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DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

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COMDTNOTE 11300

COMMANDANT NOTICE 11300

CANCELLED: 7 APR 1982
7 OCT 1982

Subj: CH-1 to the Water Supply and Waste Water Disposal Manual

1. PURPOSE. This Notice publishes changes to the Water Supply and Waste Water Disposal Manual, COMDTINST M11300.2 (old CG-379)

2. ACTION. District commanders, commanding officers of Headquarters units, and Commander, Coast Guard Activities Europe shall:

a. Remove and destroy the following pages:	b. Insert the following new and revised pages:
Table of Contents	Table of contents - page i Table of contents for Chapter 1
A-1-1 thru A-1-7	A-1-1 thru A-1-19
A-2-1 thru A-2-3	A-2-1

3. RETENTION. This transmittal letter to Change 1 shall be retained in the front of the manual until its removal is directed.

R. S. LUCAS
Chief, Office of Engineering

Encl: (1) CH-1 to COMDTINST M11300.2

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U. S. Coast Guard
Water Supply and Waste Water Disposal Manual
COMDTINST M11300.2

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WATER SUPPLY AND WASTE WATER DISPOSAL MANUAL
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Chapter 1

A. INTRODUCTION

1. Water is a vital resource. Uses include drinking, industrial cooling, power production transportation, fishing, recreation, agriculture and waste disposal. As a source of life for man, plants and lower forms of life, it cannot be replaced. As with all resources, there is a limit to its supply. Water is sometimes referred to as the "universal solvent" in deference to its ability to dissolve so many substances. In fact, nearly all the naturally occuring chemical elements can be found either dissolved in or suspended in water. Water's ability to dissolve gases is basic to all life and some of the elements which are normally found in water are vital to many forms of life. On the other hand, the presence of some impurities can make water unpalatable and even harmful. This chapter will discuss the applicable regulations and standards for water quality. These standards include criteria for the physical and microbiological properties of water, inorganic chemical, organic chemicals, and radioactivity. These water properties, constituents and pollutants are described by parameters, color, order, turbity, settleable and dissolved solids, temperature, pH, fecal coliform, dissolved oxygen, radiation, toxic substance chemicals, oil.

2. Regulations.

a. The Public Health Service Act as amended by the Safe Drinking Water Act of 1974 requires compliance with all national primary drinking water regulations in effect under section 1412 of subject act. The Environmental Protection Agency (EPA), in accordance with the Safe Drinking Water Act, is charged with establishing maximum contaminant levels for drinking water. These levels have been established for a number of contaminants and are contained in 40 Code of Federal Regulation (CFR) Part 141 as National Interim Primary Drinking Water Regulations. These regulations are binding on all Federal agencies (including the CG) with responsibility for public water systems. The Safe Drinking Water Act Amendment of 1977 contains a provision which gives states authority over Federal facilities. Furthermore, EPA has published the National Secondary Drinking Water Regulation contained in 40 CFR Part 143 to serve as guidelines and deal primarily with esthetic qualities of drinking water.

3. Definitions.

a. Contaminant - any physical, chemical, biological, or radiological substance or matter in water.

b. Public Water System - a system for the provision to CG personnel or the public of piped water for human consumption, if such system has at least fifteen service connections (building and or vessel potable water connection) or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. Such term includes (1) any collection, treatment, storage and distribution facilities under control of the operator of such system and used primarily in connection with such system and (2) any collection or pretreatment storage facility not under such control which are used primarily in connection with such system. A public water system is either a community water system or non-community water system.

c. Community water system - a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

d. Non-community water system -a public water system that is not a community water system.

e. Sanitary survey - an on-site review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

f. Standard sample - a representative part of finished drinking water that is examined for the presence of coliform bacteria.

g. State - the agency of the State government which has jurisdiction over public water systems. During any period when a State does not have primary enforcement responsibility pursuant to Section 1413 of the Act, the term "State" means the Regional Administrator, U. S. Environmental Protection Agency.

h. Supplier of Water - any person who owns or operates a public water system.

i. Dose equivalent - the product of the absorbed dose from ionizing radiation and such factors as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the International Commission on Radiological Units and Measurements (ICRU).

j. Rem - the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem (mrem)" is 1/1000 of a rem.

k. Picocurie (pCi) - that quantity of radioactive material producing 2.22 nuclear transformations per minute.

l. Gross alpha particle activity - the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

m. Man-made beta particle and photon emitters - all radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium-232, uranium-235 and uranium-238.

n. Gross beta particle activity the total radioctivity due to beta particle emission as inferred from measurements on a dry sample.

o. Halogen - one of the chemical elements chlorine, bromine or iodine.

p. Trihalomethane - (THM) one of the family of organic compounds, named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

q. Total trihalomethanes (TTHM) the sum of the concentration in milligrams per liter of the trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane and tribromomethane [bromoform]), rounded to two significant figures.

r. Maximum Total Trihalomethane Potential (MTP) - the maximum concentration of total trihalomethanes produced in a given water containing a disinfectant residual after 7 days at a temperature of 25 degrees C or above.

s. Disinfectant - any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

t. Secondary Maximum Contaminant Levels (SMCLs) - The SMCL means the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of public water systems. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition.

u. Maximum contaminant level - the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water system; except in the case of turbidity where the maximum permissible level is measured at the point of entry to the distribution system. Contaminants added to the water under circumstances controlled by the user, except for those resulting from corrosion of piping and plumbing caused by water quality are excluded from this definition.

v. Municipality - a city, town or other public body created by or pursuant to State law, or an Indian tribal organization authorized by law.

w. National primary drinking water regulation - any primary drinking water regulation contained in 40 CFR Part 141.

x. Coliform - Those bacteria which are most abundant in sewage and in streams containing feces and other bodily waste discharges.

y. Primary Authority - the specific state if it has an EPA approved program, will be the primary authority. If the state has not obtained program approval EPA will be the primary authority.

z. Residents - can be Coast Guard or private individuals serviced by the water system.

