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MSDH Public Water Fluoridation Guidelines

I. Fluoridation Benefits Oral Health

Tooth decay is the most prevalent chronic disease of man. By age 17, the average American will have 6.3 decayed, missing or filled teeth. In 2000, a statewide clinical survey of 5,227 Mississippi 3rd graders revealed that over 70% had tooth decay.

Tooth decay is a complex process characterized by a loss of tooth structure as a result of destruction of these tissues by acids released from specific kinds of bacteria. About 7 of ~500 bacteria identified in the mouth have the ability to cause tooth decay; yet, these bacteria can spread and infect children by vertical transmission from the mother.

No other public health measure is as effective or as equitable in building decay-resistant teeth as public water fluoridation. Fluoride is naturally present in small yet varying amounts in soil, water, plants, and animals and, thus, is a normal constituent of all diets. In mammals, the highest concentrations of fluoride are found in the bones and teeth.

Water fluoridation is the deliberate addition of fluoride into drinking water in accordance with scientific guidelines. In 1945 and 1947, data from four studies demonstrated the oral health benefits of fluoridated water in several communities (Grand Rapids, Michigan; Newburgh, New York; Brantford, Ontario [Canada]; and Evanston, Illinois) and established water fluoridation as a practical, effective public health measure that would prevent tooth decay. Since then, hundreds of studies in the U.S. and other countries have concurred that water fluoridation is a safe and effective way to prevent tooth decay.

These guidelines provide information that will enable the MSDH Division of Water Supply (DWS) and Division of Dental and Oral Health (DOH), public water system officials, consulting water engineers, and Certified Waterworks Operators to design and operate public water fluoridation programs.

II. Starting a Water Fluoridation Program

A. Eligibility: Public water systems (PWS) that serve 1,000 people or more are eligible to receive MSDH funds in the form of a grant for the capital and associated costs required to begin fluoridation at the water facility. The PWS must be located in Mississippi and willing to comply with all safety monitoring and

reporting requirements. Funding for PWS that serve less that 1,000 people may be considered on a case-by-case basis when requested by public water system officials.

B. Funding Assistance: The MSDH is periodically able to fund new water fluoridation programs based on the availability of monies from several sources, such as foundation grants. Public leaders that approve a community water fluoridation program may request a contract to receive MSDH funding to pay for water fluoridation equipment, installation, and associated costs. The contractor must agree to abide by all terms and conditions as stated by the MSDH in the contract agreement (appended). Additionally, PWS that receive funding must agree to operate the water fluoridation program for at least five years unless otherwise required to de-fluoridate the public water system by the MSDH.

C. Fluoridation System Design:

Engineering Guidelines

1) The fluoride feed system must be installed so that it cannot operate unless raw water pumps are operating (interlocked). To assure this, the metering pump must be wired electrically in series with the main well pump or the service pump. If a gravity flow situation exists, a flow switch or pressure device should be installed.[1]

2) When the fluoridation system is connected electrically to the well pump, the fluoride-metering pump cannot be plugged into any continuously active ("hot") electrical outlet. The fluoride-metering pump must only be plugged into the circuit that contains the interlock protection.[2]

3) A secondary flow-based control device (e.g., a flow switch or a pressure switch) should be installed for back-up protection in water systems that serve populations of <500 persons.

4) The fluoride injection point should be located where all the water to be treated passes; however, fluoride should not be

[1] The interlock may not be necessary when water systems have an on-site water operator 24 hours a day.

[2] One method of ensuring interlock protection is to install a special clearly labeled plug on the metering pump that is compatible with a special outlet on the appropriate electrical circuit. Another method of providing interlock protection is to wire the metering pump directly into the electrical circuit that is tied electrically to the well pump or service pump.

injected at sites where substantial losses of fluoride can occur (e.g., the rapid-mix chemical basin).[3]

5) The fluoride injection point in a water line should be located in the lower one-third of the pipe, and the end of the injection line should extend into the pipe approximately one-third of the pipe's diameter.
6) A corporation stop valve should be used in the line at the fluoride injection point when injecting fluoride under pressure. A safety chain must always be installed in the assembly at the fluoride injection point to protect the water plant operator if a corporation stop valve assembly is used.

