the concentration of radioactivity in finished water;
- (C) A community water system using two or more sources having different concentrations of radioactivity shall monitor source water, in addition to water from a free-flowing tap, when ordered by the department;
- (D) Monitoring for compliance with .1617 of this Section after the initial period need not include radium-228 except when required by the department, provided that the average annual concentration of radium-228 has been assayed at least once using the quarterly sampling procedure required by (a)(1) of this Rule;
- (E) Suppliers of water shall conduct annual monitoring of any community water system in which the radium-226 concentration exceeds 3 pCi/l, when ordered by the secretary.
- (3) If the average annual maximum contaminant level for gross alpha particle activity or total radium as set forth in .1617 of this Section is exceeded, the supplier of a community water system shall give notice to the department pursuant to .1631 of this Section and notify the public as required by .1633 of this Section. Monitoring at quarterly intervals shall be continued until the annual average concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.
- (b) Monitoring requirements for man-made radioactivity in community water systems:
- (1) Within two years of the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.26, eff June 24, 1977), systems using surface water sources and serving more than 100,000 persons and such other community water systems as are designated by the secretary shall be monitored for compliance with .1618 of this Section by analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. Compliance with .1618 of this Section may be assumed without further analysis if the average annual concentration of gross beta particle activity is less than 50 pCi/l and if the average annual concentrations of tritium and strontium-90 are less than those listed in Table A in .1618 of this Section provided that if both radionuclides are present the sum of their annual dose equivalents to bone marrow shall not exceed 4 millirem/year.

- (A) If the gross beta particle activity exceeds 50 pCi/l, an analysis of the sample must be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with .1618 of this Section;
 - (B) Suppliers of water shall conduct additional monitoring, as ordered by the secretary, to determine the concentration of man-made radioactivity in principal watersheds designated by the department;
 - (C) At the discretion of the secretary, suppliers of water utilizing only ground waters may be required to monitor for man-made radioactivity.
- (2) After the initial analysis required by (b)(1) of this Rule, suppliers of water shall monitor at least every four years following the procedure given in (b)(1) of this Rule;
 - (3) Within two years of the effective date of the National Primary Drinking Water Regulations (40 C.F.R. 141.26, eff. June 24, 1977) the supplier of any community water system designated by the secretary as utilizing waters contaminated by effluents from nuclear facilities shall initiate quarterly monitoring for gross beta particle iodine-131 radioactivity and annual monitoring for strontium-90 and tritium:
 - (A) Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended. If the gross beta particle activity in a sample exceeds 15 pCi/l, the same or an equivalent sample shall be analyzed for strontium-89 and cesium-134. If the gross beta particle activity exceeds 50 pCi/l, an analysis of the sample must be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with .1618 of this Section;
 - (B) For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the secretary, more frequent monitoring shall be conducted when iodine-131 is identified in finished water;
 - (C) Annual monitoring for strontium-90 and tritium shall be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended;
 - (D) The secretary may allow the substitution of environmental surveillance data taken in conjunction with a nuclear facility for direct monitoring of a man-made radioactivity by the supplier of water where the secretary determines

such data is applicable to a particular community water system.

- (4) If the average annual maximum contaminant level for man-made radioactivity set forth in .1618 of this Section is exceeded, the operator of a community water system shall give notice to the department pursuant to .1631 of this Section and to the public as required by .1633 of this Section. Monitoring at monthly intervals shall be continued until the concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. September 9, 1980; December 19, 1979.

.1628 MONITORING OF CONSECUTIVE PUBLIC WATER SYSTEMS

(a) When a public water system supplies water to one or more other public water systems the department may modify the monitoring requirements imposed by this Section to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a schedule specified by the department and concurred in by the Administrator of the U.S. Environmental Protection Agency.

