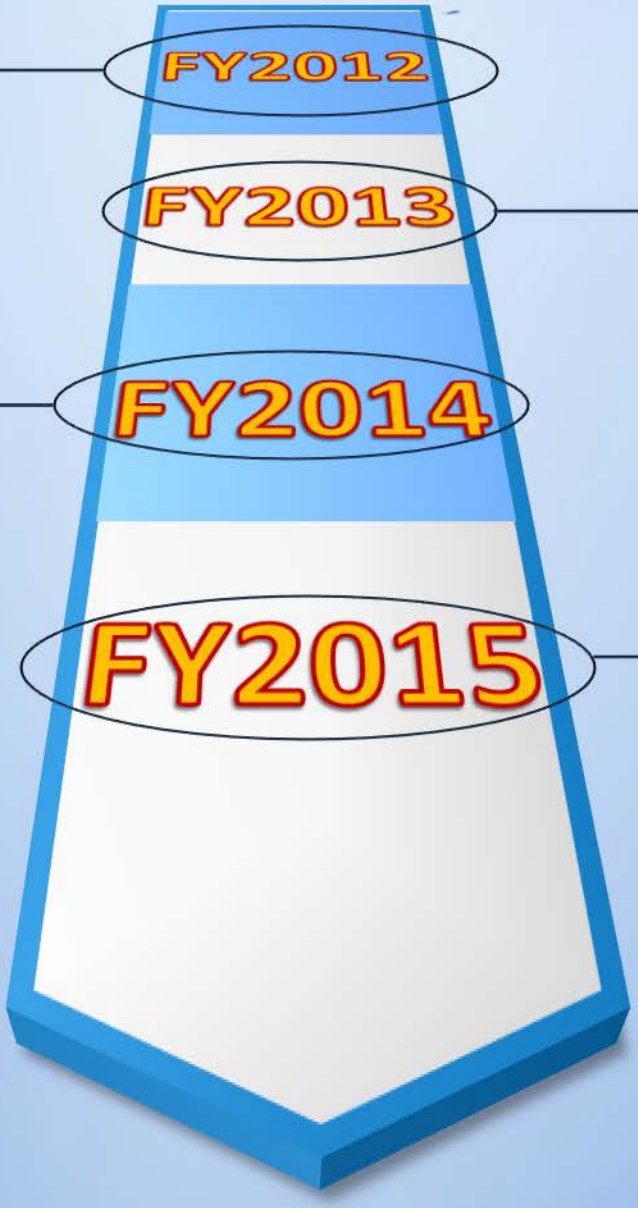
WATER FLUORIDATION WBT
PROJECT HISTORY AT A GLANCE

FY-2012
- CA training observation
- TN & GA site visits
- Video-based course beta

FY-2013
- Instructional Design
- Content preparation (27 modules, 1482 frames)
- Revised approach

FY-2014
- New context: public usefulness
- Review panel assembly
- Bootstrap course development
- **Target:** one module

FY-2015
Projected:
- Sponsor (funding provider) changes from CSELS to DOH
- Bootstrap course development
- **Target:** seven modules to review panel for clearance



WATER FLUORIDATION WBT
PROJECT HISTORY

ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

The Oak Ridge Institute for Science and Education (ORISE) is a U.S. Department of Energy institute focusing on scientific initiatives to research health risks from occupational hazards, assess environmental cleanup, respond to radiation medical emergencies, support national security and emergency preparedness, and educate the next generation of scientists. ORISE is managed by Oak Ridge Associated Universities.

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Table of Contents

Background

In FY2012, ORAU was tasked, through interagency agreement (DOE Proposal 1111-000154), to convert a traditional, in-person water fluoridation principles and operations training program into an online curriculum. The CDC's National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) Division of Oral Health (DOH) and the Educational Design and Accreditation Branch (EDAB) in the Scientific Education and Professional Development Program Office (SEPDPO) collaborated on the design and development of the course and materials. Additional FY2012 project details are contained in the project history records.