7) Operation of a fluoridation system without a functional antisiphon device can lead to overfeed that exceeds 4 mg/L. Two diaphragm-type, antisiphon devices must be installed in the fluoride feed line when a metering pump is used. The antisiphon device should have a diaphragm that is spring-loaded in the closed position. These devices should be located at the fluoride injection point and at the metering pump head on the discharge side. The antisiphon device on the head of the metering pump should be selected so that it will provide the necessary back pressure required by the manufacturer of the metering pump. Oversized metering pumps should not be used because serious overfeeds (i.e., overfeed that exceeds 4 mg/L) can occur if they are set too high. Conversely, undersized metering pumps can cause erratic fluoride levels.[4]

8) The fluoride metering pump should be located on a shelf not more than 4 feet (1.2 m) higher than the lowest normal level of liquid in the carboy, day tank, or solution container. A flooded suction line is not recommended in water fluoridation.

9) For greatest accuracy, metering pumps should be sized to feed fluoride near the midpoint of their range. Pumps should always operate between 30%–70% of capacity. Metering pumps that do not meet design specifications should not be installed. The priming switch on the metering pump should be spring-loaded to prevent the pump from being started erroneously with the switch in the priming position.

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[3] In a surface-water treatment plant, the ideal location for injecting fluoride is the rapid sand filter effluent line going into the clear well.
[4] Vacuum testing for all antisiphon devices should be done semiannually. All antisiphon devices must be dismantled and visually inspected at least once a year. Schedules of repairs or replacements should be based on the manufacturer's recommendations.

10) An in-line mixer or a small mixing tank should be installed in the finished water line exiting from the water plant if the first customer is less than or equal to 100 feet (30.5 m) from the fluoride injection point and if there is no storage tank located in the line before the water reaches the customer. The minimum distance is 100 feet, assuming there are typical valves and bends in the water line that allow for adequate mixing.

11) Flow meter-paced systems should not be installed unless the rate of water flow past the point of fluoride injection varies by more than 20%.

12) A master meter on the main water service line must be provided so that calculations can be made to confirm that the proper amounts of fluoride solution are being fed.

13) The fluoride feed line(s) should be either color coded, when practical, or clearly identified by some other means. Color coding helps prevent possible errors when taking samples or performing maintenance. The pipes for all fluoride feed lines should be painted light blue with red bands. The word “fluoride” and the direction of the flow should be printed on the pipe.
14) Fluoride feed equipment, controls, safety equipment, accessory equipment, and other appurtenances must be inspected annually.

15) All hose connections within reach of the fluoride feed equipment should be provided with a hose bibb vacuum breaker.

16) All fluoride chemicals must conform to the appropriate American Water Works Association (AWWA) standards (B-701, B-702, and B-703) to ensure that the drinking water will be safe and potable.
17) Storage should be provided for at least a three-month supply of fluoride chemical to minimize the effect of a possible fluoride chemical shortage. Shortages have occurred sporadically in the past (CDC, unpublished report, 1986).

18) Cross-connection controls that conform to state regulations must be provided.

Sodium Fluoride Saturator System Requirements

1) The minimum depth of sodium fluoride in a saturator should be 12 inches (30.5 cm). This depth should be marked on the outside of the saturator tank. The saturator should never be filled so

high that the undissolved chemical is drawn into the pump suction line.

2) Only granular sodium fluoride should be used in saturators, because both powdered and very fine sodium fluorides tend to cause plugging in the saturator.

3) The water used for sodium fluoride saturators should be softened whenever the hardness exceeds 50 parts per million (ppm). Only the water used for solution preparation (i.e., the make-up water) needs to be softened.

4) A flow restrictor with a maximum flow of two gallons (7.6 L) per minute should be installed on all up-flow saturators.

