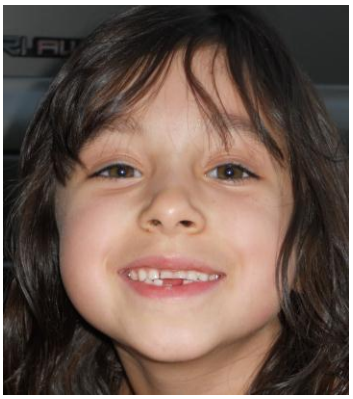
Nevada State Health Division

ORAL HEALTH PROGRAM

Fluoridation Plan

2011



"You are not healthy without good oral health"

Dr. C. Everett Koop, Surgeon General of the United States, 1981-1989

http://health.nv.gov/CC_Oral Health.htm

TABLE OF CONTENTS

Introduction and Background

The Oral Health Program created the Fluoridation Plan to guide Nevada toward: increasing the percentage of Nevada's population served by community water systems that fluoridate; increasing awareness of the benefits observed in Nevada communities that fluoridate; reducing disparities in incidence of tooth decay between population sub-groups; reducing tooth decay in all populations served by optimally fluoridated community water systems. The Fluoridation Plan also addresses the safe and efficient delivery of community water fluoridation. The fundamental purpose of the Fluoridation Plan is to educate the Oral Health Program's key partners and to be an informational resource for the public.

Prevention is the most effective tool for public health. In the United States, those populations that have access to community-fluoridated water supplies, topical fluorides, and dental sealants show a markedly lower percentage of tooth decay compared to those populations, which have limited access to dental care. (*The Burden of Oral Disease in Nevada* 2008, p. I-1) Since community water fluoridation began in 1945, it has been demonstrated to be a safe and cost effective way to prevent tooth decay. Studies continue to show that widespread community water fluoridation prevents cavities and saves money, for both families and the health care system. (www.cdc.gov/fluoridation/benefits.htm). According to *Oral Health in America: Summary of the Surgeon General's Report, May 2000, "*Oral health means much more than healthy teeth, and is integral to the general health and well-being of all Americans. Oral health must be included in the provision of health care and design of community programs." The Centers for Disease Control and Prevention (CDC) recognizes the fluoridation of drinking water as one of the ten greatest public achievements in the twentieth century (cdc.gov/fluoridation).

Tooth decay is the most common chronic disease of childhood and, if left untreated, the cumulative and progressive affects become more complex and more difficult to treat. (*The Burden of Oral Disease in Nevada* 2008, p. I-1) The burden of disease is far worse for those individuals who have limited access to preventive care and treatment services. Tooth pain or loss negatively affects, not only the overall health of the individual, but also their self-esteem. These negative effects can lead to lower weight averages for school-aged children and an

inability to perform in school (agd.org). "With more than 51 million school hours lost each year because of dental-related illness, the way in which states ensure that children have access to oral health care services is clearly an issue that deserves the devotion and dedication necessary to reach a solution so no child suffers needlessly from dental pain," says Academy of General Dentistry (AGD) President David F. Halpern, DMD, FAGD (agd.org)

Fluoridation protects teeth in two ways: First, when delivered through the water supply to children during the tooth forming years, and second through direct contact with teeth throughout life. It is recommended that a greater concentration of fluoride be deposited while teeth are forming through drinking fluoridated water or taking fluoride supplements. Statistically, it has been shown that the least expensive way to reach a large population is through community water fluoridation. Realizing that all water contains at least some level of fluoride, when a community water system fluoridates its water supply, it takes into account the levels of naturally occurring fluoride and adjusts it to the levels that are considered optimal for the prevention of tooth decay. The level that has been determined optimal for the prevention of tooth decay is 0.7 mg/L, or parts per million (ppm), (http://www.cdc.gov/fluoridation/benefits.htm)

Studies have shown specific proof that fluoridation continues to be one of the most effective ways to prevent tooth decay, especially in populations at lower socioeconomic levels. These populations tend to have limited access to preventative dental care. Research shows that water fluoridation can decrease the amount of tooth decay by 20-40% (American Dental Association, *Fluoridation Facts*, 2005, p. 1). This holds true even in a time when access to fluoride is widespread in toothpastes, mouth rinses, and fluoride varnishes. Nearly all tooth decay can be prevented when fluoridation is combined with dental sealants and other fluoride products, such as toothpaste or varnish. (www.cdc.gov/fluoridation/fact_sheets/benefits)

Laws and Regulations

Fluoridation of community water supplies in Nevada is addressed in Nevada Revised Statute (NRS) 445A.025 thru 445A.055 inclusive (*Appendix A*) and Nevada Administrative Code (NAC) 445A.6682 (*Appendix B*). Per Statute, "The State Board of Health shall adopt regulations requiring the fluoridation of all water delivered for human consumption in a county, show population at 400,000 or more by a:

(a) Public water system that serves a population of 100,000 or more; or

(b) Water authority."

The official population number is determined by the decennial census. Counties with populations less than 400,000 may achieve fluoridation through a fluoridation ballot initiative. Smaller counties may choose to purchase water from a larger, fluoridated water source or pursue other avenues of fluoride application such as establishing fluoride varnish programs.

However, in 2011 community fluoridation regulations were amended to pertain to Counties with a population of 700,000 or more. The increase in this regulation effectively removes Washoe County (population 421,407 U.S. Census 2010) from community fluoridation legislative implementation requirement.

Healthy People 2010

The goal of the Healthy People 2020 (HP 2020), objective OH-13, is to increase the proportion of the U.S. population served by community water systems with optimally fluoridated water. For a state to achieve this objective, 79.6% of the population must have access to optimally fluoridated water. This is an increase of 4.6% from Health People 2010 (HP 2010).

