

2005

Water Fluoridation Training For Water Treatment Facility Operators

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CDC Training Objective

Water fluoridation, although simple in nature and no different than other chemical addition at a water treatment facility, does require certain unique knowledge to be fully successful. EARWF (Engineering and Administrative Recommendations for Water Fluoridation, Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, September 29, 1995) stipulates that

- State fluoridation specialists should attend CDC's basic fluoridation training course or a similar course at least once, and an advanced class once every 3 years.
- New fluoridating water systems should have startup training.
- A minimum of 1 hour of precertification training on water fluoridation for basic certification training for water plant operators should be available.
- Annual training for operators should be available.

The recommendation on annual operator training states "Each state should provide an annual fluoridation training course for operators. This training should be a minimum of 6-8 hours and should address all aspects of water fluoridation, including fluoride analysis."

Historically, CDC has presented a multiday water fluoridation training course aimed at engineers and state water fluoridation program specialists. Some states have prepared a training course for drinking water facility operators, but many states have not prepared a specific course and do not currently provide specific drinking water fluoridation instruction. A common impediment to preparing a state course is that typically there is no one within the

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state water fluoridation program who can not compile the appropriate multidisciplinary information nor possesses the skills to prepare the presentation.

To address this perceived deficiency, the CDC prepared a Six-Hour Training Template for water fluoridation instruction targeted to drinking water facility operators. To prepare this course, selected materials from the multiday course were coupled with additional materials related to operational guidance and supervisory considerations related to water fluoridation. This course was prepared in Microsoft PowerPoint (2002) with an accompanying script.

The fluoridation specialist or fluoridation engineer for a state may have sufficient experience to provide this training, but they may not be the best candidate for the job. It is important the presenter be experienced in operator training, adult learning, and have an understanding of other water treatment processes. Consequently, the course materials were prepared so that a person experienced in operator training should be able to review the materials and accompanying script and present this course successfully. Such an experienced trainer will also be capable of answering questions by participants that may extend beyond the course materials.

Course content is based on a combination of training materials prepared by CDC for other courses, and past experience of the author as an instructor of water and wastewater treatment facility operators in other related topic areas. The fundamental premise is to include only the content that is important for an operator to successfully operate a water fluoridation system at a drinking water treatment facility. It is not intended to make the participants experts in water fluoridation, and it is not intended to provide engineers or state fluoridation program specialists with sufficient engineering and administrative knowledge for their jobs.

This Six-Hour Training Template was prepared by CDC and then reviewed by an expert panel comprising state water fluoridation program specialists, state drinking water regulatory engineers, environmental engineers, state dental officials, and water treatment facility operators. The 2005 version of the training template is being released as a DRAFT version for initial use by state programs. CDC expects to be updating this training template in future years. Future releases will reflect enhancements based on comments by users on how to improve the content and delivery and will also include a companion workbook with reference materials and exercises associated with the subject content.

The anticipated future revision will also include a second course to be used as a refresher. Using content from the Six-Hour Training Template, and adjusting the script in the Notes Page will be the basis for this future companion course. This shorter version will be prepared on the presumption that each operator would not need to repeat the entire Six-Hour Training course each time training is indicated. Generally speaking, most water treatment facility operators have a recertification cycle of 2 years during which they are responsible for obtaining the appropriate training to maintain or increase their skill. The presumption is that an entry-level operator or the operator of a water facility that was newly implementing water fluoridation would need to have the full benefit of the Six-Hour Training Template content, but, in subsequent recertification cycles, the same individual may not need to repeat the entire

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course content. Therefore, the future refresher course will eventually provide an abbreviated version of important points for reinforcement.

It is unlikely that a state water fluoridation program would control operator training in a state. Many states have professional organizations that provide training in addition to the state sponsored training, and some larger urban utility districts provide “in-house” training to their staff independent of other training opportunities. Therefore, the state water fluoridation program may need to provide copies of this training to some other parties. It is suggested that if training is transferred to other parties, state-specific information suggested for customizing slides should be provided with this CD-ROM.

This training course is the product of the author, and does not represent official CDC policy. Mention of specific products in this presentation does not represent an endorsement of such products by CDC, nor does it indicate a preference for those products over other competitive products, but have only been included as examples to facilitate training. CDC does not imply or guarantee that these training materials provide complete information on federal or state requirements concerning drinking water. The users of this training course will be responsible for verifying the accuracy and conformance to current federal and state requirements.

Instructions to Presenters

The CD-ROM contains several files.