This document gives a summary of the project history from inception through the end of FY2014 and the expected work activities for FY2015 and beyond. Funding and direction for the project as of FY2015 will be from the DOH.

FY2012

FY2012 at a glance

- Water treatment plant visits
- Classroom training observation
- Flash-based course platform
- Video lessons
- Prototype testing & feedback
- Content clearance planning

Water Treatment Plant Visits

Instructional analysis began when ORAU sent staff to visit several water treatment facilities in Tennessee, and Georgia. These visits produced over 3,000 photos and nearly three hours of video footage of water treatment facilities, equipment, and processes. The project team was able to use these visuals for both a better understanding of the procedures and context, and as a library of assets for use when developing the online training. A sample of the photo and video library is shown below. Refer to the *01_Photos* and *02_Videos-plants* folders on the enclosed DVD for the complete library.

Figure 1 – Samples of photos gathered during tours of water treatment facilities in Tennessee and Georgia

Figure 2 – Samples of videos captured during tours of water treatment facilities in Tennessee and Georgia

Classroom Training Observation

To better understand the current traditional learning experience, ORAU team members traveled to Sacramento, CA to observe classroom training. This multi-day effort resulted in over 14 hours of video footage of classroom instruction and laboratory activities. The ORAU team began envisioning how to convert the classroom instruction into self-paced online modules during the classroom sessions. Video samples are provided below. Refer to the *03_Videos-classroom* folder on the enclosed DVD for the full library.

Figure 3 – Samples of videos captured during the Sacramento, CA classroom and laboratory training

Flash-Based Course Platform

Based on the requirements, content, and resources, the client and the project team agreed on using a Flash-based platform for the course. With mobile support not a requirement at the time, this method would allow a video-based course delivery and immersive navigational experience for learners. An accessible version of the course was also planned for users with disabilities and for devices that do not support Flash.

A course player was developed to serve as the user interface for accessing and navigating the video-based course materials. The player allowed the learner to customize course content based on her/his role.

Figure 4 – Flash-based e-learning prototype course prompting the learner to select a role

Figure 5 – Flash-based e-learning prototype course presenting the learner a list of lessons within the "Fluoridation Systems Design" section

Video Lessons

A total of six animated lessons were developed and loaded into the course player. Each lesson made use of graphic and video assets produced as a result of the site tours and classroom training observation. Additionally, new motion graphics were developed to enhance the instructional message and visual appeal of the lessons. Samples are provided below. Refer to the *04_Video Lessons* folder on the enclosed DVD for additional lessons.

Figure 6 – Sample video lesson created for the topic of "Safety Attitude"

Figure 7 – Sample video lesson created for the safety section introduction

Prototype Testing and Feedback Review

The six video lessons were loaded into the course player and made available to 15 stakeholders for testing and review. The test group was made up of people from various roles, including fluoridation coordinators, oral health professionals, engineers, directors, and others.