(b) All public water systems which purchase water for resale and which do not provide any treatment except booster chlorination will be required to perform bacteriological monitoring in accordance with .1622 of this Section.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1629 CERTIFIED LABORATORIES

For the purpose of determining compliance with maximum contaminant levels, samples may be considered only if they have been analyzed by a laboratory certified by the Environmental Protection Agency or the Division of Health Services laboratory certification unit except that measurements for turbidity and free chlorine residual may be performed by any person acceptable to the department.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1630 ALTERNATIVE ANALYTICAL TECHNIQUES

With the written permission of the secretary, concurred in by the Administrator of the U.S. Environmental Protection Agency, an alternative analytical technique may be employed. An alternative

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technique shall be acceptable only if it is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with any maximum contaminant level. The use of the alternative analytical technique shall not decrease the frequency of monitoring required by this Section.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1631 REPORTING REQUIREMENTS

(a) Except where a shorter reporting period is specified, the supplier of water shall report to the department within 40 days following a test, measurement or analysis required by this Section, the results of that test, measurement or analysis.

(b) The supplier of water shall report to the department within 48 hours the failure to comply with any regulation of 10 NCAC 10D .1610 through .1634 (including failure to comply with monitoring requirements).

(c) The supplier of water is not required to report analytical results in cases where a state laboratory performs the analysis and reports the results to the Department.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. March 31, 1980.

.1632 RECORD MAINTENANCE

Any owner or operator of a public water system shall retain on its premises or at a convenient location near its premises the following records:

(1) Records of bacteriological analyses made pursuant to this Section shall be kept for not less than five years. Records of chemical analyses made pursuant to this Section shall be kept for not less than 10 years. Records of radiological analyses made pursuant to this Section shall be kept for not less than 10 years. Actual laboratory reports may be kept, or data may be transferred to tabular summaries, provided that the following information is included:

- (a) the date, place and time of sampling, and the name of the person who collected the sample;
- (b) identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;
- (c) date of analysis;
- (d) laboratory and person responsible for performing analysis;
- (e) the analytical technique/method used; and
- (f) the results of the analysis.

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- (2) Records of action taken by the system to correct violations of primary drinking water regulations shall be kept for a period not less than three years after the last action taken with respect to the particular violation involved.
- (3) Copies of any written reports, summaries or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by a local, state or federal agency, shall be kept for a period not less than 10 years after completion of the sanitary survey involved.
- (4) Records concerning a variance or exemption granted to the system shall be kept for a period ending not less than five years following the expiration of such variance or exemption.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

.1633 PUBLIC NOTIFICATION REQUIREMENTS

(a) Public notification by a supplier of water is required whenever a supplier's public water system fails to comply with a maximum contaminant level, fails to comply with an applicable testing procedure, is granted a variance or an exemption, or fails to comply with the requirements of any schedule prescribed pursuant to a variance or exemption.

(b) Community water systems shall comply with (a) of this Rule by meeting the following requirements:

- (1) Notification shall be made by inclusion of a notice in the first set of water bills of the system issued after the failure or grant. Such notice shall be repeated at least once every three months so long as the system's failure continues or the variance or exemption remains in effect. If the system issues water bills less frequently than quarterly, or does not issue water bills, the notice shall be made by or supplemented by another form of direct mail.
- (2) In addition, when the failure is to comply with a maximum contaminant level, then further notice shall be provided as follows:
 - (A) by publication on not less than three consecutive days in a newspaper or newspapers of general circulation in the area served by the system, such notice shall be completed within 14 days after the supplier of water learns of the failure;
 - (B) by furnishing a copy of the notice to the radio and television stations serving the area served by the system, such notice shall be furnished within seven days after the supplier of water learns of the failure.
- (3) When the area served by a system is not served **GLW** daily newspaper of general circulation, notification required by (b)(2)(A) of this Rule shall instead be

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given by publication on three consecutive weeks in a weekly newspaper of general circulation serving the area. If no weekly or daily newspaper of general circulation serves the area, notice shall be given by posting the notice in post offices within the area served by the system.

(c) Non-community water systems shall comply with (a) of this Rule by conspicuous posting of a notice, in a location where it may be seen by consumers.

(d) Notices given pursuant to this Rule shall be written in a manner reasonably designed to inform fully the users of the system. The notice shall be conspicuous and shall not use unduly technical language, unduly small print or other methods which would frustrate the purpose of the notice. The notice shall disclose all material facts regarding the subject including the nature of the problem and, where appropriate, a clear statement that a drinking water regulation has been violated and any preventive measures that should be taken by the public. Where designated by the secretary, bilingual notice shall be given. Notices may include a balanced explanation of the significance or seriousness to the public health, a fair explanation of steps taken by the system to correct any problem and the results of any additional sampling.