4. Application.

a. According to 40 CFR 141.3 these National Interim Primary Drinking Water Regulations shall apply to CG facilities if one or both of the following conditions exist:

(1) the water source is owned by the CG

(2) the water source is owned by a muncipality or a private organization and water treatment is performed by the CG (chlorination, disinfection, etc.)

B. NATIONAL INTERIM PRIMARY DRINKING WATER REGULATION

1. Maximum Contaminant Level (MCL) Inorganic Chemicals.

a. The following MCLs, except nitrate, apply only to community water systems. The nitrate level applies to both community and non-community water systems.

Contaminant	Level (mg/l)
Arsenic	0.05
Barium	1.0
Cadmium	0.010
Chromium	0.05
Fluoride	See table below
Lead	0.05
Mercury	0.002
Nitrate	10.0
Selenium	0.01
Silver	0.05

b. MCL for fluoride is related to the annual average of the maximum daily air temperatures.

Temperature (f)	Level (mg/L)
53.7 and below	2.4
53.8 - 58.3	2.2
58.4 - 63.8	2.0
63.9 - 70.6	1.8
70.7 - 79.2	1.6
79.3 - 90.5	1.4

c. At the discretion of the State, nitrate levels not to exceed 20 mg/l may be allowed in a non-community water system if the supplier of water demonstrates to the satisfaction of the State that:

(1) Such water will not be available to children under 6 months of age; and

(2) There will be continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure; and

(3) Local and State public health authorities will be notified annually of nitrate levels that exceed 10 mg/l; and

(4) No adverse health effects, shall result.

2. Maximum Contaminant Levels (MCL) Organic Chemicals

a. The following MCLs apply only to community water systems.

(1) Chlorinated Hydrocarbons. Endrin 0.002(mg/L)
(1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8a-octahydro-1,4-endo, endo-5,8-dimethano naphthalene).

Lindane 0.004(mg/L)
(1,2,3,4,5,6-Hexachlorocyclohexane, gamma isomer).

Toxaphene 0.005(mg/L)
(C. H. C. - Technical chlorinated camphene, 67-69 percent chlorine).

Methoxychlor 0.1(mg/L)
(1,1,1-Trichloro-2, 2 - bis).

(2) CHLOROPHENOXYS

2,4-D 0.1(mg/L)
(2,4-Dichlorophenoxyacetic acid).

2,4,5-TP Silvex 0.01(mg/L)
2,4,5- Trichlorophenoxypropionic acid

b. The MCL for total trihalomethane applies only to community water systems which serve a population of 10,000 or more individuals and which have added a disinfectant (oxidant) to the water system

Total trihalomethanes 0.10(Mg/L)

3. Maximum Contaminant Levels (MCL) Turbidity

a. The following MCLs apply to both community and non-community water systems using surface water sources in whole or in part:

(1) One turbidity unit (TU), as determined by monthly average (see paragraph C.3), except that five or fewer turbidity units may be allowed if it can be demonstrated to the Primary Authority that the higher turbidity does not:

(a) Interfere with disinfection;

(b) Prevent maintenance of an effective disinfecting agent throughout the distribution system;

(c) Interfere with micro-biological determinations.

(2) Five turbidity units based on an average of two consecutive days (see paragraph C.3).

4. Maximum Contaminant Levels Microbiological

A. The following MCLs for coliform bacteria apply to both community and non-community water systems:

Coliform Method	Samples Per Month (Based on Para. C.4 Criteria)	Less than 20 samples/mo.	Less than 5 samples/mo.	More than 20 samples/mo.	More than 5 samples/mo.
(1) MFT 100 ml Standard Portions	Not to exceed 1/100 ml as the Arithmetic Mean	4/100 ml in one sample		4/100 ml in 5% of sample	
(2) FTM 10 ml Standard Portions	Not to be present in 10% of portions	3 portions in one sample		3 portions in 5% of samples	
(2) FTM 100 ml Standard Portions	Not to be present in 60% of samples		5 portions in one sample		5 portions in 20% of samples

FOOTNOTES: 1. MFT - membrane filter technique
2. FTM - fermentation tube method

GENERAL NOTES: (1) The number of samples to be collected per month is dependent upon the service population (see Paragraph C.4.)

(2) If the population served exceeds 1000 people see 40 CFR 141.14 and 141.21 for specific requirements and exceptions.

(3) If 10 or fewer samples per month are taken, one sample may be excluded at the discretion of the primary authority (see 40 CFC 141.14 for specifics)

(4) For community and non-community water systems that are required to sample less than 4 times per month, compliance with above regulation shall be based upon sampling during a 3 month period.

5. Maximum Contaminant Levels (MCLs) Radionuclides.

a. The following MCLs apply only to community water systems.

(1) Combined radium 226 and 228 is 5 pCi/l.

(2) Gross alpha particle activity (including radium 226 but excluding radon and uranium) is 15 pCi/l.

(3) Beta particle and photon radioactivity from man made radionuclides.

