



AWWA G300 Standard on Source Water Protection

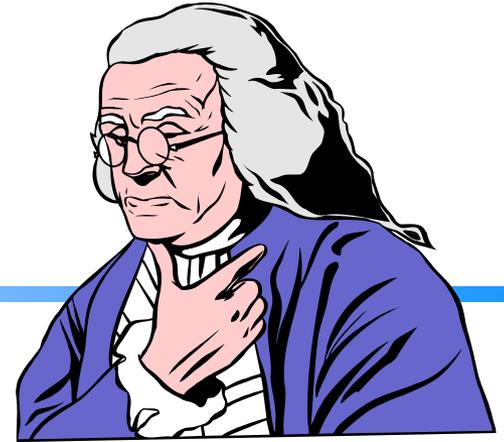
Chi Ho Sham, Ph.D.,
The Cadmus Group, Inc.
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Acknowledgement

- Dr. Richard W. Gullick, Environmental Engineering & Technology, Director of Water Resources
- Dr. Sharon C. Long, Wisconsin State Laboratory of Hygiene and University of Wisconsin, Director of Environmental Microbiology
- Ms. Pamela P. Kenel, P.E., Black & Veatch
- American Water Works Association staff

Quotes from Benjamin Franklin



- “When the well’s dry, we know the worth of water”, ___ Benjamin Franklin, Poor Richard’s Almanac, 1746
- “An ounce of prevention is worth a pound of cure”, ___ Benjamin Franklin

Overview

- An introduction to the American Water Works Association (AWWA) Standards
- AWWA Standard G300 on Source Water Protection (SWP)
- Operational Guide for AWWA Standard G300
- AWWA's plan to move forward with the G300 Standard

AWWA Standards

- One of the main goals of AWWA is to support water utilities in evaluating and improving their water quality, operations, maintenance, and infrastructure.
- AWWA standards process (more than 100 years) to produce peer-reviewed standards for materials and processes used by the water and wastewater utilities. These standards, which are American National Standards Institute (ANSI) approved, are recognized worldwide.
- The AWWA standards are designed to assist utilities and their service providers to meet expectations of their customers, investors, and government regulators.

AWWA Standards

- In recent years, AWWA has developed a new series of utility management standards for utilities.
- The Utility Management Standards (G Series) provide a means to assess service quality and management efficiency:
 - Distribution system operations (G200)
 - Source Water Protection (G300)
 - Security practice (G400)
 - Others – business practices, emergency planning, communication and customer relations

AWWA Standards

- The utility management standards are developed using the same formal, ANSI-recognized, AWWA-managed process.
- Volunteer standards committees establish standard practices in a uniform and appropriate format. Formal standards committees are formed to address the individual standard practices under the Standards Council.

Early Source Water Protection Program

- *“There shall be no man or woman dare to wash nay unclean linen, wash clothes,...nor rinse or make clean any kettle, pot, or pan or any suchlike vessel within twenty feet of the old well or new pump. Nor shall anyone aforesaid, within less than a quarter mile of the fort, dare to do the necessities of nature, since by these unmanly, slothful, and loathsome immodesties, the whole fort may be choked and poisoned.”*

Governor Gage of Virginia, Proclamation for Jamestown, VA (1610)



AWWA SWP Standard

- 1996 Safe Drinking Water Act (SDWA) Amendments – with SWP provisions
 - Source Water Assessments to be completed by States
 - Source Water Protection is voluntary
- Fall of 2000 – AWWA SWP Committee (under the Technical & Educational Council) was requested to develop accreditation criteria and supporting guidance
- June 2002 – Draft SWP accreditation document (accreditation program did not come to fruition but evolved into a new series of utility management standards – G series)

AWWA SWP Standard

- 2002 - A formal committee was formed during the first quarter under the Standards Council
- 2006 – the standards committee approved the AWWA G300 Standard
- 2007 – AWWA approved and published the G300 Standard – effective on July 1, 2007