With the implementation of community water fluoridation in Clark County, which provides fluoridated water to 1,951,269 people, 72.3% of Nevada's population has access to fluoridated water. The proportion of U.S. population served by community water systems receiving optimally fluoridated water is 72.4% as of 2008 (Healthy People 2020). The 2011 Nevada Legislative Session amended NRS 445A.050 and NRS 445A.055 for community fluoridation to increase the population threshold to 700,000. This provision was a significant blow to not only the oral health community but to the communities that would receive this protective factor and restricted Nevada of achieving the Healthy People 2020 goal of 79.6% of Nevada's population receiving community fluoridation.

The data collected during the Nevada State Health Division (NSHD), Oral Health Program (OHP) 2008-2009 Third-Grade Oral Health Survey showed that 28.1% of third grade students in Nevada had some form of untreated tooth decay. Of all third-graders screened, only 37.5% had at least one dental sealant on a permanent molar; and 5.5% of the students screened had urgent dental needs as evidenced by the presence of pain and/or swelling (www.health.nv.gov/CC_OralHealth.htm), 2008-2009 Third-Grade Oral Health Survey, p. 3-4). When comparing disease rates for children in Nevada to the rest of the nation, seven out of ten (71%) of Nevada's third-graders have some form of tooth decay. In comparison, 4.5 out of every ten (51%) third-graders nationwide have some form of tooth decay. Almost twice as many (33% vs. 18%) of Nevada's adolescents are suffering from untreated tooth decay compared to the rest of the Nation. Of the third-graders sampled, a significantly higher proportion of children in the minority category had tooth decay that had been left untreated in comparison to those in the white category (78% vs. 61%). (*The Burden of Oral Disease in Nevada* 2008, p. I-1).

Program Management

The following professional positions are in place in the NSHD, Bureau of Child, Family and Community Wellness (BCFCW), Oral Health Program (OHP) to support Nevada's fluoridation efforts:

1. OHP Manager: Oversees all aspects of the OHP including fluoridation. These duties include managing the fluoridation program, promoting fluoridation, and providing a liaison between other state and federal agencies. This position will also actively support the Basic Screening Survey, as needed, by assisting with screenings.

2. Fluoridation Specialist and Screening Coordinator: Oversees all aspects of fluoridation, including annual site visits, monthly reporting in the Water Fluoridation Reporting System (WFRS), and annual informational updates for Nevada's community water systems in WFRS; assists in training water plant operators; provides surveillance for all fluoridated water systems; and provides technical assistance as needed. This position acts as the primary contact with the Nevada Division of Environmental Protection (NDEP), Bureau of Safe Drinking Water, Safe Drinking Water Program. As screening coordinator, this position oversees all aspects of the bi-annual Basic Screening Survey that collects data on untreated tooth decay, decay experience, and dental sealants.

3. Oral Health Educator: Educate the community on all aspects of oral health, including fluoridation and fluoride varnish.

4. Biostatistician: Compiles data obtained in the Basic Screening Survey and from various other sources.

5. Administrative Assistant: Supports the OHP in various administrative and programmatic activities.

6. Program Coordinator/Evaluation Specialist: Oversees the evaluation components of the OHP and is responsible for representing the OHP at various partner and community events when the Program Manager is not available.

In the NDEP, Bureau of Safe Drinking Water, Safe Drinking Water Program the following positions collaborate with the OHP to oversee fluoridation:

1. Bureau Chief: Is the primary contact for the Fluoridation Specialist. Partners with the OHP to provide an engineer to do annual fluoridation equipment inspections, provides input for the annual review of the Memorandum of Understanding (MOU) between the two agencies, provides information on changes occurring in NRS or NAC that affect the two programs.
2. State Drinking Water Information System (SWIS) Administrator: Works directly with the Fluoridation Specialist to assure accurate annual updates are entered into the CDC WFRS.
3. Professional Engineer: Provides engineering oversight and input during annual fluoridation equipment inspections. Provides plan review when new or replacement equipment and system drawings are submitted.

The community water system owner, with professional training and assistance, is primarily responsible for assuring the ongoing operation of fluoridation equipment and maintaining surveillance and records of operation. The system's management is responsible for frequent monitoring and surveillance, and must have water operators trained in the appropriate operation of fluoridation equipment. The water systems will designate a staff person to report daily fluoride test results to the NDEP and the OHP on a monthly basis. The community water system management maintains open communication with the Fluoridation Specialist and OHP Manager, which includes monthly reporting and shutdowns.

Quality Control and Safety

In compliance with Engineering and Administrative Recommendations for Water Fluoridation (EARWF), the four Southern Nevada Water Authority (SNWA) plants; the Alfred Merritt Smith Water Treatment Facility, River Mountain Water Treatment Facility, and the City of Henderson Water Treatment Plant, monitor and record fluoride levels on a daily basis. The monitoring is done with an Accument Ion Electrode analyzer permanently located in the water line. Split sampling is done at each testing cycle and reported in conjunction with monthly reports.

Monthly reports are sent to the Fluoridation Specialist and are then entered into the CDC's Water Fluoridation Reporting System (WFRS). Split sampling is done at each testing cycle and reported in conjunction with monthly reports. For EARWF compliance, overfeed protections are in place including feed drains which drain into the reclamation basins on the property and hose bib vacuum breakers on all hose connections.

The fluoride additive, used in both of the facilities in the SNWA and in the City of Henderson, is Fluorosilicic Acid (FSA). CDC EARWF recommends the following for Fluorosilicic Acid systems:

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 7-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 7-day supply must have a day tank. A day tank should only contain a small amount of acid, usually a 1- or 2-day supply.