(a) The average annual concentration of beta particle and photon radioactivity from man made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year.

(b) Except for the radionuclides listed below, the concentration of man made radionuclides causing 4 mrem total body or organ dose equivalents shall be calculated as specified in 40 CFR 141.16(b). 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.

Annual average concentrations assumed to produce a total body or organ dose of 4 mrem/year:

Radionuclide	Critical Organ	pCi/l
Tritium	Total body	20,000
Strontium-90	Bone-marrow	8

C. MONITORING, ANALYTICAL AND COMPLIANCE REQUIREMENTS.

All Coast Guard supplies of water for community and non-community water systems shall be routinely tested as required by the following paragraphs to insure that the present water quality regulations are met, and that the systems are operated and maintained in a sanitary manner. Please note, the State has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

1. Inorganic Chemicals

a. Community water systems utilizing surface water sources shall be tested annually.

b. Community water systems utilizing only ground water sources shall be tested at three year intervals.

c. Non-community water systems whether supplied by surface or ground sources shall be tested for nitrate at intervals determined by the state

d. Testing conducted to determine compliance with paragraph 1.B.1 limitations shall be made in accordance with 40 CFR 141.23(f).

2. Organic Chemicals.

a. Community water systems utilizing surface water sources shall be tested at intervals specified by the State but in no event less frequently than at three year intervals.

b. Community water systems utilizing only ground water sources shall be tested at intervals determined by the State.

c. Non-community water

systems whether supplied by surface or ground water source shall complete one test when initially constructed or when major modifications are completed. Thereafter, tests shall be conducted at intervals specified by Commandant (G-K).

d. Testing conducted to determine compliance with paragraph IB.2 limitations shall be made in accordance with 40 CFR 141.24(f).

e. EPA has specific sampling and analytical requirements for total trihalomethanes in community water systems which serve a population of 10,000 or more individuals. Commands meeting this requirement should contact Commandant (G-ECV) for specific guidance.

3. Turbidity

a. Samples shall be taken for both community and non-community water systems at a representative entry point(s) to the water distribution system at least once per day. If the Primary Authority determines that a reduced sampling frequency in a noncommunity system will not pose a risk to public health, it can reduce the required sampling frequency. The option of reducing the turbidity frequency shall be permitted only in those public water systems that practice disinfection and which maintain an active residual disinfectant in the distribution system, and in those cases where the Primary Authority has indicated in writing that no unreasonable risk to health existed under the circumstances of this option. The requirements of this section apply only to public water systems which use water obtained in whole or in part from surface sources.

b. Testing conducted to determine compliance with paragraph 1.A.3 limitations shall be made in accordance with 40 CFR 141.22(a).

4. Microbiological

a. Community water systems shall take coliform density samples at regular time intervals, and in numbers proportionate to the population served by the system. In no event shall the frequency be less than set forth below:

Population Served	Minimum Number of Samples Per Month
25 to 1,000	1
1001 to 2,500	2
2501 to 3,300	3
3301 to 4,100	4
4101 to 4,900	5
4901 to 5,800	6
5801 to 6,700	7
6701 to 7,600	8
7601 to 8,500	9
8501 to 9,400	10
9401 to 10,300	11

b. For population more than 10,300, the minimum number of samples required per month shall be in accordance with 40 CFR 141.21(b).

c. Based on a history of no coliform bacterial contamination and on a sanitary survey by the Primary Authority showing the water system to be supplied solely by a protected ground water source and free of sanitary defects, a community water system serving 25 to 1,000 persons, with written permission from the Primary Authority, may reduce this sampling frequency, except that in no case shall it be reduced to less than one per quarter.

d. Commands supplying water

for a non-community water system shall be responsible for sampling coliform bacteria in each calendar quarter that the system provides water to the public. The State can adjust the monitoring frequency on the basis of a sanitary survey, the existence of additional safeguards such as a protective and enforced well code, or accumulated analytical data. Such frequency shall be confirmed or modified on the basis of subsequent surveys or data. The frequency shall not be reduced until the non-community water system has performed at least one coliform analysis of its drinking water and shown to be in compliance with para., 1.A.4.

e. Testing conducted to determine compliance with paragraph I.B.4 limitation shall be made in accordance with 40 CFR 141.21(a) and 40 CFR 141.21(h) for chlorine residual monitoring.

f. When the coliform bacteria in a single sample exceed four per 100 milliliter(ml) or when coliform bacteria occurs in three or more of the 10 ml portions of a single sample or when coliform bacteria occur in all five of the 100 ml portions of a single sample, 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 Primary Authority until the result obtained are below the maximum contaminated level detailed in paragraph 1.B.4.A.

g. The location at which check samples were taken pursuant to paragraph (f) above shall not be eliminated from future sampling without approval of the Primary Authority.

h. Commands operating a community water system or a non-community water system may, with the approval of the Primary Authority and based upon a sanitary survey, substitute the use of chlorine residual monitoring for not more than 75 percent of the samples required to be taken by paragraph 1.B.4, provided that the command takes chlorine residual samples at points which are representative of the conditions within the distribution system at the frequency of at least four for each substituted microbiological sample. There shall be at least daily determinations of chlorine residual. The command shall maintain no less than 0.2 mg/l free chlorine throughout the distribution system. When a particular sampling point has been shown to have a free chlorine residual less than 0.2 mg/l, the water at that location shall be retested as soon as practicable and in any event within one hour. If the original analysis is confirmed, this fact shall be reported according to procedures detailed in paragraph 1.D.4. Also, if the analysis is confirmed, a sample for coliform bacterial analysis must be collected from that sampling point as soon as practicable and preferably within one hour, and the results of such analysis reported according to procedures detailed in paragraph 1.D.4.(b). The Primary Authority may withdraw its approval of the use of chlorine residual substitution at any time.