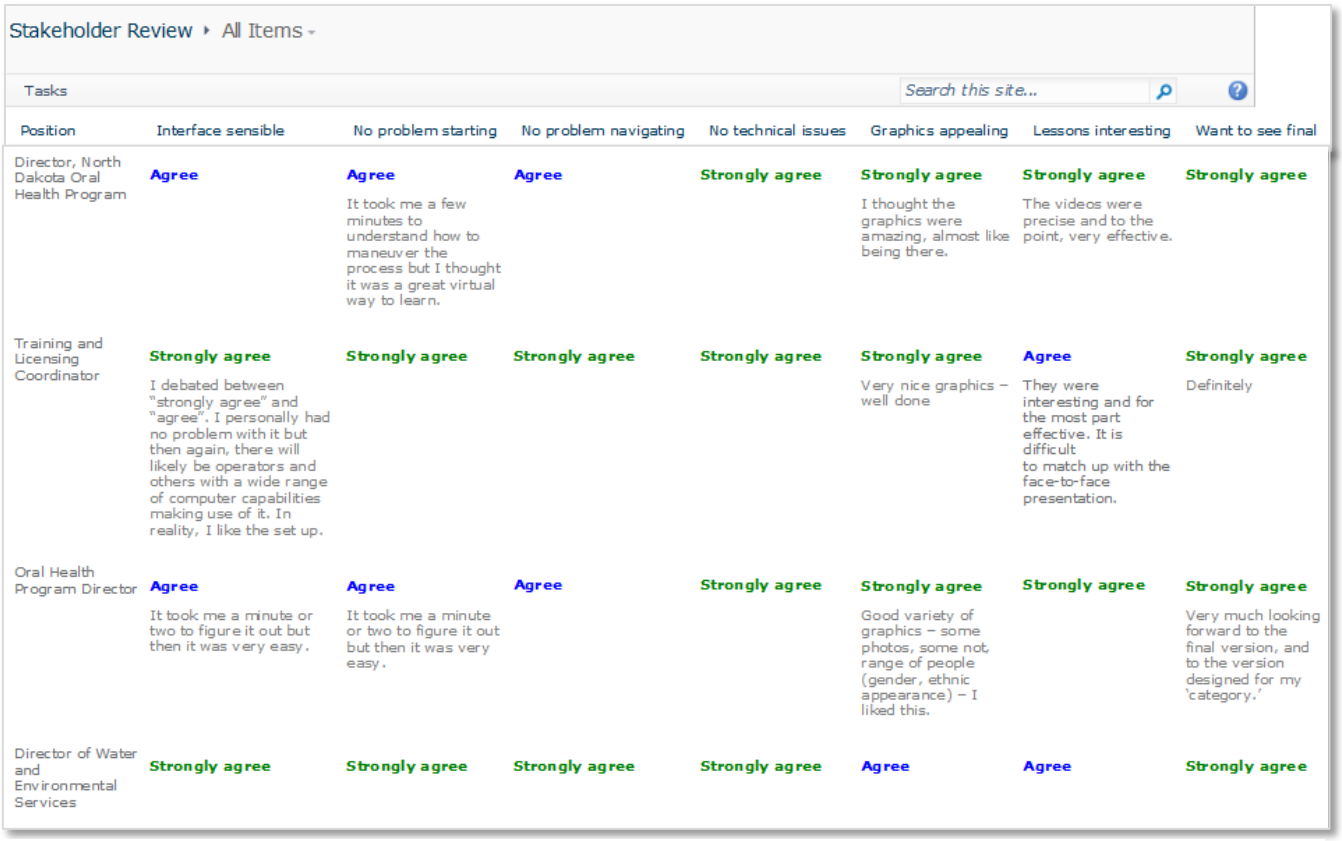
Figure 8 – E-learning prototype course with the Water Treatment Operator role selected, presenting the learner with a selection of topics

Refer to the *05_Flash Course Prototype* folder on the enclosed DVD for a link to the Flash-based prototype. (Note: An internally accessible link to ORAU is available at http://dev.orau.net/hsc/osels/WaterFluoridation/.)

The test group provided feedback via survey. Participants were asked questions about the sensibility of the interface, issues with start-up and navigation, other technical issues, visual appeal, educational interest, and desire to see the finished product.

Along with selecting responses to survey questions, several individuals provided additional commentary that proved helpful in interpreting responses and planning further development.

Across all possible questions, results were favorable (93% positive).



Stakeholder Review ▸ All Items

Tasks — Search this site...