- Instructions to Users.pdf This Instructions to Users is included on the CD-ROM in an Adobe Acrobat format.
- Six Hour Operator Training.PPT The Six-Hour Training Template was prepared using Microsoft PowerPoint 2002. It should be available to anyone with PowerPoint 2002 or a later version.
- Instructor Notes Pages.pdf Also available on this CD-ROM is an Adobe Acrobat file with the Notes Pages of each PowerPoint slide. This file presents the suggested script for the presentation. This can be printed and then used by the presenter.
- 2005 Handout 3 slides.pdf Adobe Acrobat file with slides prepared for printing three-slides per page with a place for notes as a handout for program participants. This file does not include all slides in the presentation to minimize the pages required for printing. As an example, all slides with the word “Questions” will not be printed. This requires approximately 75 pages printed single sided, and 38 pages printed double sided.
- 2005 Handout 6 slides.pdf Adobe Acrobat file with slides prepared for printing six-slides per page as a handout for program participants. This file does not include all slides in the presentation to minimize the pages required for printing. As an example, all slides with the word “Questions” will not be printed. This requires approximately 38 pages printed single sided, and 19 pages printed double sided.
- Participant Evaluation Adobe Acrobat file with an evaluation form to be used to solicit evaluation comments by the participants.
- Instructor Evaluation Adobe Acrobat file with an evaluation form that can be sent by the instructor to CDC each time this course is presented.
- Self-Study Evaluation Adobe Acrobat file with an evaluation form to be used to solicit evaluation comments by individuals completing self-study.
- Certificate of Completion Microsoft WORD file suitable for printing certificates of completion for participants to provide them documentation of completing the course for continuing education credit.

This training template is a generic presentation and does not reflect the full program support needs of any state. A state can choose to customize the content of this training template to reflect the state specific information such as a description of the state water fluoridation program, contact names and numbers, and actual regulatory guidance pertaining to water fluoridation specific to that state. It is suggested that representatives of the state water fluoridation and drinking water programs, and the designated trainer, meet and collaborate on what content needs to be customized for their state. Table 1 presents the slides that could be customized in this Six-Hour Training Template by a state program. It is requested that any slide that is modified from the original content be suitably marked so that the changes are indicated as changed from the original CDC content.

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There are approximately 290 PowerPoint slides in the Six-Hour Training Template with a suggested script. The rule-of-thumb for presentations of this type is to expect that it will require an average of one-minute per slide to present the material. For a 6-hour course, including two 10-minute breaks in the morning and again two 10-minute breaks in the afternoon, but excluding the lunch break, a total of 320 minutes would be available. This allows 10 percent of the time for questions or other discussion. Alternately, a state program could add 30-minutes for a six-and-one-half-hour presentation to allow an extended discussion time, or it could be presented as an 8-hour course, by including an expanded hands-on laboratory or fluoride testing demonstration.

Some states may feel that they wish to have more time for questions, or they may wish to include a shortened version of this training with other operator training. This training template includes sequenced material, and the understanding and comprehension by the participants may suffer if the entire training template is not used. CDC included the slides and content as a result of comments from the expert panel review. Although CDC believes that the complete course is preferable, a state may choose to reduce the number of slides to achieve a shorter presentation. Although this is not recommended, Table 2 presents a list of slides to consider deleting to achieve a shorter presentation.

The course can be presented by state programs or by their designated trainer in whole or in part, with the suggested script or using their own script. If, upon inspection, a state program decides to use some of the PowerPoint slides from the CDC training template, and replace some of the slides with their own or different content, they are free to do so. For example, a state may elect to use all the slides except those involving laboratory and fluoride testing and replace that section with either a hands-on demonstration or a different set of slides from another source. However, all slides that are modified from the original content should be indicated as modified.

The training template includes a Slide Master (accessible by clicking on VIEW, then from the drop-down menu selecting Master and then sequentially Slide Master). The Slide Master provides the presentation with a consistent format. If this course is modified by adding or inserting slides, then an inserted new slide will assume the same format as the slide master. If slides are moved from this presentation into another file, then the slides may retain the presentation of the slide master of that document. If slides are moved from this presentation, it will be important to review each slide for inconsistent formatting because some of the slides have unique formatting that does not conform to the slide master. It may be necessary to apply the slide master to inserted slides. States can also choose to add their logo to the slide master, or to delete the CDC logo.