5. Radionuclides.

a. 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 $\sigma_{\sim}$ where $\sigma_{\sim}$ is the standard deviation of the net counting rate of the sample):

(1) to determine compliance with paragraph 1.B.5.a.(1) the detection limit shall not exceed 1 pCi/l.

(2) to determine compliance with paragraph 1.B.5.b.(2) the detection limit shall not exceed 3 pCi/l.

(3) to determine compliance with paragraph I.B.5.a.(3). the detection limit shall not exceed the following:

Radionuclide	Detection Limit
Tritium	1000 pCi/l
Strontium 89	10 pCi/l
Strontium 90	2 pCi/l
Iodine 131	1 pCi/l
Cesuim 134	10 pCi/l
Gross beta	4 pCi/l
Other radionuclides	1/10 of the applicable limit

b. Monitoring requirements for gross alpha particle activity, radium 226 and radium 228:

(1) Community water systems shall be monitored at least once every four years. Compliance shall be based on the analysis of an annual composite of four consecutive quarterly samples or the average of the analysis of four samples obtained at quarterly intervals. At the discretion of the State, when an annual record, taken in conformance with the above, has established that the average annual concentration is less than half the maximum contaminant level, analysis of a single sample may be substituted for the quarterly sampling procedure.

(2) 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 $\sigma_{\sim}$ where $\sigma_{\sim}$ is the standard deviation of the net counting rate of the sample).

(3) 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.

(4) Within one year of the introduction of a new water source for a community water system the testing sampling required by paragraph 1.C.5.b.(1) shall be performed

b. Monitoring for compliance with paragraph 1.B.5a need not include radium 228, except when required by the Primary Authority. Provided, that the average annual concentration of radium 228 has been assayed at least once using the quarterly sampling procedures detailed in paragraph 1.C.5.b.(1).

c. Monitoring requirements for man made radioactivity in community water systems:

(1) Community water systems using surface water shall be monitored at least once every four years. Compliance shall be based on the analysis of an annual composite of four consecutive quarterly samples or the average of the analysis

of four samples obtained at quarterly intervals.

(2) At the discretion of the Primary Authority, suppliers of water utilizing only ground waters may be required to monitor for man-made radioactivity.

d. Testing conducted to determine compliance with paragraph B.5. limitations shall be made in accordance with 40 CFR 141.25(a).

6. Laboratories

a. For the purposes of determining compliance with the National Interim Primary Drinking Water Regulations, samples may be considered only if they have been analyzed by a laboratory approved by the Primary Authority except that the measurement for turbidity, pH, temperature and free chlorine residual may be performed by any person acceptable to the Primary Authority.

b. Methods published in "American Public Health Association Standard Methods for Examination of Water and Wastewater" (latest edition) shall be used as a guide for obtaining water samples.

7. Special Monitoring Regulations for Organic Chemicals and Otherwise Unregulated Contaminants.

a. Special Monitoring for Sodium.

(1) Community water system utilizing surface water sources in whole or in part shall analyze annually one sample per unit at the entry point of the distribution system for the determination of sodium concentration levels.

(2) Community water systems utilizing solely ground water sources shall analyze at least every three years at the entry point of the distribution system for the determination of sodium concentration levels.

(3) Results of the analyses for sodium shall be reported in accordance with paragraph I.D.6.a requirement.

(4) Commands operating a community water system shall report to District (ecv) and COMDT (G-K) for Headquarters units and the appropriate local and State Public Health Official the sodium levels by written notice within 3 months of each test.

(5) Sodium levels shall be tested in accordance with the procedures set forth in 40 CFR 141.41(d).

b. Special Monitoring for Corrosivity Characteristics.

(1) Community water systems utilizing surface water sources in whole or in part shall analyse annually two samples (midsummer and mid winter) per unit at the entry point of the distribution system for the determination of corrosivity characteristics.

(2) Community water systems utilizing ground water sources shall analyze annually one sample per unit at the entry point of the distribution system for the determination of corrosivity characteristics.

(3) Determination of the corrosivity characteristics of the water shall include measurement of pH, calcium hardness, alkalinity,

temperature, total dissolved solids (total filterable residue and calculation of the Langelier index).

(4) Results of the analyses of corrosivity shall be reported in accordance with paragraph 1.D.6.a. requirement.

(5) Analysis conducted to determine the corrosivity of water shall be made in accordance with procedures set forth in 40 CFR 141.42 (c).

c. Commands operating a community water supply system shall identify whether the following construction materials are present in their distribution system and report to District (ecv), or COMDT (G-K) for Headquarters units. The district or COMDT (G-K) shall make the determination whether the presence of these materials may contribute contaminant to the drinking water.

(1) Lead from piping, solder, caulking, interior lining of distributuon mains, alloys and home plumbing.

(2) Copper from piping and alloys, service lines, and home plumbing.

(3) Galvanized piping, service lines, and home plumbing.

(4) Ferrous piping materials such as cast iron and steel.

(5) Asbestos cement pipe.

(6) Vinyl lined asbestos cement pipe.

(7) Coal tar lined pipes and tanks.