Position	Interface sensible	No problem starting	No problem navigating	No technical issues	Graphics appealing	Lessons interesting	Want to see final
Director, North Dakota Oral Health Program	Agree	Agree It took me a few minutes to understand how to maneuver the process but I thought it was a great virtual way to learn.	Agree	Strongly agree	Strongly agree I thought the graphics were amazing, almost like being there.	Strongly agree The videos were precise and to the point, very effective.	Strongly agree
Training and Licensing Coordinator	Strongly agree I debated between "strongly agree" and "agree". I personally had no problem with it but then again, there will likely be operators and others with a wide range of computer capabilities making use of it. In reality, I like the set up.	Strongly agree	Strongly agree	Strongly agree	Strongly agree Very nice graphics – well done	Agree They were interesting and for the most part effective. It is difficult to match up with the face-to-face presentation.	Strongly agree Definitely
Oral Health Program Director	Agree It took me a minute or two to figure it out but then it was very easy.	Agree It took me a minute or two to figure it out but then it was very easy.	Agree	Strongly agree	Strongly agree Good variety of graphics – some photos, some not, range of people (gender, ethnic appearance) – I liked this.	Strongly agree	Strongly agree Very much looking forward to the final version, and to the version designed for my 'category.'
Director of Water and Environmental Services	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	Strongly agree

Figure 9 – Samples of feedback received from stakeholders during prototype testing of the Flash-based e-learning course

While the prototype was well-received, further discussion with key stakeholders and decision makers resulted in a change of focus due to the nature of the target audience in public health. In addition, it was determined that the course structure should have a more linear approach to navigating the course content.

Refer to the *06_Prototype Feedback* folder on the enclosed DVD for a list of all prototype feedback received.

Content Clearance Process Planning

Throughout the year, the Division of Oral Health (primary client) continued working with internal partners at CDC to create a more workable content clearance process. As of September 2014, a clearance process is nearly defined but without a clear path forward. The client and ORAU continue to agree that the complexities of content clearance are hurdles that can hinder successful development of this course.

FY2013 at a glance

- Design revisions
- Content gathering
- Instructional design
- Development revision

FY2013

Design Revisions

With new client direction requiring a more linear navigational approach, the project team revised the course design. The new version will have multiple navigation options, depending on the user's preferences. Some of these options include navigating specific scenes, selecting topics from an index, making selections according to the user's role, or printing lesson materials from PDF files.

Content Gathering

In addition to the content and media gathered during the first year's site visits, the client provided source content in the form of PowerPoint presentations. This content included 16 individual presentations with over 800 slides. Samples are provided below. To view all source materials, refer to the *07_Source Materials* folder on the enclosed DVD.

Figure 10 – Samples of source content slides

Instructional Design

The instructional design process involved a deep analysis of all the source materials and information gathered to date. The material covered on each individual slide was pulled into an instructional design document that:

- Organizes the content into manageable sections
- Extracts the pure text content
- Aligns the material with specific objectives
- Identifies visuals that reinforce important concepts
- Provides an area for subject matter experts to provide input during the review process

The instructional design process resulted in 27 of these documents, each representing a separate module. Because the final deliverable will be an e-learning course, the content was pulled into these documents and

organized into frames, or individual “screens” within a typical page-turner course. The result is over 1400 potential frames to be developed into e-learning screens or pages.

Following are examples of these instructional design documents. Each row in the table organizes a selection of source material into a specific lesson, breaking out the text content, supporting visuals, relevant references, and any notes or resources. In these documents, the Instructional Designer analyzed and organized the content into logical and manageable units. Developers use the documents to build the actual e-learning modules.

PPT: Additives Presentation Slides: 1-54

ID:	Type:	Slides:	Lesson:	Content:	Visuals:	References:	Notes/Resources:
					Cryolite  Google Apatite		
11		8, 9	Apatite	The principal raw material for fluoride additive production in the U.S. is the mineral apatite. Apatite is a mixture of calcium and phosphate compounds with a fluoride content of 4-7% including calcium phosphate, calcium carbonates, calcium fluorides, and fluorosilicates.	 Google Apatite	AWWA MOP 4	
12				Apatite contains 3 to 7% fluoride depending on the ore deposit. Florida, North Carolina, the Gulf Coast area, Idaho, and Mexico are all sources for apatite. China and Morocco also have large apatite quarrying.	 92243400 The U.S. is the largest source for apatite.	AWWA Fluoride Standards Committee	
13				Calcium fluoride deposits were the historical source for fluoride products before the fertilizer industry. Afterwards, apatite became the principal source. This photo shows milled apatite which is used in the manufacture of phosphate fertilizers. Shown next to it is calcium fluoride, also known as fluorite or fluorspar.	 PPT slide 8 Calcium fluoride (left) and milled apatite (right)	AWWA Fluoride Standards Committee	