(e) Notices required by this Rule may be given by the secretary on behalf of the supplier of water.

(f) The requirements of this Rule shall not apply to .1619, .1620, and .1621 of this Section.

(g) In any instance in which notification by mail is required by (b)(1) of this Rule but notification by newspaper or to radio or television stations is not required by (b)(2) of this Rule, the secretary may order the supplier of water to provide notification by newspaper and to radio and television stations when circumstances make more immediate or broader notice appropriate to protect the public health.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979;
Amended Eff. December 19, 1979.

.1634 VARIANCES AND EXEMPTIONS

Variations and exemptions from a maximum contaminant level or required treatment technique may be requested by a public water system and may be granted by the secretary in accordance with 10 NCAE 10D .2501 through .2511.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Eff. September 1, 1979.

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Regulation 10 NCAC 10D .1635; TOTAL TRIHALOMETHANES SAMPLING AND ANALYSIS; has been adopted and reads as follows:

.1635 TOTAL TRIHALOMETHANES SAMPLING AND ANALYSIS

(a) Community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process shall analyze for total trihalomethanes (TTHMs) in accordance with this Rule. For systems serving 75,000 or more individuals, sampling and analyses shall begin not later than November 29, 1980. For systems serving 10,000 to 74,999 individuals, sampling and analyses shall begin not later than November 29, 1982. For the purpose of this Rule, the minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with Department approval, be considered one treatment plant for determining the minimum number of samples. All samples taken within an established frequency shall be collected within a 24-hour period.

(b) For all community water systems utilizing surface water sources in whole or in part, and for all community water systems utilizing only ground water sources that have not been determined by the Department to qualify for the monitoring requirements of (c) of this Rule, analyses for TTHMs shall be made as follows:

- (1) Analyses shall be performed at quarterly intervals on at least four water samples for each treatment plant used by the system. At least 25 percent of the samples shall be taken at locations within the distribution system reflecting the maximum residence time of the water in the system. The remaining 75 percent shall be taken at representative locations in the distribution system, taking into account number of persons served, different sources of water and different treatment methods employed. The results of all analyses per quarter shall be arithmetically averaged and reported to the Department within 30 days of the system's receipt of such results. All samples collected shall be used in the computation of the average, unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in (e) of this Rule.
- (2) Upon the written request of a community water system, the monitoring frequency required by (b)(1) of this section may be reduced by the Department to a minimum of one sample analyzed for TTHMs per quarter taken at a point in the distribution system reflecting the maximum residence time of the water in the system, upon a written determination by the Department that the data from at least 1 year of monitoring in accordance with (b)(1) of this Rule and local conditions demonstrate that total trihalomethane concentrations will be consistently below the maximum contaminant level.
- (3) If at any time during which the reduced monitoring frequency prescribed under this paragraph applies, the

results from any analysis exceed 0.10 mg/l of TTHMs and such results are confirmed by at least one check sample taken promptly after such results are received, or if the system makes any significant change to its source of water or treatment program, the system shall immediately begin monitoring in accordance with the requirements of (b)(1) of this Rule, which monitoring shall continue for at least 1 year before the frequency may be reduced again. At the option of the Department, a system's monitoring frequency may and should be increased above the minimum in those cases where it is necessary to detect variations of TTHM levels within the distribution system.

(c) Upon written request to the Department, a community water system utilizing only ground water sources may seek to have the monitoring frequency required by (b)(1) of this Rule reduced as follows:

