OCT WATER QUALITY ACADEMY
A U.S. Government Funded Education Contractor.
An ANSI/IACET Accredited School Nationwide.
Class Description submittal to OESAC

Title: **Source Water Quality & Characteristics**

☒ **New Class** or ☐ **Class Renewal**
CEU Award requested: **0.7 CEUs.**

OVERVIEW:

This is a fundamental class that reviews Surface water sources, Groundwater sources, and reviews water quality parameters. Water quality refers to the physical, chemical, and biological characteristics of water, usually in relation to its suitability for a specific use, such as drinking, swimming, or supporting aquatic life. It represents a measure of the condition of water relative to human needs and natural ecosystem health.

CLASS DESCRIPTION:

The goal of source water quality management is to safeguard, maintain, or improve the quality and quantity of drinking water sources—such as rivers, lakes, and aquifers—before treatment

OUTLINE:

1. Introduction to Source Water Assessment.
2. Understanding Source Water.
3. Techniques for Assessing Source Water Conditions.
4. Regulations that Impact Source Water Protection.
5. Contaminants of concern in source water assessments.
6. Where source water contaminants originate.
7. Drinking water impacts from source water contaminants.
8. Treatment strategies for managing source water contaminants

DETAILED SUPPORTING DESCRIPTION:

Chapter 1. Introduction to Source Water Assessment.

Fig 1. Source Water Sampling.

This chapter will focus on the importance of source water assessments in the treatment of drinking water. In our first chapter will give you an overview of the history and need for source water assessment in the United States.

- These in-depth evaluations of water quality and the potential sources of pollution are a helpful tool for utilities when it comes to proper treatment, planning for plant upgrades, and budgeting for treatment chemicals.
- However, source water assessments can provide a wealth of information to water plant operators. Source water assessments are often programs that are implemented by state and federal regulators.
- Today, our source water assessment programs not only consider public heath aspects of water quality, but they also consider how water quality influences drinking water treatment processes, environmental and ecosystem health, and the overall well-being of our communities.

Chapter 2. Understanding Source Water.

Fig 2. Water pollution.

Water providers rely on a variety of water sources. Surface water and groundwater have different characteristics and can be impacted differently by human activities and the natural environment. Source water assessments are an important tool for operators in understanding the conditions and possible pollutants that may impact treatment processes.

- Ground Water is a source of water supply that is used by a large number of water providers, particularly in the central part of the United States.
- Surface water is the predominant supply source for water providers in the United States.

Chapter 3. Techniques for Assessing Source Water Conditions.

Fig 3. Sampling.

The techniques that we will examine are used by utilities but are also used by regulatory agencies and consultants to better understand water quality conditions. Our look at how source water quality is assessed will focus on three broad topics: field sampling, laboratory analysis, and modeling and GIS.

- Field sampling is the first place where most source water assessments start. If a utility is struggling with treatment, or if there is a known pollutant that is causing harm to a

- Collecting samples is the first step to understanding source water conditions.
- With source water samples collected, water providers have a number of different laboratory analyses that can provide helpful information about source water quality.

Chapter 4. Regulations that Impact Source Water Protection.

The regulations that drive the need for source water assessment programs. Source water assessments have become very important in the development of drinking water regulations at all levels of government.

Fig 4. Source water.

- Source water assessments have become very important in the development of drinking water regulations at all levels of government.
- In some cases, the rules developed by regulators are the reason that water providers implement source water assessment programs.
- For operators, regulations for drinking water protection, though familiar, can become complicated when source water assessments are added to the mix.

Chapter 5. Contaminants of Concern in Source Water Assessments.

The goal of source water assessment is to gain a better understanding of water supply conditions and to develop strategies for improved treatment we will look at contaminants that are either difficult to treat or can have impacts on finished water quality.

Fig 5. Contaminates.

- How nutrients contribute to algae blooms and degraded water quality.
- Total Organic Carbon and disinfection byproducts.
- Radionuclides and metals in source waters.
- Algae and microbial impacts to water quality.
- Emerging contaminants that are of concern to water providers.

Chapter 6. Where Source Water Contaminants Originate.

It is important for water operators to be aware of the activities that occur within the area of drinking water sources. As we progress through this chapter, one thing to keep in mind is that source waters are all unique and each utility will have different contaminant sources to manage.

Fig 6. Water Contaminates.

- The source of water supply pollutants comes from activities that we may not see as harmful but may cause a great deal of challenge when it comes to effectively treating drinking water. As water providers we often focus on the sources of pollutants that come from the obvious location, but it is also important to consider non-point sources of pollution

Chapter 7. Drinking Water Impacts from Source Water Contaminants.

Source water quality can have a direct impact on the quality of finished drinking water that we supply to our communities. As operators, our goal is to produce the best possible product for our customers, however, when source water conditions change, or are degraded in some manner, it can make it challenging to produce a consistent product.

Fig. 7 Source water contaminates.

- Understanding source water conditions can help drive treatment processes.
- Source water conditions that cause aesthetic changes to drinking water quality can diminish the confidence customers have that their drinking water is safe.
- The easy to see or smell or taste water quality issues are the ones that drive customer complaints.

Chapter 8. Treatment strategies for Managing Source Water Contaminants.

Most of this chapter will focus on actual treatment processes that can be used to reduce or eliminate contaminants in finished drinking water. Utilizing a thoughtful evaluation of treatment options may result in obvious ways that operators can improve treatment through capital projects or alterations to current treatment processes. The utility must also maintain public trust.

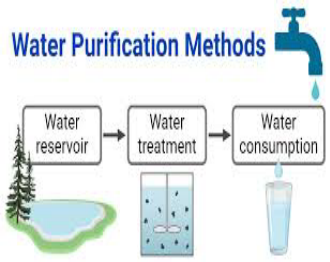

Fig. 8 Treatment Steps.

- As we gain a better understanding of source water conditions, we also learn more about how we treat those contaminants.

OBJECTIVES:

- Students will learn that source water conditions that cause aesthetic changes to drinking water quality can diminish the confidence customers have that their drinking water is safe.
- Students will gain a basic fundamental knowledge of all topics listed in the outline above.
- Students will have the opportunity to interact with an experienced instructor to clarify information on problems where they lack knowledge and understanding.
- Students will be prepared for state operations examinations to increase licensure in their state of residence.

TIME PRESENTATION OUTLINE:

Start Time	End Time	Instructional Time	Allotted Break Time	Chapter/Discussion/Quiz
8:00am	8:50am	50 minutes	8:50am–9:00am	Introduction to Source Water Assessment.
9:00am	9:50am	50 minutes	9:50am–10:00am	Understanding Source Water.
10:00am	10:50am	50 minutes	10:50am-11:00am	Techniques for Assessing Source Water Conditions.
11:00am	12:00pm	60 minutes	12:00pm-12:30pm	Regulations that Impact Source Water Protection.
12:30pm	1:20pm	50 minutes	1:20pm-1:30pm	Contaminants of concern in source water assessments.
1:30pm	2:20pm	50 minutes	2:20pm-2:30pm	Where source water contaminants originate.
2:30pm	3:20pm	50 minutes	3:20pm-3:30pm	Drinking water impacts from source water contaminants.
3:30pm	4:30pm	60 minutes		Treatment strategies for managing source water contaminants.
		420 minutes		

6 sessions of 50 minutes of instruction and 2 sessions of 60 minutes of instruction equals 420 minutes. 420 minutes equates to 7 hours of instruction divided.

END