3. Day tanks or direct acid-feed carboys/drums should be located on scales and 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 (berms) in accordance with state/local codes or ordinances.

In compliance with EARWF, the Fluoridation Specialist and a water engineer from the Nevada Department of Environmental Protection inspect these facilities on an annual basis. These inspections include a visual inspection of all fluoridation equipment including sampling equipment, overflow protection and ventilation, Occupational Safety and Health Administration (OHSA) compliance, and safety manuals. A fluoridation facility inspection report is compiled with evaluations or inspections of fluoride testing equipment, storage areas, operation and maintenance manuals, backflow preventers, anti-siphon devices, and on-site emergency plans. (*Appendix D*)

Any new systems coming online will also be required to follow EARWF recommendations and guidelines. The NDEP Professional Engineer will approve new equipment and drawings for those systems. The Fluoridation Specialist will provide new systems with an outline of the information that needs to be submitted to remain in compliance.

Recommended Optimal Fluoride Levels for Community Public Water Systems (EARWF)

Annual Average of Maximum Daily Temperatures F	Recommended Fluoride Concentration (ppm)	Recommended Control Range of Fluoride Concentration (ppm)
40.0 – 53.7	1.2	1.1 – 1.7
53.8 – 58.3	1.1	1.0 – 1.6
58.4 – 63.8	1.0	0.9 – 1.5
63.9 – 70.6	0.9	0.8 – 1.4
70.7 – 79.2	0.8	0.7 – 1.3
79.3 – 90.5	0.7	0.6 – 1.2

Recommended Fluoride Overfeed Actions for Community Water Systems (EARWF)

Fluoride Level	Actions Recommended
0.1 mg/L above control range to 2.0 mg/L	1. Leave the fluoridation system on. 2. Determine malfunction and repair.
2.1 mg/L to 4.0 mg/L	1. Leave the fluoridation system on. 2. Determine malfunction and repair. 3. Notify the water plant operator supervisor and report the incident to the appropriate regulatory agency.
4.1 mg/L to 10.0 mg/L	1. Determine malfunction and immediately attempt repair. 2. If the problem is not found and corrected quickly, turn off the fluoridated system. 3. Notify the water plant operator supervisor and report the incident to the appropriate regulatory agency. 4. Take water samples at several points in the distribution system and test the fluoride content. Retest if results are still high. 5. Determine malfunction and repair. Then, with supervisor's permission, restart the fluoridation system.
10.1 mg/L or greater	1. Turn off the fluoridation system immediately. 2. Notify the water plant operator supervisor, report the incident immediately to the appropriate regulatory agency, and follow their instructions. 3. Take water samples at several points in the distribution system and test the fluoride content. Retest if results are still high. Save part of each sample for the state laboratory to test. 4. Determine malfunction and repair. Then, with supervisor's and the state's permission, restart the fluoridation system.

Most overfeeds do not pose an immediate health risk; however, some fluoride levels can be high enough to cause immediate health problems. All overfeeds should be corrected immediately due to the potential of serious long-term health effects. (EARWF)

In order to make sure the system is providing optimal levels of fluoride there are general technical requirements that should be followed according to CDC's EARWF:

1. The fluoride feed system must be installed so that it cannot operate unless water is being produced (interlocked). For example, the metering pump must be wired electrically in series with the main well pump or the service pump. If a gravity flow situation exits, a flow switch or pressure device should be installed. The interlock might not be required for water systems that have an operator present 24 hours a day.

2. When the fluoridation system is connected electrically to the well pump, it must be made physically impossible to plug the fluoride metering pump into any continuously active ("hot") electrical outlet. The pump should be plugged only into the circuit containing the interlock protection. One method of ensuring interlock protection is to install on the metering pump a special, clearly labeled plug that is compatible only 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, so that such hard wiring can only be changed by deliberate action.

3. A secondary flow-based control device (e.g., a flow switch or a pressure switch) should be provided as 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 injected at sites where substantial losses of fluoride can occur (e.g., the rapid-mix chemical basin). In a surface-water treatment plant, the ideal location for injecting fluoride is the rapid sand filter effluent line going into the clear well.

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 (31,32).

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. Two diaphragm-type, anti-siphon devices must be installed in the fluoride feed line when a metering pump is used. The anti-siphon 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 anti-siphon 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.

8. All anti-siphon 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. Vacuum testing for all anti-siphon devices should be done semiannually. Operation of a fluoridation system without a functional anti-siphon device can lead to an overfeed that exceeds 4 mg/L.

9. 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.

10. 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. Oversized metering pumps should not be used because serious overfeeds (i.e., an overfeed that exceeds 4 mg/L) can occur if they are set too high. Conversely, undersized metering pumps can cause erratic fluoride levels.

11. 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.

12. 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 £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.

13. 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%.

14. 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.

15. 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 .

16. Fluoride feed equipment, controls, safety equipment, accessory equipment, and other appurtenances must be inspected annually.

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

18. 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 (43–45).

19. Storage should be provided for at least a 3-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; 46).

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

Education and Training

The Fluoridation Specialist will attend the CDC *Water Fluoridation Principles and Practices* course and the *Water Fluoridation Reporting Systems* training class. In addition, each year the Fluoridation Specialist provides training to all of the water systems operators of the systems that fluoridate. Included in the operators training are all aspects of water fluoridation, including analysis.

A statewide CDC water fluoridation poster has been distributed to all water systems that fluoridate. (*Appendix C*) Also available for community education is a *Parents' Guide to Fluoride Supplements* posted on the Nevada State Health Divisions website at: http://health.nv.gov/PDFs/OH/parentalfluorideguide.pdf. This guide includes a dietary fluoride supplement schedule and a flow chart of how to gauge fluoride supplementation with the current water system used by the family. In addition, a *Fluoride Supplementation Flow Chart* was distributed to each dental office in the state as a guideline for the prescription of dietary fluoride supplements also available on the NSHD website at: http://health.nv.gov/PDFs/OH/Fluorideflowchart.pdf.