5) In the event of a plant shutdown, the make-up water solenoid valve should be physically disconnected from the electrical service.

6) For systems that use $\leq$ 10 gallons ($\leq$ 38 L) of saturator solution per day, operators should consider using an up-flow saturator that is manually filled with water.

7) In an up-flow saturator, either an atmospheric vacuum breaker must be installed or a backflow prevention device must be provided in accordance with state or local requirements. The vacuum breaker must be installed according to the manufacturer's recommendations.

8) A sediment filter (20 mesh) should be installed in the water make-up line going to the sodium fluoride saturators. The filter should be placed between the softener and the water meter.

9) A water meter must be provided on the make-up water line for the saturator so that calculations can be made to confirm that the proper amounts of fluoride solution are being fed. This meter and the master meter should be read daily and the results recorded.

10) Unsaturated (batch-mixed) sodium fluoride solution should not be used in water fluoridation.

Fluorosilicic Acid System Requirements

1) To reduce the hazard to the water plant operator, fluorosilicic acid (hydrofluosilicic acid) must not be diluted.

Small metering pumps are available that will permit the use of fluorosilicic acid for water plants of any size.

2) No more than a seven-day supply of fluorosilicic acid should be connected at any time to the suction side of the chemical feed pump. All bulk storage tanks with more than a seven-day supply must have a day tank. A day tank should only contain a small amount of acid, usually a one- or two-day supply.

3) Day tanks or direct acid-feed carboys/drums should be located on scales; daily weights should be measured and recorded. Volumetric measurements, such as marking the side of the day tank, are not adequate for monitoring acid feed systems.

4) Carboys, day tanks, or inside bulk storage tanks containing fluorosilicic acid must be completely sealed and vented to the outside.

5) Fluorosilicic acid should be stored in bulk, if economically feasible.

6) Bulk storage tanks must be provided with secondary containment (i.e., berms) in accordance with state/local codes or ordinances.

Fluoride Dry Feed System Requirements

1) A solution tank that has a dry feeder (both volumetric and gravimetric) must be provided.

2) Solution tanks should be sized according to CDC guidelines.

3) A mechanical mixer should be used in every solution tank of a dry feeder when sodium fluorosilicate (i.e., silicofluoride) is used.

4) Scales must be provided for weighing the amount of chemicals used in the dry feeder.

III. Water System Monitoring and Reporting

A. Fluoride Testing Requirements:

1) Water system personnel must test water samples for stable and consistent fluoride levels in the water system.[5] Water samples

[5] The optimal control range in Mississippi for adjusting fluoride in water is 0.7 - 1.3 parts per million fluoride (ppm) with the optimal fluoride level being 0.8 ppm.

must be taken on a regular basis as determined by the MSDH, and sample taking should be performed at all entry points throughout the water system.

2) At least once each month, water system personnel shall divide (split) one sample and have one portion analyzed for fluoride by water system personnel and the other portion analyzed by the MSDH Laboratory.

3) Each PWS shall submit a report each month of the results of required water sample testing to the MSDH Division of Dental and Oral Health.[6] These reports must include:

a. The amount and type of chemicals fed and the total number of gallons of water treated per day;

b. The results of required monitoring for fluoride in the water distribution system; and

c. The results of monthly split sample(s).

4) The calculated dosage should be cross-checked against the reported fluoride levels to identify chronic non-optimal operation.

5) Samples of the PWS raw water source (i.e., water that has not been treated) should be submitted annually for fluoride content analysis at the MSDH Lab.

6) PWS that are successful in "optimally" fluoridating their water supplies will be awarded a special certificate of recognition by the MSDH.[7]

B. Fluoride Testing: Substances such as chloride and sulfate may interfere with the analysis of fluoride ion in water; however

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[6] Required samples include a minimum of three (3) routine fluoride samples which shall be taken on different days each week and submitted monthly, and submission of a monthly split water sample to the MSDH Lab for testing.