Tips for Use:

- Verify that the presentation loads on the computer and projector you intend to use.
- Print the Adobe Acrobat file with the Notes Pages, and review the script for each slide. Make a practice presentation to gain confidence on the length of time to present each section.
- Obtain a copy of the American Water Works Association Manual of Practice No. 4 on water fluoridation along with the AWWA standards for additives and review for content. Have display copies available for review by participants.
- Obtain a copy of Fluoridation Facts by the American Dental Association. This is a good reference on frequently asked questions addressing some of the erroneous and alarming challenges that are sometimes made about water fluoridation. If you have funding available, provide a complementary copy to each participant.
- Feel free to customize the slides to reflect your state program and situation. See the list of slides to be customized in Table 1.
- Ensure preparation of training site. Visit the location where the training will be held and if possible project several slides to see if there are problems with visibility. Have a replacement bulb in the event the projector bulb is not operative. Check seating arrangements, and test acoustics.
- Request that training facility provide tools necessary for delivering of presentation/training such as: flip chart, markers, and pencils/pens.
- Attempt to secure funding for lunch and breaks so the participants remain at the location and do not feel compelled to leave the premises. The professional societies or major utilities in the state may be willing to fund the lunch.
- Print the presentation in Handout format so that each participant can have something to carry home with notes that they may have taken. If printed as three to a page, single-sided, the number of sheets would be approximately 90 sheets. If printed 6 to a sheet, double-sided, then the number of sheets would be approximately 23 sheets.
- Consider incorporating a warm up activity (ice breaker). This can give the class an opportunity to get to know each other better, and it also gives students a chance to get up and move around! The most popular are games that have participants reveal something personal about themselves to get to know each other.
- Adult learners need active involvement and interaction with both the presenter and their classmates. They need to see the relevance of training to their own life, and be actively involved in the learning process by sharing their experience and knowledge. The trainer can accommodate a variety of learning styles by:
 - Ask participants what their expectations are.
 - Ask learners to share related experiences.
 - Include group activities (brain storming, role playing, etc.)
- Pass out evaluation forms to class participants 15 minutes prior to end of class. This will ensure that participants have adequate time to reflect on the training and provide useful input.
- At the completion of each training event, print the training report file on the CD-ROM to complete the report and mail to the CDC. This will be important in the future as CDC modifies this training template.

Questions on the Training Template

Training water plant operators is problematic because the skill level of water treatment facility operators varies widely from some high school to college graduates with advanced degrees. The needs of each state also vary. Consequently, it is difficult to prepare a “one-size-fits-all” type of operator training. The material in this course may be too technical for some poorly trained or inexperienced operators. It is geared for an operator who is in responsible charge of a facility with a service population of 5,000 or more. If there are operators of smaller facilities in the class, some content and presentation may need to be adjusted.

Each state may, upon reviewing this training template, decide that the mix and content need to be adjusted for their state program. A state may think the mix of topics in this training template does not align with the state’s priority and inadequate or excessive emphasis is placed on public health. That is why this is called a Training Template. It is intended to serve as a starting point for a state program in developing a curriculum. Full permission is granted to states to purge slides, replace slides, add slides, or take any combination of actions deemed appropriate to develop a course content that will meet the needs of the state program.

This training course includes content for both Fluorosilicic acid addition as well as dry additives. It is not recommended that the course be modified for exclusively Fluorosilicic acid or dry additives for an operator might leave their current location of employment and seek employment at another facility with a different additive. Therefore, the operator training should expose them to all industry practices, not just their own unique facility.

CDC is committed to developing high-quality training to serve the needs of the state water fluoridation programs. This presentation has been released as a draft version for use by the state programs so that feedback can be obtained on how to improve the training. Please think of the following items as you review this.

Accuracy: Is the content accurate?

Completeness: Does this presentation provide the essential minimum information for water facility operators? Are there items that are not included that should be included?

Comprehension: Is the content matter presented in an appropriate manner for the intended audience?

Questions and suggestions for improvements on this training template should be directed to

Division of Oral Health
Centers for Disease Control and Prevention
4770 Buford Hwy MS-F-10
Atlanta, GA 30341
Phone 770-488-6054

Table 1

The training template was prepared with a generic perspective. The content can be customized so that it reflects the specific needs of a state program. This list suggests slides that may need to be customized by the state program. However, all slides in the presentation should be reviewed to verify if specific content for a state needs to be reflected.