The Authoritative Resource on Safe Water®

AWWA Standard

Source Water
Protection



Effective Date: July 1, 2007

This edition approved: Jan. 21, 2007

Approved by American National Standards Institute: April 20, 2007

AWWA SWP Standard

- The objective of source water protection is to maintain, safeguard, and/or improve the quality of source water. All water agencies strive to consistently supply their customers with sufficient quantities of high-quality water at affordable rates.
- The drinking water industry uses a multiple-barrier approach to achieve this goal. The multiple-barrier approach involves several consecutive steps, including
 - selection of high-quality source water(s),
 - source water protection,
 - optimized water treatment as necessary,
 - distribution system management, and
 - water quality monitoring.

AWWA SWP Standard

- Scope - describes the essential requirements for the effective protection of source waters.
- Purpose - defines the minimum requirements for the protection of source waters.
- Application - referenced in the evaluation of source water protection for recognition.

AWWA SWP Standard

- Source water protection is a highly site-specific process that reflects the inherent diversity of natural waters and the areas from which they are derived.
- Successful source water protection programs may vary widely in their details; but it is a premise of G300 standard that successful programs share several fundamental elements.
- These elements form the basis of the source water protection standard. Within this generalized framework, individual utilities may establish and maintain source water protection programs that account for their unique local conditions, incorporate the interests of local stakeholders, and reflect sustainable long-term commitments to the process by all parties.

AWWA SWP Standard

- The minimum requirements for a source water program include six primary elements:
 1. A source water protection program vision;
 2. Source water characterization;
 3. Source water protection goals;
 4. Source water protection action plan;
 5. Implementation of the action plan; and
 6. Periodic evaluation and revision of the entire program.

Although each of the six primary elements may differ greatly in their complexity or effort, they are each vital to the success of the program. Accordingly, basic success in each area must be demonstrated for a utility to obtain recognition in the area of SWP.

AWWA SWP Standard – Operational Guide

- Based on the draft materials developed in 2002, AWWA SWP Committee (under Technical and Educational Council) was tasked by AWWA in 2009 to produce a guidebook to support the implementation of AWWA Standard G300
- Guidebook completed and published in May 2010

SWP Committee Chair (2007-2010) – Chi Ho Sham, Ph.D.

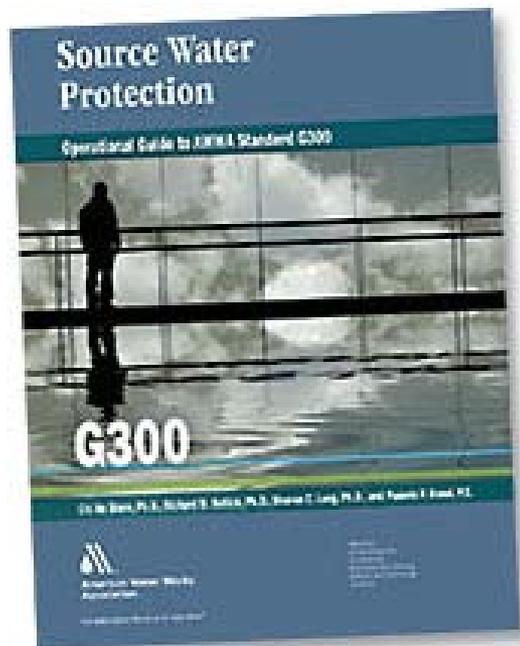
SWP Committee Chair (2010-2013) – Sharon Long, Ph.D.

SWP Committee Chair (2001-2004) – Rich Gullick, Ph.D.

SWP Committee Chair (1998-2001) – Pamela Kenel, P.E.