[7] For a water system to be considered optimally fluoridating:
a) The monthly average fluoride concentration of the PWS and at least 75% of those monthly averages during the calendar year shall fall within the optimal control range.
b) At least 75% of required water samples in a month and at least 75% of required water samples during the calendar year shall be taken by the PWS.
c) At least 75% of required water samples in a month and at least 75% of required water samples during the calendar year shall fall within the optimal control range.
d) At least 75% of monthly split samples shall be taken by the PWS during the calendar year.
e) At least 75% of monthly split samples taken by the PWS during the calendar year shall agree with the MSDH Lab results within the split sample tolerance of +/- 0.2 ppm.

using an appropriate testing method allows the operator to account for the interference in the daily monitoring results.

Colorimeter (SPADNS Method)

1) The colorimetric method (SPADNS) of fluoride analysis is based on a reaction in which a deep color (from zirconium in dye) turns lighter in the presence of fluoride (fluoride removes zirconium). The colorimetric method can be used where no interference occurs or where the interferences are consistent (e.g., from iron, chloride, phosphate, sulfate or color). Consistent interferences can be accounted for by collecting a split sample and comparing the colorimetric results with results provided for by MSDH Lab personnel. State laboratory personnel, MSDH DOH, and the water plant operator can then make the appropriate adjustment.

2) The colorimetric method (SPADNS) of fluoride analysis is applicable for daily testing of fluoride levels in the range 0.1 to 2.0 ppm. Beyond this range, dilutions must be made using deionized water to obtain accurate measures of the fluoride concentration.

Specific Ion Meter (Electrode Method)

The electrode method is capable of measuring fluoride concentrations from 0.1 to 10 ppm.

IV. Safety and Reporting

A. Water Operator Safety

1) The water supply industry has a high incidence of unintentional injuries as compared with other industries in the United States; with proper safety procedures injuries can be avoided.

2) Water operator should follow proper safety procedures to avoid injuries and overexposure to chemicals. Water plant personnel should regularly receive safety training on all chemicals, including fluoride. Exposure hazards and first aid should be reviewed and emergency spill procedures should be established and explained to workers.

B. Protective Equipment

1) The use of personal protective equipment (PPE) is required when handling fluoride chemicals or when maintenance on fluoridation equipment is performed.

2) Required PPE for handling sodium fluoride or sodium fluorosilicate includes:

a. NIOSH/MSHA approved high efficiency dust respirator (chemical mask) with soft rubber face-to-mask seal and replaceable cartridges.

b. Gauntlet neoprene gloves (12″ glove minimum length)

c. Heavy duty neoprene aprons.

3) Required PPE for handling fluorosilicic acid includes:

a. Gauntlet neoprene gloves (12″ glove minimum length)

b. Heavy duty neoprene aprons.

c. Full 8″ face shield or acid type safety goggles

d. Safety shower/eye washer in easily accessible location (or pint-size bottle of eyewash solution).

C. Chemical Storage

1) Do not allow unauthorized personnel, especially small children, in areas where fluoride chemicals are fed or stored. Do not eat or keep food in areas where fluoride is stored.

2) Store dry fluoride on pallets, in stacks preferably not more than six bags high. If fiber drums are used, keep the tops closed to prevent moisture contamination.

3) Vapors from fluorosilicic acid are corrosive; containers should be kept tightly closed, vented to the outdoors, and stored away from hot temperature areas. Bulk storage tanks can be made of fiberglass polyethylene or rubber-lined steel.

4) Fluoride waste should be disposed of in accordance with Mississippi’s Environmental Protection Program. Chemical spills should be cleaned immediately.

D. Fluoridation System Overfeed

1) When a community fluoridates its drinking water, a chance of a fluoride overfeed exists. However, it is difficult for consumers to swallow large enough doses of fluoride to cause toxic effects because one of the symptoms of fluoride poisoning is severe nausea; people purge the ingested fluoride by vomiting.