Surveillance and Monitoring

Federal, state, and local governing bodies regulate drinking-water safety. The Safe Drinking Water Act (SDWA) is legislated at the federal level to ensure the safety of drinking water. Under the SDWA, the Environmental Protection Agency (EPA) establishes standards for drinking water quality and oversees states and community municipalities' adherence to the promulgated standards (cdc.gov/fluoridation/safety).

A yearly report of updated contact information for all of the community water systems in the Safe Drinking Water Information System (SDWIS), compiled by the administrator, is sent to the fluoridation specialist from the Nevada Division of Environmental Protection. This report is then used to update pertinent information in the Water Fluoridation Reporting System (WRFS).

The CDC Division of Oral Health developed WFRS, a computer based program, to track the quality of water fluoridation, which was implemented nationally in 2002. Access for entering data into the Water Fluoridation Reporting System (WFRS) is restricted to official representatives of the State of Nevada.

The data is available to the public through CDC websites, *My Water's Fluoride found at: http://apps.nccd.cdc.gov/MWF/CountyDataV.asp?State=NV* and *Oral Health Maps found at: http://apps.nccd.cdc.gov/gisdoh/default.aspx*. Consumer information available through these websites is consistent with the Safe Water Drinking Act, including information on each of the community water systems in the state and all contact information, populations served, fluoridation status and type, water source and chemical type, and fluoride criteria.

The fluoride criteria include fluoride concentrations, split and tolerance levels, and the variable highs and lows. Each month the Fluoridation Specialist is sent a fluoride report from each of the water systems that fluoridate. This report includes averages of daily samples for the month including a weekly split-sample.

Goals and Objectives

The primary goal of community water fluoridation is to decrease the number of Nevadans with untreated tooth decay, and increase accessibility to optimally fluoridated community water supplies. A secondary goal is to increase the number of topical fluoride applications if a community's water supply is not fluoridated.

The Specific, Measureable, Achievable, Realistic, and Timed (SMART) objectives set forth in the five-year plan under the CDC Cooperative Agreement are as follows:

Phase 1:

1. Track the implementation of the State Fluoridation Plan: Evaluate progress, and submit annual reports using the Management Overview for Logistics Analysis and Reporting (MOLAR).

2. Fluoridation monitoring and WFRS reporting: Collect and report water fluoridation data for all public water systems that fluoridate in Nevada, on a monthly basis.

3. Track Progress on EARWF practice: Continue tracking water authority compliance with EARWF including daily samples and split samples, and notification of shutdowns and fluoridation equipment inspections.

4. Report communities and populations receiving new or replacement equipment: Track and report findings on equipment updates in the database set forth in year 1.

5. Report progress toward Healthy People 2010 objective: Continue monitoring the population percentage with access to fluoridated water, with a goal of 75% of the population having access.

Phase 2:

1. Establish a Community Water Fluoridation (CWF) quality and control program: Ensure that all water authorities that fluoridate, also test, report, inspect and train water plant operators in compliance with EARWF.

2. CWF education and promotion: Evaluation results will be used to modify existing activities and implement new activities.

3. Identify communities for CWF to meet Healthy people 2010: Identify target communities that, if fluoridated, would increase the percentage of Nevadans on community water supplies with optimal levels of fluoride.

4. Identify communities and populations needing equipment by funding source: Track and report communities and populations receiving new or replacement equipment utilizing database established in year one.

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APPENDIX A

NRS 445A.025 Proposal to adjust concentration of fluoride in water: Receipt by governing body of county, city or town; notice to county clerk. Whenever the governing body of any city or town or the board of county commissioners receives a written proposal from a supplier of water, public health authorities or from any person or persons that the naturally occurring fluoride concentration of the water be adjusted to levels recommended by public health authorities, such governing body or board may, in its discretion, give notice of such proposal and the geographical area in which the water is distributed to the county clerk of each county in which any water so affected is distributed.

(Added to NRS by 1967, 768)—(Substituted in revision for NRS 445.033)

NRS 445A.030 Publication of proposal; submission to registered voters. Upon receipt of such notice, each county clerk shall cause such proposal to be published and submitted to the appropriate registered voters, as specified in NRS 445A.035, in the manner provided by the general election laws for the submission of questions. If required to carry out the provisions of NRS 445A.035, such proposal shall appear on a separate ballot.

(Added to NRS by 1967, 768)—(Substituted in revision for NRS 445.034)

NRS 445A.035 Proposal to be voted on at next general election. The proposal shall be submitted at the next general election to the registered voters of each political subdivision or precinct in which the water affected is distributed.

(Added to NRS by 1967, 768)—(Substituted in revision for NRS 445.035)

NRS 445A.040 Certification of votes for and against proposal; results to be sent to supplier of water or Secretary of State.

1. Upon completion of the canvass of the vote, the county clerk shall certify the number of votes cast for and against the proposal to:

(a) The supplier, if the water affected is distributed in but one county.

(b) The Secretary of State, if the water affected is distributed in more than one county.

2. If such results are certified to the Secretary of State, he or she shall compile the results from all counties affected and certify to the supplier the number of votes cast for and against the proposal.

(Added to NRS by 1967, 768)—(Substituted in revision for NRS 445.036)

NRS 445A.045 Adjustment of concentration of fluoride in water by supplier of water if proposal approved by voters. The supplier may proceed to put the proposal into effect only if a majority of all the votes cast upon the question were cast for the proposal.