Slide	Title	Required Action
1	Welcome To:	Add name of state, and presenter's name
12	What?	Recommended optimal level and CDC control range may need to be replaced with a state range
15	Percent of Population on Public Water Systems	Mention the percentage of your state
24	Enamel Fluorosis	Verify if state regulations have different MCL or SMCL that are potentially different than EPA's
32	Public Policy on Fluoridation	Is there a state organization that should be referenced alongside these national organizations?
33	Fluoridation Facts	Add contact information for the state program
39	Safe Drinking Water Act (SDWA)	Identify if state has primacy on drinking water or if there is another state issue that should be mentioned
42	Water Additives Not Regulated by EPA	Add clarification on state water fluoridation program
45	National Primary Drinking Water Regulations	Some states may have different MCL than the federal criteria
47	National Secondary Drinking Water Regulations	Some states may have enforceable secondary drinking water regulations. Verify your state criteria.
48	National Primary Drinking Water Regulations	A state program might have different sampling requirements than stated
50	National Primary Drinking Water Regulations	In some states, notification of exceedance of the SMCL for fluoride is only required for naturally occurring fluoride, and not for adjusted fluoride.
51	State Water Fluoridation Program	This slide is a good opportunity to discuss specifics of the state program.
53	Regulatory Perspective	Use the optimal level, control range, and MCL for your state program
65	Fluoride Additive Standards	Some states require compliance with NSF 60/61. Clarify your state regulations

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Table 1 – Slides to be modified for state specific content, continued		
Slide	Title	Required Action
81	Fluoride Additives – Dry Spills	In the discussion on state requirements for disposal of contaminated dry additives, provide any guidance by your state program.
82-84	Fluoride Additives – Liquid Spills	In the discussion on state requirements for disposal of contaminated liquid additives, provide any guidance by your state program.
93	Fluoride Additive Selection – continued	The choice of which additive or system design can be heavily influenced by state practices. This may be a point of discussion about opinions or considerations by the state program.
134	Size/Capacity of Equipment	There may be state requirements for day tanks or smaller maximum sizes on day tanks, that should be mentioned here.
135	Design Modifications	Opportunity to mention state requirements on submission of engineering documentation or installation inspections for changes or modifications.
143	Method Selection	Are there state requirements pertaining to method selection?
195	Safe Practices – Knowledge	Include state-specific requirements on safety
231	Optimal Fluoride Levels	This is a place to mention the state recommended dosage for optimal health, and if the state has a different control range than that recommended by CDC
232	Goal is to maintain optimal level	Mention the state recommended dosage for optimal health and the control range.
235	Simplified Process Control Scheme	Some states require calculations. Verify your state requirements.
237	Process Calculations	The optimal level for your state can be replaced here
243	Process Calculations	The example discussion could be changed to use the recommended optimal dosage in your state, consequently changing the net dosage.
256	Operational Records	Does your state have requirements on submission of records.
257	Sampling	Does the state program have sampling requirements?
258	Records	Does the state program have record requirements?
259	Operational Records	Verify with the drinking water program on any record requirements
260	Operational Records	Most states require monthly submittals, some states have a weekly requirement
261	Laboratory Records	If the state program has a split sampling requirement, this might be a place to discuss it.
283	Overfeed	Include state-specific overfeed instructions

Table 2

CDC feels that the content of this course is best if the entire content is presented. If a state feels that it is essential to have a shorter presentation, certain slides can be considered for deletion. It is the opinion of CDC that the reduced course content may be complete, but the presentation may suffer particularly with respect to operator comprehension of the material. In addition to the slides listed here, a state may choose to delete additional slides not on this list.

Slide	Title
1	Welcome To:
2	An Operator's Guide to Water Fluoridation
3	Operator Knowledge Is Most Important Success Measure
4	Operator Training
5	Course Objectives
7	Schedule
14	Population Growth by Population
15	Percent Population on Public Water Systems
16	Halo Effect
19	How Fluoride Works
21	Fluoride Public Health Issues
27	Alternatives to Fluoridated Water
58	Apatite
95	Objectives of Water Treatment
96	Simplified Water Treatment
97	Fluoridation Design Basis
98	It's really very simple
100	Experience builds knowledge
109	Fluorosilicic acid feed
120	Types of Auxiliary Equipment
121	Types of Auxiliary Equipment
122	Piping Considerations
123	Backflow and Air-relief valves
124	Calibration Cylinders
125	Injector
126	Static In-Line Mixer
127	Continuous Analyzers
128	Drum Pump – hand
129	Drum Pump - electric
143	Method Selection
144	Colorimetric Analysis
145	Color & Light Absorption

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Table 2 – Slides to be modified for state specific content, continued	
Slide	Title
146	Visual Acuity
147	Visual Determinations
148	Absorbance Measurement
191	Why Is Safety a Consideration in a Water Fluoridation Program?
192	Principles of Occupational Safety
193	Safe Practices
222	Standard Operating Procedures
223	Examples of Best Practices
224	Proper Signage and Marking
225	CAUTION
233	Proper Operator Understanding of Job is most important success measure
234	Standard Operating Procedure
238	Process Calculations
242	Process Calculations
256	Operation
258	Records
260	Operational Records
261	Laboratory Records
262	Maintenance Records
288	Course Content