2) Specific actions should be taken when equipment malfunctions or an adverse event occurs in a PWS that causes a fluoride chemical overfeed (Table 1).

3) When a fluoride test result is at or near the top end of the analyzer scale, the water sample must be diluted and retested to ensure that high fluoride levels are accurately measured.

Table 1: Emergency Procedures for Fluoride Overfeeds

Fluoride Content (mg/l)	Recommended Actions
0.1 mg/L above routine to 4.0 mg/L	1. Leave the fluoridation system on. 2. Determine malfunction and repair. 3. Notify supervisor and report the incident.
4.1 mg/L to 10.0 mg/L	1. Consider turning off the fluoridation system if the problem is not found quickly and repaired. 3. Notify supervisor and report the incident. 4. Take water samples at several points in the distribution system and test the fluoride content. 5. Determine malfunction and repair.
10.1 mg/L or greater	1. Turn off the fluoridation system immediately. 2. Notify supervisor and report the incident. 3. Take water samples at several points in the distribution system and test the fluoride content. 4. Send water sample to MSDH lab for testing. 5. Determine malfunction and repair.

E. Chemical Exposure

1) Skin contamination **-** If the operator gets wet or dry chemicals on the skin, he or she should thoroughly wash the contaminated skin area immediately. If the operator's clothing is contaminated with a wet chemical, he or she should remove the wet contaminated clothing immediately. If the operator's clothing becomes contaminated with dry chemicals, he or she should change their work clothing no later than the close of the work day.
2) Ingestion of Excessive Amounts of Fluoride –
Refer to Tables 2 and 3.

TABLE 2
Recommended emergency treatment for persons who ingest dry fluoride chemicals (NaF and Na2SiF6)

Milligrams fluoride ion (mg)	**Treatment**
<5.0 mg of fluoride ion/kg[8]	1. Give calcium (milk) orally to relieve gastrointestinal symptoms. Observe for 2–4 hours. (A can of evaporated milk may be kept available for emergency use.) 2. Induced vomiting is not necessary.
≥ 5.0 mg of fluoride ion/kg	1. Move the person away from any contact with fluoride and keep him or her warm. 2. Call the Poison Control Center. 3. If the person is conscious, induce vomiting by rubbing the back of the person's throat with either a spoon or your finger or giving the person syrup of ipecac. To prevent aspiration of vomitus, the person should be placed face down with the head lower than the body. 4. Give the person a glass of milk or any source of soluble calcium (i.e., 5% calcium gluconate or calcium lactate solution). 5. Take the victim to the hospital as quickly as possible.

[8] Average weight/age: 0–15 kg/0–2 years; 15–20 kg/3–5 years; 20–23 kg/6–8 years; 23–45 kg/9–15 years; 45–70 kg and higher/15–21 years and older. 5 mg of fluoride (F) equals 11 mg of sodium fluoride (8 mg of sodium fluorosilicate). Ingesting 5 mg F/kg is equivalent to a 154-lb. (70 kg) person consuming 0.8 grams of sodium fluoride (0.6 grams of sodium fluorosilicate).

TABLE 3
Recommended emergency treatment for persons who ingest Fluorosilicic Acid

Milligrams fluoride ion (mg)	Treatment
<5.0 mg of fluoride ion/kg[9]	1. Give calcium (milk) orally to relieve gastrointestinal symptoms. Observe for 2–4 hours. (A can of evaporated milk may be kept available for emergency use.) 2. Induced vomiting is not necessary.
≥ 5.0 mg of fluoride ion/kg	1. Move the person away from any contact with fluoride and keep him or her warm. 2. Call the Poison Control Center. 3. If the person is conscious, induce vomiting by rubbing the back of the person's throat with either a spoon or your finger or giving the person syrup of ipecac. To prevent aspiration of vomitus, the person should be placed face down with the head lower than the body. 4. Give the person a glass of milk or any source of soluble calcium (i.e., 5% calcium gluconate or calcium lactate solution). 5. Take the victim to the hospital as quickly as possible.