(Added to NRS by 1967, 769)—(Substituted in revision for NRS 445.037)

NRS 445A.050 Exemptions. The provisions of NRS 445A.025 to 445A.050, inclusive, do not apply to:

1. A public water system that serves a population of 100,000 or more in a county whose population is 400,000 or more.

2. A water authority, as defined pursuant to NRS 377B.040, and any political subdivision that receives all or a part of its water supply from such a water authority in a county whose population is 400,000 or more.

3. Purveyors of bottled water who label their containers to inform the purchaser that the naturally occurring fluoride concentration of the water has been adjusted to recommended levels.

4. A supplier of water who supplies water to less than 500 users.

(Added to NRS by 1967, 769; A 1969, 1080; 1999, 1114, 3169)

NRS 445A.055 Regulation of fluoridation in county whose population is 400,000 or more; financial support for enforcement; payment of initial costs for compliance.

1. The State Board of Health shall adopt regulations requiring the fluoridation of all water delivered for human consumption in a county whose population is 400,000 or more by a:

(a) Public water system that serves a population of 100,000 or more; or

(b) Water authority.

2. The regulations must include, without limitation:

(a) The minimum and maximum permissible concentrations of fluoride to be maintained by such a public water system or a water authority, except that:

(1) The minimum permissible concentration of fluoride must not be less than 0.7 parts per million; and

(2) The maximum permissible concentration of fluoride must not exceed 1.2 parts per million;

(b) The requirements and procedures for maintaining proper concentrations of fluoride, including any necessary equipment, testing, recordkeeping and reporting;

(c) Requirements for the addition of fluoride to the water if the natural concentration of fluorides is lower than the minimum permissible concentration established pursuant to paragraph (a); and

(d) Criteria pursuant to which the State Board of Health may exempt a public water system or water authority from the requirement of fluoridation upon the request of the public water system or water authority.

3. The State Board of Health shall not require the fluoridation of:

(a) The wells of a public water system or water authority if:

(1) The groundwater production of the public water system or water authority is less than 15 percent of the total average annual water production of the system or authority for the years in which drought conditions are not prevalent; and

(2) The wells are part of a combined regional and local system for the distribution of water that is served by a fluoridated source.

(b) A public water system or water authority:

(1) During an emergency or period of routine maintenance, if the wells of the system or authority are exempt from fluoridation pursuant to paragraph (a) and the supplier of water determines that it is necessary to change the production of the system or authority from surface water to groundwater because of an emergency or for purposes of routine maintenance; or

(2) If the natural water supply of the system or authority contains fluoride in a concentration that is at least equal to the minimum permissible concentration established pursuant to paragraph (a) of subsection 2.

4. The State Board of Health may make an exception to the minimum permissible concentration of fluoride to be maintained in a public water system or water authority based on:

(a) The climate of the regulated area;

(b) The amount of processed water purchased by the residents of the regulated area; and

(c) Any other factor that influences the amount of public water that is consumed by the residents of the regulated area.

5. The Health Division of the Department of Health and Human Services shall make reasonable efforts to secure any available sources of financial support, including, without limitation, grants from the Federal Government, for the enforcement of the standards established pursuant to this section and any related capital improvements.

6. A public water system or water authority may submit to the Health Division a claim for payment of the initial costs of the public water system or water authority to begin complying with the provisions of this section regardless of whether the public water system or water authority is required to comply with those provisions. The Administrator of the Health Division may approve such claims to the extent of legislative appropriations and any other money available for that purpose. Approved claims must be paid as other claims against the State are paid. The ongoing operational expenses of a public water system or water authority in complying with the provisions of this section are not compensable pursuant to this subsection.

7. As used in this section:

(a) "Supplier of water" has the meaning ascribed to it in NRS 445A.845.

(b) "Water authority" has the meaning ascribed to it in NRS 377B.040.

(Added to NRS by 1999, 1112; A 1999, 3169)

Sec. 222. NRS 445A.050 is hereby amended to read as follows:

445A.050 The provisions of NRS 445A.025 to 445A.050, inclusive, do not apply to:

1. A public water system that serves a population of 100,000 or more in a county whose population is ~~[400,000]~~ ***700,000*** or more.

2. A water authority, as defined pursuant to NRS 377B.040, and any political subdivision that receives all or a part of its water supply from such a water authority in a county whose population is ~~[400,000]~~ ***700,000*** or more.

3. Purveyors of bottled water who label their containers to inform the purchaser that the naturally occurring fluoride concentration of the water has been adjusted to recommended levels.

4. A supplier of water who supplies water to less than 500 users.

Sec. 223. NRS 445A.055 is hereby amended to read as follows:

1. The State Board of Health shall adopt regulations requiring the fluoridation of all water delivered for human consumption in a county whose population is ~~[400,000]~~ ***700,000*** or more by a:

(a) Public water system that serves a population of 100,000 or more; or

(b) Water authority.

2. The regulations must include, without limitation:

(a) The minimum and maximum permissible concentrations of fluoride to be maintained by such a public water system or a water authority, except that:

APPENDIX B

NAC 445A.6682 Fluoridation. (NRS 439.200, 445A.055, 445A.860)

1. On or before March 1, 2000, all water delivered for human consumption in a county whose population is 400,000 or more by a:

(a) Public water system that serves a population of 100,000 or more; or

(b) Water authority,

➥ must be fluoridated.

2. In a county whose population is less than 400,000, all requests that fluoride be added to the water supply for the reduction of the incidence of dental caries must be referred to the health authority, who shall send the request to the board of health for consideration. In addition to any approval required pursuant to NRS 445A.025 to 445A.050, inclusive, the following must agree to a request to add fluoride to the water supply:

(a) The public water system;

(b) The county board of health;

(c) The State Board of Health;

(d) The local dental and medical society, or if there is none, the state dental and medical society; and

(e) The local governing authority.