PPT: Risk Communication Slides: 1-57

ID:	Type:	Slides:	Lesson:	Content:	Visuals:	References:	Resources/Notes:
0				Outline			
Section: Introduction Slides: 1							
1	V	1	**Risk Communication**	In this lesson... When discussing how to communicate about water fluoridation, it is important to have a basic understanding of the principles of risk communication. The subject of water fluoridation is contentious in some communities, and some people will perceive that fluoridated water is a risk to their health exists, and will certainly want more information. This presentation has been designed to give you some basic tools you can use when developing messages about the safety and effectiveness of community water fluoridation. Will mention objectives in this video script.			
Section: Objectives							
2				Objectives here...			
Section: How Risk is Perceived Slides: 2-8							
3		2		Let's start this section with some basic principles of risk communication. Then we'll talk about building trust, working with the press, engaging in community debates, and, finally, the "Precautionary Principle."	 122413285 Basic principles		
4		3		Here are some consumer perceptions of risk: • A threat to something we value • Emotion is usually engaged; risks generate anxiety and "mental noise" • Technical information may be difficult to understand: probabilities, graphs, and scientific information • Initial views are resistant to change	 135448176 Perceptions of risk		

Figure 11 – Sample instructional design documents created to organize source content into logical, manageable learning units

The instructional design process also produced quiz questions to ensure the learning objectives are being measured as part of the course.

A SharePoint site was used to manage the project and related files. Resources on the SharePoint site include detailed meeting notes, source materials, instructional design documents, project tasks, videos, photos, and all other project assets. Following is a list of the 27 instructional design documents created for the course, along with the estimated number of frames. Refer to the *08_ID Documents* folder for the complete library of instructional design documents.

Doc Num	Edit	Type	Section	Name	Frames
				Count= 27	**Sum= 1,482**
Section : Fluoride and Dental Decay (9)					
				Count= 9	**Sum= 334**
12			Fluoride and Dental Decay	Comparing Differing Scientific Studies	36
13			Fluoride and Dental Decay	Discovery of Fluoride Benefits	43
14			Fluoride and Dental Decay	Early Trials	
15			Fluoride and Dental Decay	Environmental Concerns	16
16			Fluoride and Dental Decay	Fluorosis	65
17			Fluoride and Dental Decay	Health Concerns	105
18			Fluoride and Dental Decay	Health Effects	
19			Fluoride and Dental Decay	Scientific Reviews	41
20			Fluoride and Dental Decay	Total Intake	28
Section : Organizational Mngt (7)					
				Count= 7	**Sum= 311**
21			Organizational Mngt	CDC Program	23
22			Organizational Mngt	Data Management	50
23			Organizational Mngt	Funding	23
24			Organizational Mngt	Inspections	18
25			Organizational Mngt	Managing Fluoride Levels	87
26			Organizational Mngt	Regulatory	42
27			Organizational Mngt	State Programs	68
Section : Program Mngt Issues (5)					
				Count= 5	**Sum= 248**
7			Program Mngt Issues	Campaigns	47
8			Program Mngt Issues	Costs	40
9			Program Mngt Issues	Public Health Issues	26
10			Program Mngt Issues	Risk Communication	120
11			Program Mngt Issues	Other Modalities Other Countries	15
Section : Technical Operations Engineering (6)					
				Count= 6	**Sum= 589**
3			Technical Operations Engineering	Additives	
1			Technical Operations Engineering	Safety	87
2			Technical Operations Engineering	Design	96
4			Technical Operations Engineering	Equipment	113
5			Technical Operations Engineering	Laboratory	182
6			Technical Operations Engineering	Operations	111

Figure 12 – Listing of the 27 instructional design documents on the SharePoint site for the project

The client's content review process was still being defined during FY2013, while ORAU focused on instructional design.