[9] Average weight/age: 0–15 kg/0–2 years; 15–20 kg/3–5 years; 20–23 kg/6–8 years; 23–45 kg/9–15 years; 45–70 kg and higher/15–21 years and older. 5 mg of fluoride (F) equals 27 mg of 23% fluorosilicic acid. Ingesting 5 mg F/kg is equivalent to a 154-lb. (70 kg) person consuming 2 grams of fluorosilicic acid.

V. Water Fluoridation Program Maintenance Guidelines

To ensure that a fluoridation system is functioning properly it is necessary that equipment, including feed lines and testing equipment, be maintained. Fluoridation systems that are not properly maintained tend to have a higher rate of malfunction that deprives the public of the benefits of water fluoridation. Water operators should read and follow all maintenance guidelines found in the equipment manufacturer's user's manuals and other manuals such as the CDC's Manual for Water Plant Operators, April 1994.

VI. State Monitoring and Surveillance

A. MSDH Division of Dental and Oral Health (MSDH DOH)

The MSDH DOH shall be responsible for: a) managing the fluoridation program; b) promoting water fluoridation; c) providing liaison with other state and federal agencies; (d) assisting MSDH Division of Water Supply (DWS) with resolution of problems, and (e) surveillance and reporting of all fluoridation monitoring reports from MSDH DWS. When feasible, MSDH Division of Dental and Oral Health staff will accompany MSDH Division of Water Supply personnel on inspection visits, certification visits and water operator training courses. MSDH DOH shall have access to all MSDH DWS Public Water System files.

1) The MSDH Division of Dental and Oral Health shall submit the following information to the CDC:

a. Names of all fluoridated water systems in the state;

b. Names of all consecutive systems (i.e., a public water system that buys water from another public water system) that purchase water from fluoridated water systems;

c. Names of all communities served by optimally fluoridated water systems and their consecutive water systems.

2) The MSDH Division of Dental and Oral Health shall participate in the CDC's Water Fluoridation Reporting System (WFRS).

3) MSDH DOH must report, at least annually, the state's water fluoridation statistics to the State Board of Health.

4) The MSDH DOH must notify the MSDH Division of Water Supply and area health-care providers (i.e., those that may prescribe

fluoride supplements) when a fluoridation system is started or discontinued.

5) The MSDH-DOH shall make available to area health-care providers the most recent fluoride content of Mississippi community water supplies.

B. MSDH Division of Water Supply (MSDH DWS)

The MSDH DWS shall be responsible for: (a) site visits; (b) start-up visits; (c) training of water plant operators; (d) periodic inspections of all fluoridated water systems; (e) reception of all fluoridation monitoring records from the PWS; (f) resolution of problems, and (g) enforcement.

1) MSDH Division of Water Supply must provide a detailed, on-site inspection of each new fluoridation system before the system start-up to ensure that construction and installation are in accordance with state-approved plans and specifications.

2) MSDH DWS should inspect individual water fluoridation systems at least once a year. This comprehensive inspection should include, at a minimum, the following:

a. Evaluation of the use of fluoride testing equipment;

b. Inspection of the fluoridation system and chemical (fluoride) storage area;

c. Inspection of the operation and maintenance guidelines;

d. Assessment of state-approved backflow and antisiphon devices (as well as testing procedures for such equipment);

e. Assessment of on-site emergency protocols (activities followed in case of overfeed and public-notification procedures) if permitted by law.

3) MSDH Division of Water Supply must provide water operators with test results of monthly split or check samples that are submitted to the MSDH lab, and forward a copy of these results to the MSDH Division of Dental and Oral Health.

4) Both MSDH DWS and DOH staff shall stay informed regarding new and emerging scientific findings concerning water fluoridation.

5) MSDH Division of Water Supply shall offer training to all water plant operators about water fluoridation programs. Training for personnel working with new fluoridation programs shall include:

a. Information about equipment and monitoring, including how to test water for fluoride and report to the MSDH;

b. Safety requirements and what to do in event of an emergency;

c. Information about the public health benefits of fluoride.