AWWA SWP Standard – Operational Guide

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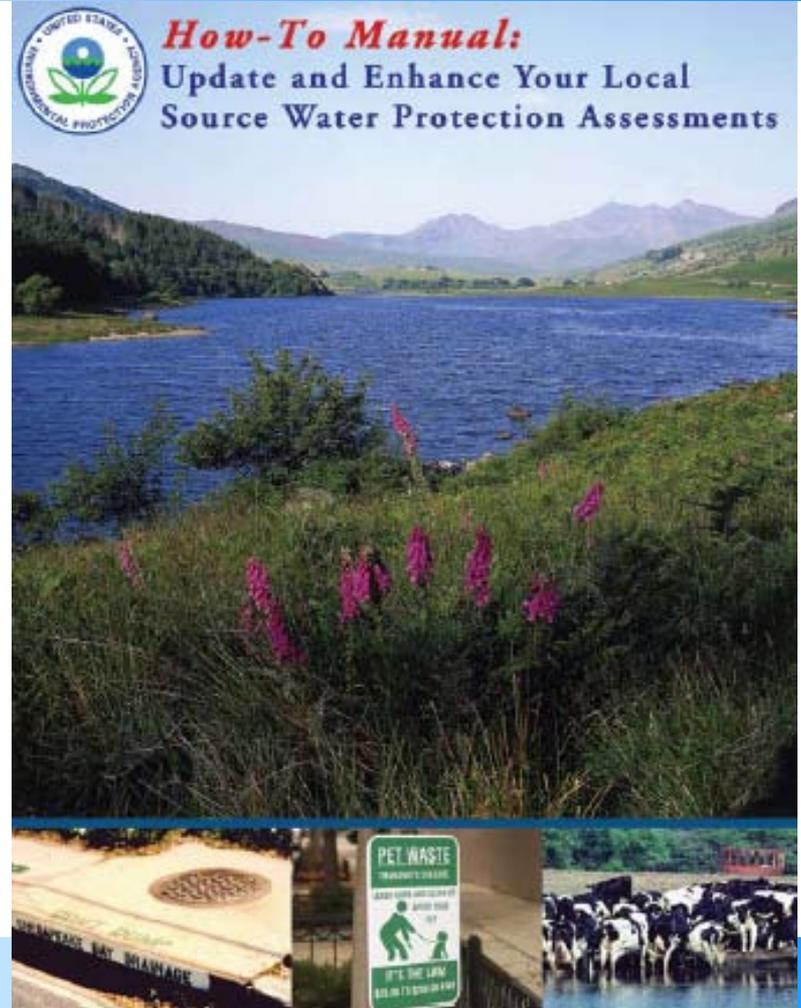
- Source Water Protection Program Vision
 - A formalized vision guides the development and implementation of an SWP program. The vision states a utility's SWP policy as put forth by the decision-making body of the utility
 - Elements:
 - Recognition that SWP is but one of the multiple barriers for ensuring the safety and quality of drinking water;
 - Commitment of sufficient resources; and
 - Identification of key stakeholders involved.

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- Characterization of Source Water and Source Water Protection Area
 - Characterization and assessment of the source water and the land areas that affects it, along with a risk assessment analysis of the susceptibility of the source water to potential contamination, are critical to properly understanding and developing appropriate goals and plans that will achieve the vision of the SWP program.

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- Source Water Assessment Update:
 - Update to address newly regulated contaminants
 - New Public Water Systems (PWSs), intakes, or wastewater discharges
 - Changes in land use
 - Local information



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- Source Water Protection Goals
 - The development of strategic-level goals that connect back to the vision statement and source water area characterization and susceptibility analysis is essential.
 - The goals should address water quality issues such as public health and aesthetic concerns but may also include other considerations such as environmental stewardship, biological diversity, socioeconomic and political equity, and balances with competing considerations.

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- Source Water Protection Goals
 - Referred to as “Key Objectives” or “Critical Business Factors” in quality programs and become the basis for developing interim projects and activities for the SWP program.
 - The goals should be prioritized to reflect the concerns of greatest importance and areas and projects where success is most likely.
 - Typically, the SWP program strategic goals will be relatively high level, and they will not be modified in the near term.

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- Action Plan
 - An action plan lays out a road map of activities to be conducted to achieve the desired SWP goals. The action plan complements the broad sweep of community objectives, including economic development, quality of life, and other local issues.
 - The action plan should include specifics as to how each action items will be accomplished and a timetable for implementation of each part of the plan. Necessary resources should be identified.