Development Revisions

Due to the large volume of content involved with this course (over 1400 e-learning frames across 27 modules), the client and ORAU agreed that video is not the most cost-effective method of development for the course. Additionally, video-based development would far exceed the funding and resources available for completion of the project. As such, the project team agreed to abandon the video-based approach and to scale back the design. This would also help with the project schedule since the content approval time was excessive. The team determined the final deliverable will be an e-learning course with an emphasis on text and visuals, along with some supporting videos, with the delivery platform to be determined.

FY2014

FY2014 at a glance

- Goal redefined
- Challenges
- Development launched

Goal Redefined

The client's newly assigned division director emphasized the importance of end products that are the most useful for the public. In weighing the balance between research and actual use, the goal is to produce a final version that is more practical (less theoretical). As a result, the instructional strategy was refined slightly to strip the content down to the more practical and to help the project team focus on what is most important for the success of the learners. ORAU offered assistance with trimming the objectives and content where possible to help achieve this goal and to meet timeline and funding requirements.

Challenges

The content review process continued to prove a challenge due to the absence of a key reviewer on medical leave. Later, the client assembled an internal review panel to address content clearance and try to move the content approval forward. The client also revised the process to a single-round of clearance -- once content is reviewed for factual accuracy, the first module can be considered as stamped "approved." Additionally, the client agreed that ORAU should proceed with development of un-cleared content if the CDC review process is stalled, with the caveat that any revisions would be incorporated upon clearance.

Development Launched

The ORAU development team proposed an HTML-based solution using Bootstrap technology and YouTube-hosted video as the best solution given the content, resources, and timeline. The team developed a prototype of the HTML product and shared it with the client for review and feedback.

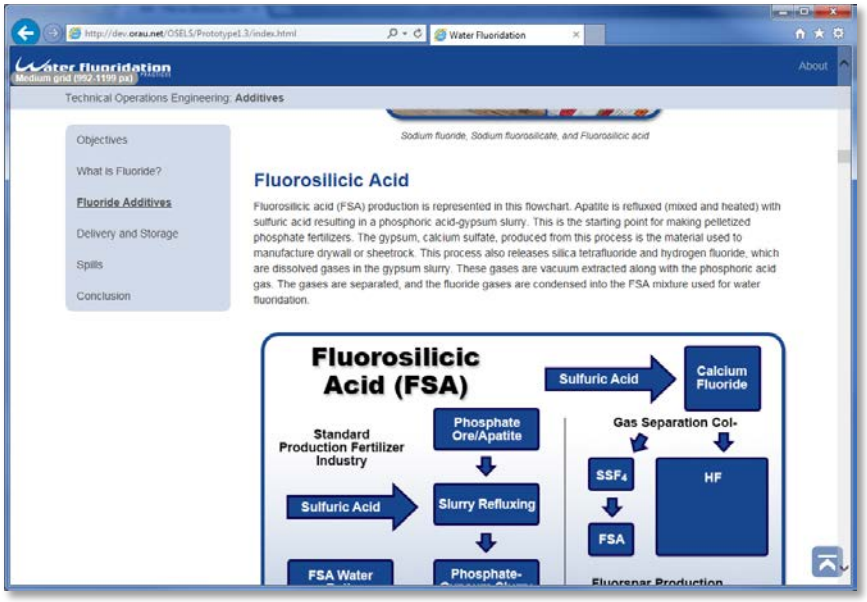


Figure 13 – Bootstrap-based course prototype

The client agreed the Bootstrap model would work well for the Water Fluoridation course. ORAU developed the first module, "Technical Operations Engineering: Additives" using this platform. Upon review of the developed content, revisions were made to finalize the module. A screenshot of the Bootstrap course is provided below. To access the course, use the link in the *09_Bootstrap Module* folder of the enclosed DVD, or access it directly at http://dev.orau.net/OSELS/Prototype1.4/ (link internally accessible to ORAU only).