VII. References

A. Centers for Disease Control and Prevention (CDC): Morbidity and Mortality Weekly Report – September 29, 1995/Volume 44/No. RR – 13

B. Association of State and Territorial Dental Directors: astdd.org>best practices>community water fluoridation

C. MSDH-DWS: Recommended Minimum Design Criteria For Mississippi Public Water Systems

D. MSDH-DWS: Recommended Minimum Job Performance Guidelines & Regulation Governing the Certification of Waterworks Operators in the State of Mississippi

E. CDC Water Fluoridation Website: http://www.cdc.gov/OralHealth/topics/fluoridation.htm

F. CDC-Basic Water Fluoridation Engineering Course, Murfreesboro, TN, June 2-5,2003 (Course Manual)

G. CDC-Water Fluoridation, A Manual for Water Plant Operators, April 1994.

Appendix A
Glossary of Technical Terms

Adjusted fluoridated water system: A community public water system that adjusts the fluoride concentration in the drinking water to the optimal level for consumption (or within the recommended control range).

Calculated dosage: The calculated amount of fluoride (mg/L) that has been added to an adjusted fluoridated water system. The calculation is based on the total amount of fluoride (weight) that was added to the water system and the total amount of water (volume) that was produced.

Centers for Disease Control and Prevention (CDC): An agency of the U.S. Department of Health and Human Services charged with promoting health and quality of life by preventing and controlling disease, injury, and disability.

Census designated place: A populated place, not within the limits of an incorporated place, that has been delimited for census purposes by the U.S. Bureau of the Census.

Certified Waterworks Operator: A water operator who meets the minimal criteria set by the Mississippi State Department of Health Division of Water Supply for certification as evident by passing a written examination.

Check sample: A distribution water sample forwarded to either the state laboratory or to a state-approved laboratory for analysis.

Community: A geographical entity that includes all incorporated places as well as all census-designated places as defined by the U.S. Bureau of the Census.

Community water system (CWS): Any water system serving piped water for human consumption to 15 or more individual service connections used year-round by consumers or regularly serving 25 or more individual consumers year-round, including, but not limited to, any collection, pretreatment, treatment, storage and/or distribution facilities or equipment used primarily as part of, or in connection with such system, regardless of whether or not such components are under the ownership or control of the operator of such system.

Connection: Generally speaking, water service into an individual housing unit or dwelling.

Consecutive water system: A public water system that buys water from another public water system. For purposes of water fluoridation record keeping, the consecutive water system should purchase at least 80% of its water from a fluoridated water system.

Distribution sample: A water sample taken from the distribution lines of the public water system that is representative of the water quality in the water system.

Division of Water Supply: A division of the Office of Environmental Health, Mississippi State Department of Health.

Dry Fluoride Feed System: A fluoridation system that uses a dry chemical compound (usually sodium fluorosilicate) as the means to fluoridate a PWS.

Fluorosilicic Acid System: A fluoridation system that uses fluorosilicic acid as the means to fluoridate a PWS.

Fluorosis: A clinical condition of the teeth where whitish to brownish staining occurs due to excessively high levels of fluoride exposure during tooth development.

Incorporated place: A populated place possessing legally defined boundaries and legally constituted government functions.

MG/L: Milligrams per liter; also, ppm.

MSDH: Mississippi State Department of Health.

MSDH DOH: Mississippi State Department of Health Division of Dental and Oral Health

MSDH DWS: Mississippi State Department of Health Division of Water Supply.

MSDH Lab: The Mississippi State Department of Health Public Health Laboratory.

Monitoring, fluoride: The regular analysis and recording by water system personnel of the fluoride ion content in the drinking water.

Must: See Shall.

Natural fluoride level: The concentration of fluoride (mg/L) that is present in the water source from naturally occurring fluoride sources.