➥ If such approval is granted, the fluoridation of the water must be provided in accordance with the provisions of this section.

3. The State Board of Health will exempt a public water system or water authority from the requirement of fluoridation of the groundwater in its wells if the public water system or water authority submits documentation to the State Board of Health that demonstrates that its system for the production of groundwater:

(a) Produces less than 15 percent of the total average annual water production of the public water system or water authority for the years in which drought conditions are not prevalent; and

(b) Is part of a combined regional and local system for the distribution of water that is served by a fluoridated source.

4. A public water system or water authority that is required to fluoridate all water delivered for human consumption pursuant to subsection 1 shall:

(a) Cease fluoridation of that water during an emergency related to fluoridation of the water;

(b) Submit to the Health Division within 30 days after the emergency occurs, a written notice describing the emergency and the length of time during which the public water system or water authority ceased fluoridation of the water; and

(c) Resume fluoridation of the water when the emergency no longer exists.

5. A public water system or water authority that is required to fluoridate all water delivered for human consumption pursuant to subsection 1 may cease fluoridation of that water during a period of routine maintenance if the public water system or water authority:

(a) Submits to the Health Division within 30 days before the period of routine maintenance, a written notice describing the maintenance and the length of time during which the public water system or water authority will cease fluoridation of the water; and

(b) Resumes fluoridation of the water when the maintenance is completed.

6. In addition to meeting the standards set forth in NAC 445A.450 to 445A.492, inclusive, a public water system or water authority shall maintain in all water it delivers for human consumption:

(a) A minimum concentration of fluoride that is not less than 0.7 ppm; and

(b) A maximum concentration of fluoride that does not exceed 1.2 ppm.

7. The introduction of a chemical for fluoridation into the facilities of a public water system or water authority must be made:

(a) Through accurate feeding equipment; and

(b) In accordance with *Water Fluoridation: A Manual for Engineers and Technicians*.

8. The feeding equipment must be maintained in accordance with *Water Fluoridation: A Manual for Engineers and Technicians*.

9. The feeding equipment must be controlled in such a manner that fluoride is added to the facilities of the public water system or water authority only when those facilities and the related equipment for supplying water are functioning properly. Electrical power to the feeding equipment must be wired in conjunction with the pumping or

flow control equipment of the public water system or water authority in such a manner that fluoride cannot be introduced into the supply of water when the water is not flowing. Pumps for feeding chemicals must be equipped with flow detectors which ensure that the injection of chemicals stops when the well or booster pumps stop.

10. Either gravimetric or volumetric dry-feed equipment or positive displacement liquid-feed equipment with an accuracy within 5 percent is required. When liquid-feed equipment is used, at least two solution tanks must be available for the preparation and storage of the fluoride solution.

11. A person who handles chemicals that are added to the water in the fluoridation process shall comply with the requirements relating to protective equipment set forth in section 5.3.4 of the *Recommended Standards for Water Works*.

12. Each public water system and water authority shall:

(a) Maintain a kit which is approved by the health authority for testing the concentration of fluoride in water.

(b) Adjust the concentration of fluoride if the natural concentration of fluoride in the water delivered for human consumption by the public water system or water authority is not within the permissible concentrations of fluoride set forth in subsection 6.

(c) Take samples from one or more points in the distribution system that are approved by the health authority.

(d) Test or monitor the concentration of fluoride daily after its introduction into the facilities of the public water system or water authority and maintain accurate records of the results of that testing or monitoring.

(e) Report the results of the daily testing or monitoring to the health authority at least monthly and in accordance with any written instructions prescribed by the health authority.

(f) Not less than once a week, have a properly certified laboratory verify the results of the testing or monitoring for at least 1 day using the methods approved in the *Standard Methods for the Examination of Water and Wastewater*. The health authority may take samples from points in the distribution system approved by it pursuant to paragraph (c) to test the samples for control purposes.

(g) Follow any written instructions of the health authority for the sampling of water to which fluoride has been added.

(h) Keep a record or copy of the results of the daily testing or monitoring on the premises of its facility or at a convenient location near the premises for the period specified in 40 C.F.R. § 141.33. The record or copy must be available for inspection by the health authority upon request.

(i) In the fluoridation of water, only use fluoride that meets the requirements set forth in standards B701-94, B702-94 and B703-94 of the *American Water Works Association Standards*.

(j) Notify the Health Division as soon as possible, but not later than the end of the next business day, if:

(1) The concentration of fluoride in the water that is delivered for human consumption does not meet the levels of concentration required by subsection 6; or

(2) Any other event occurs that may affect the ability of the public water system or water authority to produce safe, potable water.

(k) Comply with the provisions of:

(1) This section;

(2) The *Recommended Standards for Water Works*;

(3) The *Standard Methods for the Examination of Water and Wastewater*;

(4) *Water Fluoridation: A Manual for Engineers and Technicians*; and

(5) Standards B701-94, B702-94 and B703-94 of the *American Water Works Association Standards*.

➥ If there is a conflict between any of the provisions described in this paragraph, the most stringent of those provisions prevails.

13. As used in this section:

(a) "Health authority" has the meaning ascribed to it in NAC 445A.66055, except that with regard to a county whose population is 400,000 or more, "health authority" means the officers and agents of the Health Division.

(b) "Water authority" has the meaning ascribed to it in NRS 377B.040.