D. REPORTING, NOTIFICATION, AND RECORD MAINTENANCE.

1. Inorganic Chemicals

a. If the results of the testing made pursuant to paragraph 1.C.1 indicate that the maximum contaminated level (MCL) detailed in paragraph 1.B.1 has been exceeded, the command operating the water system shall notify the District (ecv) (or Commandant(G-ECV) in the case of a Headquarters unit), COMDT (G-K) and appropriate Primary Authority within 7 days. The command shall initiate three additional tests at the same sampling point within one month. When the average of the four analyses made, rounded to the same number of significant figures as the maximum contaminant level for ths substance in question, exceeds the maximum contaminant level, reporting procedures shall be followed as specified in paragraph D.6.(a). The users of such water shall be notified as detailed in paragraph D.7.

b. The maximum contaminant level for nitrate shall be determined on the basis of the mean of two analyses. When a level exceeding the MCL, for nitrate is found, a second analyses shall be initiated within 24 hours, and if the mean of the two analyses exceeds the MCL reporting procedures shall be followed as specified in paragraph 1.D.6. The user of such community water shall be notified as detailed in Paragraph 1.D.7.

2. Organic Chemicals

a. If the results of the testing made pursuant to paragraph 1.B.2 indicates that the maximum contaminant level (MCL) detailed in paragraph 1.B.2 has been exceeded, the command operating the water system shall notify the District (ecv) (or COMDT (G-ECV) in the case of a Headquarters unit), Commandant (G-K) and the appropriate Primary Authority within 7 days. The command shall initiate three additional

tests at the same sampling point within one month. When the average of the four analyses made, rounded to the same number of significant figures as the MCL for the substance in question, exceeds the MCL, the reporting procedures specified in paragraph D.6 shall be followed. The users of such community water systems shall be notified as detailed in paragraph D.7.

3. Turbidity.

a. If the results of the testing made pursuant to paragraph 1.B.3 indicate that the maximum contaminant level (MCL) detailed in paragraph 1.B.3 has been exceeded the command operating the water system shall retest as soon as practicable, preferably within one hour and confirm the previous measurement. If the repeat test confirms that the MCL has been exceeded, the command shall notify the District (ecv) (or Commandant (G-ECV) in the case of a Headquarters unit), Commandant (G-K) and the appropriate Primary Authority 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 tests exceeds the MCL or if the average of two tests taken on consecutive days exceed 5TU, the reporting procedures specified in paragraph D.6 shall be followed. The users of such water shall be notified as detailed in paragraph D.7.

4. Microbiological.

a. The results from all coliform bacterial analyses performed pursuant to paragraph 1.C.4, except those obtained from check samples and special purpose samples, shall be used to determine compliance with maximum contaminant level MCL detailed in paragraph 1.B.4. When the presence of coliform bacteria in water taken from a particular sampling point has been confirmed by any check samples required by paragraph 1.C.4.(f), the Command operating the water system shall notify the District (ecv) (or Commandant (G-ECV) in the case of Headquarters unit), Commandant (G-K) and the Primary Authority within 48 hours and notify the user according to procedures detailed in paragraph 1.D.6 and 1.D.7.

5. Radionuclides.

a. If the results of the testing made pursuant to paragraph 1.C.5 indicates that the maximum contaminant level (MCL) for gross alpha particle activity or total radium as detailed in paragraphs 1.B.5.a.(1) and 1.B.5.a.(2) and the MCL for man-made radioactivity detailed in paragraph 1.B.5.a.(3) has been exceeded, the command operating the water system shall notify the District (ecv) (or Commandant (G-ECV) in the case of a Headquarters unit), Commandant (G-K), the Primary Authority and the users according to procedures detailed in paragraph 1.D.6 and 1.D.7. Monitoring at monthly intervals shall be continued until the concentration no longer exceeds the MCL or until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.

6. Reports.

a. Except where a shorter period is specified, commands operating a water system shall report to the District (ecv) or commanding officer of Headquarters unit and state a test result within 40 days of receipt of the test result or within 10 days following the Primary Authority required monitoring period.

7. Public Notifications.

a. If a Coast Guard operated and maintained community and non-community water system: fails to comply with an established applicable maximum contaminant level, is granted a variance or an exemption from an applicable MCL, fails to comply with an established applicable testing procedure, fails with the requirements of any schedule prescribed pursuant to a variance or exemption, or fails to perform any monitoring required, the District command or CO of a Headquarters unit shall notify the public (non-CG personnel) served by the system of the failure by written notice within three months. Such notice shall be repeated at least once every three months as long as the system's failure continues or the variance or exemption remains in effect.

b. Notices given shall be written in a manner reasonably designed to inform fully the users of the system. The notice shall disclose all material facts regarding the subject including the nature of the problem, the primary drinking water regulation which has been violated, the seriousness of the public health hazard, and any preventive measures that should be taken by the water users.

c. Additional users notification may be required, as specified by the Primary Authority, including newspapers, TV, and posting of notices in local post offices.

d. District commanders and commanding officers of Headquarters units shall forward a copy of each public notification required above to Commandant (G-ECV), Commandant (G-K), and the Primary Authority.