- (1) There shall be a minimum of one sample for maximum TTHM potential per year for each treatment plant used by the system taken at a point in the distribution system reflecting maximum residence time of the water in the system. The system shall submit to the Department the results of at least one sample analyzed for maximum TTHM potential for each treatment plant used by the system taken at a point in the distribution system reflecting the maximum residence time of the water in the system. The system's monitoring frequency may only be reduced upon a written determination by the Department that, based upon the data submitted by the system, the system has a maximum TTHM potential of less than 0.10 mg/l and that, based upon an assessment of the local conditions of the system, the system is not likely to approach or exceed the maximum contaminant level for total TTHMs. The results of all analyses shall be reported to the Department within 30 days of the system's receipt of such results. All samples collected shall be used for determining whether the system must comply with the monitoring requirements of (b) of this Rule, unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in (e) of this Rule.
- (2) If at any time during which the reduced monitoring frequency prescribed under (c)(1) of this Rule applies, the results from any analysis taken by the system for maximum TTHM potential are equal to or greater than 0.10 mg/l, and such results are confirmed by at least one check sample taken promptly after such results are received, the system shall immediately begin monitoring in accordance with the requirements of (b) of this Rule and such monitoring shall continue for at least one year before the frequency may be reduced again. In the event of any significant change to the system's draw water or treatment program, the system shall

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immediately analyze an additional sample for maximum TTHM potential taken at a point in the distribution system reflecting maximum residence time of the water in the system for the purpose of determining whether the system must comply with the monitoring requirements of (b) of this Rule. At the option of the Department, monitoring frequencies may and should be increased above the minimum in those cases where this is necessary to detect variation of TTHM levels within the distribution system.

(d) Compliance with 10 NCAC 10D .1615(3) shall be determined based on a running annual average of quarterly samples collected by the system as prescribed in (b)(1) or (2) of this Rule. If the average of samples covering any 12 month period exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 10 NCAC 10D .1631 and notify the public pursuant to 10 NCAC 10D .1633. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(e) Sampling and analyses made pursuant to this section shall be conducted by one of the following EPA approved methods:

- (1) "The Analysis of Trihalomethanes in Finished Waters by the Purge and Trap Method," Method 501.1, Environmental Monitoring and Support Laboratory, EPA Cincinnati, Ohio.
- (2) "The Analysis of Trihalomethanes in Drinking Water by Liquid/Liquid Extraction," Method 501.2, Environmental Monitoring and Support Laboratory, EPA Cincinnati, Ohio.

Samples for TTHM shall be dechlorinated upon collection to prevent further production of trihalomethanes, according to the procedures described in the above two methods. Samples for maximum TTHM potential should not be dechlorinated, and should be held for seven days at 25° C prior to analysis, according to the procedures described in the above two methods.

(f) Before a community water system makes any significant modifications to its existing treatment process for the purposes of achieving compliance with 10 NCAC 10D .1615(3), such system must submit and obtain Department approval of a detailed plan setting forth its proposed modification and those safeguards that it will implement to ensure that the bacteriological quality of the drinking water served by such system will not be adversely affected by such modification. Each system shall comply with the provisions set forth in the Department approved plan. At a minimum, a Department approved plan shall require the system modifying its disinfection practice to:

- (1) Evaluate the water system for sanitary defects and evaluate the source water for biological quality;
- (2) Evaluate its existing treatment practices and consider improvements that will minimize disinfectant demand and optimize finished water quality throughout the distribution system;

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- (3) Provide baseline water quality survey data of the distribution system. Such data should include the results from monitoring for coliform and fecal coliform bacteria, fecal streptococci, standard plate counts at 35° C and 20° C, phosphate, ammonia nitrogen and total organic carbon. Virus studies should be required where source waters are heavily contaminated with sewage effluent;
 - (4) Conduct additional monitoring to assure continued maintenance of optimal biological quality in finished water, for example, when chloramines are introduced as disinfectants or when pre-chlorination is being discontinued. Additional monitoring should also be required by the Department for chlorate, chlorite and chlorine dioxide when chlorine dioxide is used as a disinfectant. Standard plate count analyses should also be required by the Department as appropriate before and after any modifications;
 - (5) Demonstrate an active disinfectant residual throughout the distribution system at all times during and after the modification.
- (g) The maximum contaminant levels for trihalomethanes set forth in 10 NCAC 10D .1615 shall take effect November 29, 1981 for community water systems serving 75,000 or more individuals, and November 29, 1983 for community water systems serving 10,000 to 74,999 individuals.

History Note: Authority G.S. 130-166.43;
P.L. 93-523; 40 C.F.R. 141;
Effective September 30, 1980.

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