[Bd. of Health, Water Supply Reg. § 10, eff. 1-8-52]—(NAC A 2-20-97; R118-99, 2-10-2000)

APPENDIX C

Water Fluoridation in Nevada

A RESOURCE GUIDE FOR POTABLE WATER PRODUCTION FACILITY OPERATORS

FLUOROSILICIC ACID

Your Community Benefits

- Thousands of research studies and 60 years of experience have shown that water fluoridation is safe, effective and the best method of improving oral health in a community.
- Water fluoridation is recognized as a major public health achievement of the 20th century by the Centers for Disease Control and Prevention (CDC).
- Although dental caries (tooth decay) is largely preventable, it remains the most common chronic disease of children aged 5 to 17 years. In the U.S., tooth decay affects
  - 1 out of 4 elementary school children
  - 2 out of 3 adolescents
  - 9 out of 10 adults
- Both children and adults benefit from water fluoridation. Studies have demonstrated that people in communities with fluoridated water have 20 to 40 percent less tooth decay than those in communities without fluoridated water.
- The cost to fluoridate water for the lifetime of one person is less than the cost to treat one cavity.
- Every dollar spent on fluoridation saves $38 in avoided dental bills.
- In 2002, the CDC estimated that 66 percent of U.S. residents who receive their water from community water systems, or 170 million people, had access to fluoridated water. The *Healthy People 2010* goal is to increase this to 75 percent. In Nevada, 69.4 percent of the population has access to fluoridated water, resulting in better oral health, less dental pain, and fewer cavities for millions of people living in Nevada.

Optimal Fluoridation

For Nevada, the most benefit to oral health is achieved when waters are fluoridated to 0.9 mg/L.

Optimal fluoridation is achieved when the fluoride level in potable water is maintained in the control range of 0.8 to 1.4 mg/L.

The benefits of fluoridation are quickly lost when fluoride levels drop below the optimal range.

The U.S. Environmental Protection Agency (EPA) has set both the maximum contaminate level (MCL) and the maximum contaminant level goal (MCLG) for fluoride to 4 mg/L. In addition, the secondary maximum contaminant level goal (SMCLG) of 2 mg/L has been set for fluoride to minimize potential dental fluorosis (staining of the teeth).

Operation

Monitor water fluoride levels daily to ensure optimal fluoridation, and adjust feed rates as necessary.

Send split samples monthly to the state health laboratory to verify your accuracy in measuring fluoride levels.

Each batch of fluorosilicic acid may have a different concentration, which should be supplied by the manufacturer. Blends of different batches in a bulk storage tank could have a different concentration than either batch. Therefore, verify the acid concentration when computing the quantity of acid to add.

Because natural fluoride levels can vary seasonally, verify the quantity of acid necessary to achieve the optimum fluoride level.

Inspect the diaphragms, pistons, or tubing of the feed pumps and replace worn parts. Ensure that replacement parts are fluoride compatible. Also, inspect feed tubes/pipes for possible encrustations and for accumulated air pockets, both of which can restrict flow.

Recheck the pump delivery calibration weekly to verify that the pump is operating properly.

Safety Corner

Although fluoride is entirely safe at the recommended optimum dosage levels in potable water, it can be harmful at more concentrated levels.

Always wear a full-face shield, splash-proof goggles, Neoprene gloves with cuffs, boots, and acid-proof aprons when handling or working with fluorosilicic acid.

Inspect all pipes and tubing regularly for leaks, and repair them promptly if necessary.

Always clean equipment and gear after their exposure to fluorosilicic acid.

Do not consume food or beverages in proximity to the fluoride storage area.

Ensure that fluorosilicic acid storage tanks are sealed and that volatile fumes vented to outdoors.

Important Contacts

For questions on the Fluoridation Program in Nevada, contact the Nevada State Health Division, Bureau of Family Health Services, Oral Health Program, 775-684-4285.

For questions on the health effects of fluoridation, contact the Bureau of Health Protection Services, 775-687-6615.

For questions on drinking water in Nevada, contact the Bureau of Health Protection Services, 775-687-6615.

The following Web sites are good sources of information about fluoridation:

American Dental Association:
www.ada.org/public/topics/fluoride/index.asp

Centers for Disease Control and Prevention:
www.cdc.gov/OralHealth/topics/fluoridation.htm

American Water Works Association:
http://awwa.org/Advocacy/pressroom/fluoride.cfm

This poster was issued by the State of Nevada, Oral Health Program, Bureau of Family Health Services, 2004.

Recommended fluoride overfeed actions for community water systems, MMWR 1995 (CDC)

Fluoride level	Actions Recommended
0.1 mg/L above control range to 2.0 mg/L	1. Leave the fluoridation system on. 2. Determine malfunction and repair.
2.1 mg/L to 4.0 mg/L	1. Leave the fluoridation system on. 2. Determine malfunction and repair. 3. Notify supervisor and report the incident to the appropriate county or state agencies.
4.1 mg/L to 10.0 mg/L	1. Determine malfunction and immediately attempt repair. 2. If the problem is not found and corrected quickly, turn off the fluoridation system. 3. Notify supervisor and report the incident to the appropriate county or state agencies. 4. Take water samples at several points in the distribution system and test the fluoride content. Retest if results are still high. 5. Determine malfunction and repair. Then, with supervisor's permission, restart the fluoridation system.
10.1 mg/L or greater+	1. Turn off the fluoridation system immediately. 2. Notify supervisor and report the incident immediately to the appropriate county or state agencies and follow their instructions. 3. Take water samples at several points in the distribution system and test the fluoride content. Retest if results are still high. Save part of each sample for the state laboratory to test. 4. Determine malfunction and repair. Then, with supervisor's and the state's permission, restart the fluoridation system.

+The state might require public notification to prevent consumption of high levels of fluoridated water.