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- Program Implementation
 - The development of a comprehensive and implementable plan, the use of an adaptive management approach to respond to unexpected challenges and barriers, and adherence to an established timeline are all integral to the success of implementing an SWP program.
 - The ability to work within and overcome institutional obstacles is an hallmark of the viability of an SWP program.

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- Evaluation and Revision
 - A good SWP program will include provisions for reviewing, benchmarking, and – if necessary – modifying the SWP vision, characterization, goals, action plan, and implementation elements.
 - This step is intended to measure the accomplishment or completion of projects, programs, and activities identified in the action plan, and to identify obstacles and means to overcome these obstacles.

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Worksheet A: Developing a Vision

	High	Medium	Low	None
1. Is there a written mission statement or policy adopted by the governing board of the utility that specifically addresses SWP?	Organizational mission statement	Policy statement		No statement of any form
2. Is the SWP vision (mission statement or policy) distributed and understood throughout the organization?	All staff	Management level only	Board Directors only	Not known at any levels
3. Does your mission statement recognize that SWP is one of the multiple barriers for drinking water production?	Yes		No	
4. Does the utility mission statement include commitment of, or intention to commit, sufficient resources?	Yes		No	
5. Have key stakeholders been identified and involved in development of the mission statement (e.g., was there a process in which outside entities had the opportunity to comment)?	Extensive identification and contact efforts	Partial survey and contact	Minimal effort	Complete lack of stakeholder involvement
6. Is there a process for regular/periodic review of the SWP vision? When was the SWP vision last reviewed?	Yes		No	
7. <i>Optional</i> Is the SWP vision available to the public (in Consumer Confidence Report, Annual Report, other Outreach Materials, and/or the utility's Web site)?	Yes		No	

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Worksheet B: Source Water and Source Water Protection Area Characterization

	High	Medium	Low	None
1. Have the SWP area(s) and area(s) of concern been delineated? • Using geological tools? • Estimated time of travel?	Complete	Partial	Just started	No
2. Do water quality data exist for the source water at intakes or wells?	Extensive and comprehensive sets of data (over 10 years' worth)	Extensive but not comprehensive (e.g., missing certain water quality parameters and data records)	Partial sets of data (with missing records)	No data
3. Do inventories, records or knowledge of actual and potential contaminant sources, and associated land-use information exist?	GIS maps with all sources and uses	Partial mapping of sources and uses	Partial listing of source and uses	No data
4. Is the information from Question 3 in a useable format?	GIS data layers available	Computer files available	Paper files available	No data or unusable data format
5. Have existing management activities and pollution control practices in the SWP area been evaluated?	Complete census and analyses	Partial survey and analyses	Limited coverage	No evaluation activities
6. Has a source water susceptibility analysis been conducted?	Yes, complete analysis	Yes, partial analysis	Limited analysis	No
7. Are relevant personnel aware of applicable federal/state/provincial/local regulations?	Yes, and have comprehensive knowledge	Yes, but not sure about some of the regulations (e.g., other non-SDWA regulations)	Yes, but not sure about most of the regulations involved	No idea at all
8. Have source water area stakeholders, landowners, their roles, and their initiatives been identified? Are working relationships with these groups established?	Extensive identification and contact efforts	Partial survey and contact	Minimal effort	Complete lack of knowledge
9a. Has the utility adequately identified the key security threats to the source water?	Extensive identification	Partial identification	Minimal identification	No identification
9b. Does the utility have written plans describing the expected response of personnel in the event of an emergency incident (including sabotage and accident)?	Very clear and comprehensive security plans, known by all relevant employees	Adequate security plans, but not known by all relevant employees	Adequate security plans, but not known by or available to all relevant employees	Inadequate or no security plans
9c. Does the emergency plan include components for both protecting people and protecting the source water?	Yes, for both		Only for one	Neither
10. Does the utility have documentation that describes emergency response plans and provides specific directions to personnel in the event of an emergency?	Very clear and comprehensive emergency plans, known by all relevant employees	Adequate emergency plans, known by all relevant employees	Adequate emergency plans, but not known by or available to all relevant employees	Inadequate or no emergency plans
11. Does the utility have documentation of health and safety procedures that are designed to safeguard the employees and visitors engaged in operations activities pertaining to watershed management?	Very clear and comprehensive health and safety procedures, known by all relevant employees	Adequate health and safety procedures, known by all relevant employees	Adequate health and safety procedures, but not known by or available to all relevant employees	Inadequate or no health and safety procedures
12. Is there a process for periodic updating of the source protection area?	Yes	Process is under development		No