8. Record Maintenance.

a. Records of bacteriological analyses shall be kept for not less than 5 years.

b. Records for chemical analyses shall be kept for not less than 10 years.

c. Copies of any written reports, summaries or communications relating to sanitary surveys of the system conducted by the Coast Guard, by a private consultant, or by any local, State or Federal agency, shall be kept for a period not less than 10 years following the survey.

d. Records concerning a variance or exemption granted to the water system shall be kept for a period ending not less than 5 years following the expiration of such variance or exemption.

e. Records of action taken by the Command to correct violations of primary drinking water regulations shall be kept for a period not less than 3 years after the last action taken with respect to the particular violation involved.

f. Laboratory report data may be transferred to tabular summaries, provided that the following information is included.

(1) The date, place and time of sampling, and name of person who collected the sample.

(2) Identification of the sample as to whether it was a routing distribution system sample, check sample, raw or process water sample or other special purpose sample.

(3) Date of the analyses, analytical technique/method used and the results of the analyses.

(4) Laboratory and the person responsible for performing the analyses.

NATIONAL INTERIM PRIMARY DRINKING WATER REGULATION

MAXIMUM CONTAMINANT LEVEL ITEM (MCL)	COMMUNITY WATER SUPPLY(1)	NON COMMUNITY WATER SUPPLY	SURFACE WATER	GROUND WATER	MCL See Para	SAMPLING COMMUNITY WATER SYSTEM SURFACE	SAMPLING COMMUNITY WATER SYSTEM GROUND WATER	SAMPLING NON COMMUNITY WATER SYSTEM SURFACE WATER	SAMPLING NON COMMUNITY WATER SYSTEM GROUND WATER	TESTING REQUIREMENTS	NOTIFICATION REQUIREMENTS
1.Inorganic All(except Nitrate)	Yes	No	Yes	Yes	B.1.	Annual	3 yrs			40 CFR 141.23(8)	7 days
Nitrate	Yes	Yes	Yes	Yes	B.1.	Annual	3 yrs	Set by State	Set by State		
2.Organic All(except Total Trichelomethane)	Yes	No	Yes	Yes	B.2.	Set by State	Set by State	Only when initially constructed and as directed by G-K		40 CFR 141.24(f)	7 days
				Contact COMDT G-ECV for specific guidance							
3.Turbidity	Yes	No	Yes	No	B.3	Daily	(2)	Daily	(2)	40CFR141.22(a)	2 days
4.Microbiological	Yes	Yes	Yes	Yes	B.4	Monthly	Monthly	Quarterly	Quarterly	40CFR141.2a & h	2 days
5.Radionuclide	Yes	No	Yes	Yes	B.5	4 Yrs.	4 Yrs	(3)		40CFR141.25(a)	10 days
6.Special Contaminant											
Sodium	Yes	No	Yes	Yes	Set by	Annual	3 Yrs			40CFR141.42(d)	10 days
Corrosivity	Yes	No	Yes	Yes	State	Annual	Annual			40CFR141.42(c)	10 days

NOTE: (1) A No or Yes indicates whether Drinking Water Regulations apply.
(2) No testing since Primary Authority has determined that a risk to public health is not possible.
(3) Man made radioactivity shall be tested only in surface water (see 1.C.5.c.(1)

E. SUMMARY OF CONTAMINANT EFFECTS.

1. Arsenic - arsenic is highly toxic, and ingestion of as little as 100 mg. usually results in severe poisoning. Regular ingestion has an accumulative effect. Arsenic is easily absorbed through the gastro-intestinal tract and lungs, and is then distributed throughout the body tissues, and fluids. There is some evidence that arsenic causes lung and skin cancer. Arsenic can be removed from water by conventional alum or iron coagulation and lime softening treatment processes.

2. Barium - barium is a general muscle stimulant, especially affecting the heart muscles. Fatalities have occured as a result of consumption of barium salts in rat poisons. The fatal dose for humans is about 550-600 mg. Barium is capable of causing nerve block. In small doses, it produces transient increase in blood pressure. Barium can be removed from water by conventional lime softening process or ion exchange.

3. Cadmium - cadmium is a highly toxic element. It has been found in ground waters as a result of seepage from electroplating plants. It is also found in zinc used to galvanize iron, and may be released in water through corrosion. Cadmium may be removed from water by lime softening and to a lesser extent by ferric sulfate and alum coagulation treatment processes.

4. Chromium - chromium is found in ground water as a natural occurrence and in surface waters as an industrial pollutant. Chromium, when inhaled, is a known carcinogen. Chromium can be removed from water by alum coagulation, iron coagulation and lime softening.

5. Lead - Lead taken into the body can be seriously injurious to health, even lethal. Prolonged exposure to relatively small quantities may result in serious illness or death. Lead is a cumulative poison. Poisoning may result from an accumulation in the body of lead absorbed in sufficient quantities from any one or all of three common sources: food, air, and water. Lead can be removed from water by conventional treatment methods such as iron and alum coagulation, and lime softening processes.

6. Mercury - Mercury may occur in either inorganic or organic form. The organic form is the most important since it is the more toxic of the two. The most likely occurrence is in surface waters due to industrial pollution. The inorganic form may be removed from water by ferric sulfate coagulation. The organic form may be removed by granular activated carbon.

7. Nitrate - Nitrate standards are set to control the amount of nitrates discharged into the water. Nitrates and phosphates in wastes contribute to excess amounts of nutrients in our water. Artifically nutrient enriched waters are over fertilized, altering aquatic systems. Quite often algae blooms occur in lakes and slow moving streams. Certain algae can make public water supplies and fish flesh unpalatable. Aquatic growths stimulated by nutrients can trap silt and organic matter, providing ideal breeding spots for bacteria, and can choke up streams. Such growths can reduce the oxygen concentrations in the water, killing fish and greatly reducing the stream's ability to purify itself. Organic enrichment is a primary factor in overaging or eutrophication, the process causing

the "death" of Lake Erie.