Naturally fluoridated water system: A public water system that supplies water which contains naturally occurring fluoride at levels that is beneficial to dental health.

Operator: The certified waterworks operator who directly supervises and is personally responsible for the daily operation and maintenance of a community or non-transient non-community public water system.

Optimal Control Range: A range within which adjusted fluoridated water systems shall operate to maintain optimal fluoride levels. In Mississippi the range is 0.7-1.3 parts per million.

Optimal Fluoride Level: The fluoride concentration (mg/L, which is the same as ppm) based on the annual average of the maximum daily air temperature in the geographical area of the fluoridated water system. In Mississippi the optimal fluoride level is 0.8 ppm.

Optimally Fluoridated Water System: A public water system that has consistent optimal levels of fluoride for oral health from either naturally occurring sources, or by adjusting the fluoride level to optimal concentrations.

Overfeed, fluoride: Any fluoride analytical result above the recommended control range of the water system. Different levels of response are expected from the operator depending on the extent of the overfeed (Table 1).

PPM: parts per million. See also, mg/L.

Public water supply/system (PWS): The definition as provided for in the MSDH-DWS Mississippi Primary Drinking Water Regulation as found in the 'Recommended Minimum Design Criteria for Mississippi Public Water Systems'.

Required Water Samples: Required samples include a minimum of three (3) routine fluoride samples which shall be taken on different days each week and submitted monthly, and submission of a monthly split water sample to the MSDH-Lab for testing.

Shall: Indicates that which is mandatory; a requirement.

Sodium Fluoride Saturator System: A fluoridation system that uses a saturated solution of sodium fluoride as the means to fluoridate a PWS.

Split sample: A distribution water sample taken by the water plant operator, who analyzes a portion of the sample and records the results on the monthly operating report to the state. The operator then forwards the remainder of the sample to the MSDH-Lab for analysis.

Split sample tolerance: The amount of variance allowed between the portion of the split sample tested by the water system operator and the MSDH Lab. In Mississippi the split sample tolerance is 0.2 ppm.

State: This term refers to Mississippi unless otherwise noted.

State fluoridation administrator: The MSDH employee who is responsible for the administration of the fluoridation program.

Surveillance, fluoride: The regular review of monitored data and split sample or check sample results to ensure that fluoride levels are maintained by the community water systems in a specific geographic area. The review is conducted by the MSDH.

Uniform flow: When the rate of flow of the water past a point varies by less than 20%.

Upstream: In a water line, a point closer to the source of water.

Water, make-up: Water that is used to replace the saturated solution from a sodium fluoride saturator; this saturated solution is pumped into the distribution lines.

Water fluoridation: The act of adjusting the fluoride concentration in the drinking water of a water system to the optimal level.

MDH Water Fluoridation Reporting Log

Month:_____ **Year:**_____

Instructions: Record fluoride test results (in ppm) for each individual well or fluoride entry point. Return by fax to (601) 576-7498 or email to John.Justice@HealthyMS.com or mail to MDH Dental & Oral Health, P.O. Box 1700, Jackson, MS 39215-1700 on or before the 5th day of the following month. If there are questions, call John Justice at (601)576-7500.

Name of Water System:_____ **Operator's Name:**_____

PWS ID#:_____ **Name of well/fluoride entry point sampled:**_____

County:_____ **Total # fluoride entry points:**_____ **Testing Method (Circle one): Ion Photo Color**

DAY #:	TEST RESULT (PPM):	DAY #:	TEST RESULT (PPM):
01		17	
02		18	
03		19	
04		20	
05		21	
06		22	
07		23	
08		24	
09		25	
10		26	
11		27	
12		28	
13		29	
14		30	
15		31	
16		SPLIT SAMPLE TAKEN ON: / /	
		SPLIT SAMPLE RESULT:	

FLUORIDE CONTROL RANGE is 0.7 PPM to 1.3 PPM

OPTIMAL FLUORIDE LEVEL IS 0.8 PPM

Revised 4/10/2006