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Worksheet C: SWP Goals

	High	Medium	Low	None
1. Program Goals				
a. Does the utility have written goals for the SWP program?	Yes			No
b. Are the goals prioritized?	Yes, all goals are prioritized	Yes, many goals are prioritized	A few goals are prioritized	Not at all
c. Has a specific timetable been developed to meet the goals?	Yes, specific times set for all important goals	Yes, times for some of the most important goals set	Just a few goals have a timetable	Not at all
2. Do these goals directly and adequately address the primary existing and future threats to source water quality that were identified in the source water/SWP area characterization and susceptibility analysis?	Yes, complete match	Yes, partial match	Yes, with minimal coverage	Not at all
3. Do the goals address emerging/unknown contaminants?	Yes, explicitly	Yes, partially	Yes, with minimal coverage	Not at all
4. Do the goals address potential changes in land use and related impacts?	Yes, goals explicitly anticipate future land use change and related impacts	Yes, goals identify some land use changes but do not directly address related impacts	Goals minimally identify land use change	Not at all
5. Do the goals address other potential future issues for the source water?	Yes, goals explicitly address potential future source water issues	Yes, goals partially consider potential source water issues in the future	Goals barely address any anticipated changes to the source water in the future	No anticipation of any future source water issues
6. Qualitative and Quantitative Measures				
a. Do the goals have specific qualitative and/or quantitative means of measurement?	Yes, high level of measurement detail for all goals	Yes, mostly qualitative in nature	Low level of details	Not at all
b. Do the qualitative and/or quantitative dimensions have specific means of measurement?	Yes to almost all goals	Yes, about half of the goals	Only a few	Not at all
7. Do the goals meet or exceed existing and future regulations?	Yes, goals completely address regulations	Yes, goals address some regulations	Only minimally address regulations	Do not address any regulations
8. Stakeholder Involvement				
a. Are internal stakeholders involved in development of the goals?	Yes, extensively	Yes, moderately	Yes, minimally	Not at all
b. Are external stakeholders involved in development of the goals?	Yes, extensively	Yes, moderately	Yes, minimally	Not at all
c. Do these goals adequately consider customer and other stakeholder expectations?	Customer and stakeholder expectations explicitly considered in goals	Customer or stakeholder expectations generally considered for goals	Customers and stakeholders marginally considered in goals	No consideration at all
9. Is there a process for periodic revision and improvement of the goals?	Yes	In development		No

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Worksheet D: SWP Action Plans