8. Selenium - Selenium is highly toxic and is found in waters as a natural occurrence. It is also believed to cause tumors and may increase the incidence of dental caries in humans. Certain soils have high selenium content. Selenium can be removed from water by reverse osmosis, ion exchange, and to a lesser degree by iron sulfate coagulation.

9. Silver - Silver has a cosmetic effect on the the body, resulting in permanent blue-grey discoloration of the skin, eyes, and mucous membranes. Most likely occurrence is in surface waters from industrial pollution. Silver can be removed from water by conventional coagulation and lime softening treatment processes.

10. Flouride - Flouride is found in ground waters in natural occurance. A low level of fluoride in drinking water has been found effective in reducing the incidence of dental cavities. However, an excessive concentration will result in mottling of the tooth enamel. Long term consumption of water containing a fluoride concentration greater than 8 mg/L can result in bone changes.

11. Radionuclides - Maximum contaminant levels have been established for two categories of radioactive contaminants-alpha emitters and beta and photon emitters. The beta and photon emitters are generally man made radioisotopes rather than naturally occuring ones. Different types of ionizing radiation may cause different levels of biological damage, even though the amount of energy involved is the same for each type of radiation. Radioactive material has been shown to be removed by lime softening, ion exchange, or softening processes.

12. Turbidity - Turbidity is caused by the presence of suspended matter such as clay, silt, finely divided organic matter, bacteria, plankton, and other microscopic organisms. Turbidity is an expression of the optical property of a sample of water which causes light to be scattered and absorbed rather than transmitted in straight lines through the sample. Excessive turbidity reduces light penetration into the water and therefore, reduces photosynthesis by phytoplankton organisms, attached algae, and submersed vegetation.

13. Disinfection - Disinfection is employed to protect public water supplies, primary and secondary-body-contact recreational waters, shellfisheries (because oysters, clams, and mussels can accumulate microorganisms, including bacteria and viruses, and transmit them to consumers), and agricultural waters for domestic animals. Disinfection reduces the water-borne coliformsorganisms existing in feces, and other sources, used as indicators of pathogen content of the disease-producing potential of water. Inadequately disinfected sewage can contaminate receiving waters with Salmonella, Shigella, Escherichia coli, Leptospira, and Mycobacterium. Enteric viruses such as polio and hepatitis can also be present.

14. Acidity/Alkalinity - All water quality standards contain an index of the hydrogen ion activity - pH. Even though pH determinations are used as an indication of acidity and/ or alkalinity, pH is not a measure of either. Acidity in

natural waters is caused by carbon dioxide, mineral acids, weakly dissociated acids, and the salts of strong acids and weak bases. Alkalinity is caused by strong bases and the salts of strong alkalies and weak acids. In most productive, fresh, natural waters, the pH falls in the range between 6.5 and 8.5 (except when increased by photosynthetic activity).

15. Temperature - Temperature standards are set to control thermal pollution, or the amount of heated wastes discharged into the water. Thermal pollution creates adverse conditions for aquatic life; accelerates biological processes in the streams, reducing the dissolved oxygen content of the water; increases the growth of aquatic plants, contributing to taste and odor problems; or otherwise makes the water less suitable for fish and wildlife, domestic, industrial and recreational uses.

16. Inorganics - Mercury, silver, arsenic, cadmium, copper, lead, chromium, nickel, and zinc are heavy metal compounds present in our waters and toxic to man in varying degrees. They are serious pollutants because these stable compounds have persistent and toxic effects for many years following deposit. The heavy metal compounds-chromium, cadmium, mercury, and lead have no known biological function in animal life and can act synergistically with other substances to increase toxicity. Marine organisms, especially shellfish, readily take up and concentrate these heavy metals, which are thereafter ingested by man. Once in the human system their toxic effects are cumulative and are harmful to the degree that the dosages and resultant concentrations approach a lethal threshold. The fishery industry has sustained economic losses in recent years when unacceptable levels of mercury or other heavy metals were discovered in fish from contaminated waters, provoking government condemnation of the affected catches. Fishing waters have been closed to fishermen, cutting them off from their livelihood.

17. Bacteria - Although some bacteria, the pathogens, are injurious to human life and welfare, the majority, the saprophytes, when naturally occurring are beneficial. Certainly, as the foundation of the food chain, bacteria are essential to life. Bacteria act as anti-pollutant agents, and the dissolutuon of organic matter is the prime role of bacteria in stream self-purification. Because of this function, certain types of bacteria are the workhorse of biological sewage treatment plants. Bacteria are grouped into aerobic and anaerobic classes. Aerobic bacteria thrive in the presence of O (free oxygen); anaerobic bacteria thrive in the absence of free oxygen. Pollution can cause a superabundance of the saprophyte population. Nutrients such as organic matter (sewage, improperly stabilized wood pulp) and other oxygen-demanding wastes, toxic or other chemicals, and phosphorus, among other pollutants, can promote nuisance growths and undesirable conditions for aquatic life and recreational and aesthetic water uses. They can consume the free oxygen and create favorable conditions for the growth of anaerobic bacteria. Anaerobic bacteria are a major factor in lake "deaths. "Fecal coliform bacteria are used as an indicator of the possible presence of pathogens in water.