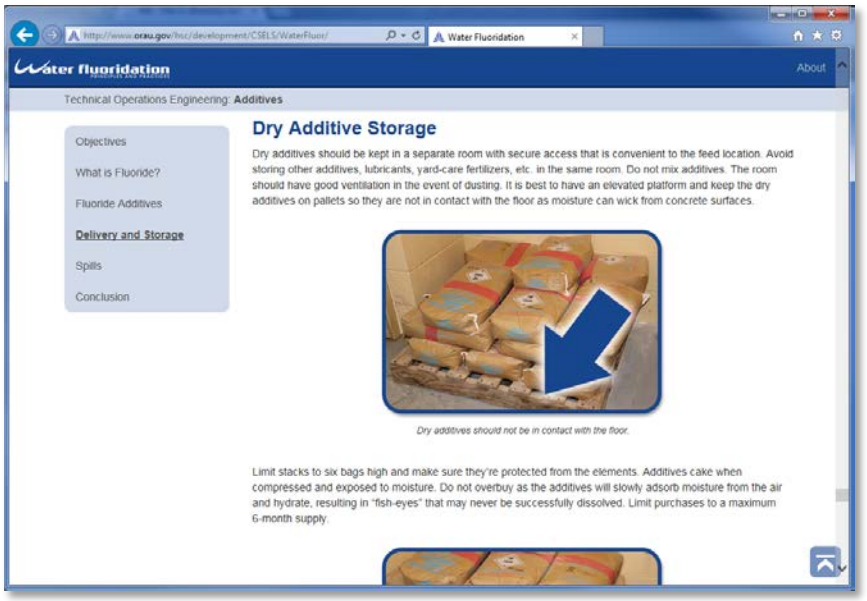


Figure 14 – Bootstrap-based course module

FY2015 (projected)

FY2015 at a glance
- Development continued

Development Continued

In FY2015, the sponsor (funding provider) will change from CSELS to DOH. ORAU is funded to continue with development of course modules using Bootstrap. The goal is to have seven modules ready for the review panel to run through CDC clearance by the end of FY2015.

Appendix

DVD Contents

The following table describes the contents of the enclosed DVDs referenced throughout this document:

Folder	Contents
01_Photos	Photos captured during ORAU site visits to water treatment facilities in Georgia and Tennessee
02_Videos-plants	Videos captured during ORAU site visits to water treatment facilities in Georgia and Tennessee
03_Videos-classroom	Videos captured during ORAU observation of classroom training in Sacramento, CA
04_Video Lessons	Video lessons produced by ORAU as part of the Flash-based course
05_Flash Course Prototype	Link to the Flash-based course prototype hosted on an internal ORAU server
06_Prototype Feedback	Consolidated feedback from stakeholders who reviewed the Flash-based course prototype
07_Source Materials	Source materials provided by the client
08_ID Documents	Instructional Design documents used to analyze, design, and organize content into manageable units of instruction
09_Bootstrap Module	Link to the HTML-based course hosted on an internal ORAU server

Table 1 – Description of DVD (Disc 1 of 2) contents

Folder	Contents
05b_Flash_Course	• Flash-based course prototype o Launch **index.html** to start the module o NOTE: The module is designed to run from a Web server and may not function properly when run from this disc or another location • Source files used to develop the Flash-based course, including Flash animations, videos, images, and layout assets
09b_Bootstrap_Course	• HTML-based Bootstrap module o Launch **index.html** to start the module o NOTE: The module is designed to run from a Web server and may not function properly when run from this disc or another location o NOTE: The module is programmed to run the videos from the YouTube server. The video files are included on the DVD and can be uploaded to another YouTube account and the course materials redirected to launch the video from that location.
09c_Bootstrap_Source	Source files used to develop the Bootstrap module, including images, videos, audio, and layout assets
10_TRAIN_Quiz	Files used to develop the Knowledge Check for the “Additives” module, hosted on TRAIN

Table 2 – Description of DVD (Disc 2 of 2) contents