APPENDIX D

FLUORIDATION FACILITY FACT SHEET

date	20	completed by		

SYSTEM INFORMATION

public water system ID number	NV 289	county	
water system name	SNWS (AMS)	phone number	( ) -
address			
city		state NV	ZIP
manager			phone number ( ) -

POPULATION SERVED DIRECTLY

residential customers		commercial customers		total population	

CONSECUTIVE SYSTEMS

system name	public water system ID number	population served
LVVWD	NV 90	1336805
City of Henderson	NV 76	265790
City of North Las Vegas	NV 175	302615
City of Boulder	NV 11	12600
Nellis Air Force Base	NV 3028	6581
	NV	
	NV	

WATER SUPPLY

number of water sources	1				
surface	purchased surface	ground	purchased ground		
average flow	275	maximum flow	600	minimum flow	100
operating pressure		Is flow meter-paced system needed			

FLUORIDE INFORMATION

Fluorosilicic acid	sodium fluorosilicate	sodium fluoride

Chemical meets AWWA standards						
natural fluoride level	normal	0.32 ppm	high	0.33 ppm	low	0.31 ppm
calculated fluoride feed rate (gallons per hour):						
average flow	23	maximum flow	50	minimum flow	8.4	
Is feeder capacity no more than twice average flow feed rate		maximum capacity	120			
emergency treatment sheet posted		material data reference sheet available				

MONITORING AND RECORD KEEPING

Are fluoride chemicals FED recorded daily		Are fluoride analytical results recorded daily	
Are refills of fluoride chemicals recorded		Are fluoride dosage calculations performed	

LABORATORY INSTRUMENTATION

analyzer brand	Accumet	model number	AR25
method of fluoride analysis	Ion Electrode		
age of analyzer	. years	last manufacture's calibration	20

raw water pumps	plant power	flow meter	control valve	high lift pumps
flow switch	feeder: special plug to interlock		feeder: hardwire to interlock	

FLUORIDATION FEED EQUIPMENT INTERLOCK

SECONDARY FLOW DEVICE

flow switch		pressure device	

POINT OF INJECTION

location	Rapid Mix	pressure	atm

corporation stop valve at injector		safety chain on corporation stop valve	
fluoride feed line color coded		in-line mixer installed	
1st customer less-than 100 feet from injection			

FEED ROOM HOSE CONNECTIONS

hose bibb vacuum breakers all hose connections	

OPERATOR CERTIFICATION

operator name		certification level	certification number
		T4/D4	
		T3/D4	
		D2/T2	
		D3/T2	
		D2/T2	
		T4	

OPERATOR FLUORIDATION TRAINING

all operators received start-up training		all operators received in-depth training	

PLANT EMERGENCY PLAN

Plant has on-site emergency plan		Plan covers accidental chemical spills	
Plan covers fluoride overfeeds		Plan provides for public notification	
Plan addresses acts of nature			

PLANT SECURITY

necessary security measures in place	

APPENDIX E

STATE OF NEVADA ORAL HEALTH PROGRAM– COMMUNITY WATER FLUORIDATION PROGRAM LOGIC MODEL

INPUTS

ORAL HEALTH PROGRAM SUPPORT:
- Oral Health Program Management
- Fluoridation Specialist/Oral Health Screening Coordinator
- Oral Health policy leadership

DATA RESOURCES:
- Water treatment plants: Fluoridation monitoring reports
- State Demographer: population reports

PARTNERS:
- NDEP– Safe drinking water
- CDC– Division of Oral Health
- Water treatment plants
- WFRS– Proportion of Nevada's population that are currently served by CWS that are optimally fluoridated.

EQUIPMENT:
- IT software and hardware
- Water Fluoridation Reporting System (WFRS)
- Oral Health Program (OHP) database

OTHER:
- Funding
- OHAC & Regional Oral Health Coalitions-pursue policies to support Community Water Fluoridation (CWF)

ACTIVITIES

Oral Health Program
- Collect fluoride level reports from water treatment plants.
- Input data into WFRS program
- Input monthly fluoride data into OHP database.
- Coordinate annual training for at least one water plant operator at community water systems that fluoridate.
- Document annual inspection checks and results.

NDEP-Safe Drinking Water
- Conduct inspections of water facilities that fluoridate at least one time per year. Inspections to include:
  - Evaluation of fluoride testing equipment
  - Inspection of operation and maintenance manuals
  - Review of facility safety equipment
  - Evaluation of on-site emergency plans
  - Verify adequacy of plant security

CDC- Division of Oral Health
- Technical assistance in implementing CWF
- Training
- Host and Maintain WFRS

Water Treatment Plants
- Monthly fluoridation reports to OHP FS/OHSC

PRODUCTS

- Community water systems (CWS) in Nevada that monitor and adjust fluoride levels of fluoride in the water to the communities they serve.
- CWS that monitor and adjust fluoride levels are operating safely.
- CWS that fluoridate have operators appropriately trained to safely monitor and adjust fluoride levels.
- Data is collected on a timely basis on CWS and the population they serve and entered into the WFRS database pool.
- Fluoride data is publically available.
- Program accomplishments, best practices, lessons learned and evaluation tools are shared.
- Evaluation results are used for quality assurance

SHORT TERM OUTCOMES

- 100% of community water systems that fluoridate are operating in a safe and efficient manner, deceasing negative effects and increasing access.
- Increase in proportion of Nevada's population served by optimally fluoridated community water systems.
- Increase funding to maintain equipment used by communities that fluoridate

LONG TERM OUTCOMES

- Reduction in dental caries in populations served by Community Fluoridated Water.
- Reduction in disparities in incidences of caries between population sub-groups.
- Increase in numbers of CWS that begin to fluoridate based on awareness of the benefits observed in Nevada's communities currently fluoridating.
- Increase in percentage of Nevada's population served by CWS that fluoridate.