F. National Secondary Drinking Water Standards.

Secondary Drinking Water Standards, as detailed in 40 CFR 143 provide guidelines for water treatment requirements to improve the aesthetic quality of drinking water. These standards also have secondary health effect, since exceeding the maximum contaminant levels may lead to uses of unsafe drinking water. These regulations are not federally enforceable but are intended as guidelines:

1. Secondary Maximum Contaminant Levels.

Contaminant	Level
Chloride	250.0 mg/l
Color	15 color units
Copper	1.0 mg/l
Corrosivity	Non-Corrosive
Foaming Agents	0.5 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
pH	6.5 - 8.5
Sulfate	250.0 mg/l
Zinc	5.0 mg/l
Odor	3 treshold odor No.
Total Dissolved Solids(TDS)	500.0 mg/l

These levels represent reasonable goals for drinking water quality. Individual states may establish higher or lower levels depending on local conditions. District commanders and commanding officers of Headquarters units shall check with the appropriate state authority for their limitations.

2. Monitoring and Analytical Requirements.

a. All CG suppliers for community water systems shall monitor for secondary maximum contaminant level at least every 3 years.

b. Testing conducted to determine compliance with Para. F.1 shall be made in accordance with 40 CFR 143.4(b).

3. Reporting.

a. All test results should be reported to the respective District (ecv) or Commandant (G-ECV) in case of Headquarters units .

4. Summary of Contaminant Effects.

a. Chloride - In reasonable concentrations it is not harmful to humans, but in concentrations above 250 mg/l chloride causes a salty taste in water which is objectionable to many people. Chloride can be removed from drinking water by distillation, reverse osmosis or electrodialysis. In some cases the entry of chloride into a drinking water source can be minimized by proper aquifer selection and well construction.

b. Color - color may be indicative of dissolved organic material which may lead to generation of trihalomethanes and other organohalogen compounds during chlorination. Color can also be caused by inorganic elements such as manganese or iron. Color becomes objectionable and unaesthetic to most people at levels over 15 color units (C.U.). In some cases, color can be objectionable at the 5.C.U. level. Depending on the nature of the substance causing color, conventional water treatment (flocculation and filtering), oxidation or carbon adsorption are processes used for removing color.

c. Copper - copper is an essential and beneficial element in

human metabolism, but is also imparts an undesirable taste to water. Small amounts of copper are generally regarded as non-toxic. Copper can be removed from water by ion exchange, and by proper control of pH, where the source of copper is corrosion of copper pipes.

d. Corrosivity - this is a complex characteristic of water related to pH, alkalinity, dissolved oxygen, total dissolved solids and other factors. A corrosive water will dissolve metals and stain plumbing fixtres. Corrosivity has a health and economic effect as well. Health effects of dissolved cadmium and lead have been discussed in Primary Drinking Water Standards. Corrosivity can be controlled by pH adjustment, use of chemical stabilizers, and other methods dependent on specific conditions of the water system.

e. Foaming agents - this is caused primarily by presence of detergents and similar substances. Water which foams is unaesthetic and considered unfit for consumption. Foaming substances can be removed from water by carbon adsorption, but it is preferable to prevent contamination by these substances.

f. Iron - iron is highly objectionable in water for either domestic or industrial uses. It may impart brownish discoloration to laundered goods. It may impart a bitter taste, and adversely affects the taste of beverages and foods made from water. The small amounts of iron consumed in water, however, have no toxicological significance. Iron can be removed from water by conventional water treatment processes, iron exchange, or oxidation followed by filtration. Corrosion control is also effective.

g. Manganese - Manganese also produces discoloration in laundered goods and imparts taste in drinking water and beverages made from water. At concentrations in excess of 0.05 mg/l, it can build up coatings in distribution piping, which can slough off and cause discoloration. Manganese can usually be removed from water by the same processes used for iron removal.

h. Odor - this is an important aesthetic quality of water for domestic and industrial use. Many manufacturing processes require odor free water. It is usually impractical or impossible to identify odor producing chemicals. Odors are usually removed by carbon adsorption or aeration.

i. pH - pH may have a variety of esthetic and health effects. Corrosion is often associated with pH levels below 6.5. Above 8.5, mineral incrustation and bitter taste may occur, germicidal activity of chlorine is reduced, and the rate of formation of trihalomethanes is significantly increased. However, the overall impact of pH on any one water system will depend on the chemistry and composition of that water.

j. Sulfate - sulfate may at concentrations above 600 mg/l have a laxative effect. The laxative effect is more predominant in transients than regular water users. Sulfate also contributes to formation of scale in boilers and heat exchangers. Sulfate can be removed from water by distillation, reverse osmosis, or electrodialyses.

k. Total Dissolved Solids (TDS) - TDS may have an influence on the acceptability of water in general, and may indicate presence

of an excessive concentration of some specific substances that are objectionable. Excessive hardness, taste, mineral deposition or corrosion are common properties of highly mineralized water. Dissolved solids can be removed by chemical precipitation in some waters, but distillation, reverse osmosis, and ion exchange are more common removal methods.

1. Zinc - this is an essential and beneficial element in human metabolism. It can also impart an undesirable taste to water. At high concentrations, it can impart a milky appearance to water. Corrosion control will minimize introduction of zinc into water, since zinc is used in coating of galvanized iron. Zinc can be removed from water by conventional water treatment processes or ion exchange.

Water Supply and Waste Water Disposal Manual

Chapter 2 TESTING

DELETED

This Chapter has been incorporated into Chapter 1 by Change 1 to this Manual.