	High	Medium	Low	None
Goals and Vision				
1a. Does the action plan incorporate the community's vision?	Yes, all aspects	Yes, some aspects		No
1b. Is each of the established SWP goals supported by potential projects and/or activities?	All are covered	Many are covered	Some are covered	None are covered
Essential Components				
2a. Address existing contaminant sources	All sources identified in characterization	Key/most risky sources identified in characterization	In progress	No
2b. Address sensitive areas	Yes, all	Yes, some		No
2c. Consider effectiveness of actions (BMPs) for key contaminants	Yes, all	Yes, some		No
2d. Involve stakeholders	Yes, stakeholders involved in planning and public comments incorporated	Yes, stakeholders involved in development of key actions	Yes, public comment solicited	No
Prioritization and Planning				
3a. Are potential projects and/or activities prioritized on the basis of <ul style="list-style-type: none"> • Relative risk from pollutant sources, • Buy-in from stakeholders, • Staff and resource commitment needed, • Budget and finances, • Expertise, • Time commitments needed to accomplish, • Political support and feasibility, • Likely effectiveness, and • Short-term vs. long-term actions? 	All topics are prioritized	Many are prioritized	Some are prioritized	None are prioritized
3b. Have work plans (including scope, budget, required resources, responsibilities, and implementation schedule) been developed for the projects?	Yes, all work plans have been developed	Most work plans have been developed	A few work plans have been developed	None have been developed
4. Are funding mechanisms in place to support the various potential projects and/or activities?	Yes, funding is in place for all the high-priority projects/activities	Some funding is in place for some of the high-priority projects/activities	Minimal funding is in place for a small number of the high-priority projects/activities	No funding is in place
5. Is a timetable laid out for implementation of each step of the action plan?	Yes, a complete timetable is laid out	A timetable is laid out for most steps	A timetable is laid out for a few steps	No
6. Have potential problems and obstacles been identified to the extent feasible?	Yes, a comprehensive list of potential problems and obstacles has been identified	Most potential problems and obstacles have been identified	A few potential problems and obstacles have been identified	No

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Worksheet E: Program Implementation

	High	Medium	Low	None
1. Milestones and Achievements				
a. Are the high-priority projects completed or in process?	Yes, all	Yes, most	Yes, some	No
b. Have project milestones been achieved on time?	Yes, all	Yes, most	Yes, some	None
c. Are projects achieving their objectives as outlined in the action plan?	Yes, all	Yes, most	Yes, some	No projects achieved plan requirements
d. Were all components of the plan implemented?	Yes, all components were implemented	Most components were implemented	Some components were implemented	No components were implemented
2. Roles and Responsibilities				
a. Were there changes of responsibilities or roles of utility personnel during implementation?	Yes, and implementation was improved		Yes, and process was slowed	
b. Was there continued support or participation throughout plan implementation by stakeholder partners?	Yes, throughout the whole implementation process and by all partners	Yes, during most of the implementation and by most partners	Yes, during some of the implementation and by some partners	No support from partners during any part of implementation
3. If obstacles to successful implementation of the action plan have been encountered, have means for surmounting those obstacles or other means of reaching the objectives been identified?				
	Yes, for all obstacles	Yes, for most obstacles	Yes, for some obstacles	No
4. Were there any funding changes during implementation of the project?				
	Yes, funding changes supplemented implementation	No, projects proceeded as planned	Yes, and changes impeded implementation	
5. Is there a process for contingency planning and periodic revision and improvement of the program implementation tasks?				
	Yes, a comprehensive process is in place	A process is in development		No

AWWA SWP Standard – Operational Guide

Worksheet F: Program Evaluation and Revision

	High	Medium	Low	None
1. Review Process				
a. Is there an established process for evaluating the SWP program, including the vision, source characterization, goals, work plans, and implementation steps?	Yes			No
b. Is there an established process for revising the SWP program based on the results of the evaluation?	Yes			No
c. Is a process in place to identify and assess emerging issues and changing land use practices and incorporate them into the program?	Yes, a comprehensive process is in place	A process is under development	No	
2. Roles and Responsibilities				
a. Has the party responsible for evaluating the SWP program been named?	Yes			No
b. Does the committee or group of individuals include a broad spectrum of stakeholders?	Yes			No
3. Is there an established timeline and/or other criteria for determining when to conduct evaluations of the program?	Yes, for the entire process	Yes, for most of the process	Yes, for some of the process	No
4. Have benchmarks against which to gauge program progress been established?				
a. For land use assessment?	Yes No			
b. For water quality monitoring?	Yes No	Yes, for all aspects of the program	Yes, for some aspects of the program	No
c. For biological/habitat monitoring?	Yes No			
d. For community and stakeholder communications?	Yes No			
e. Based on benchmarks, is there a need for additional source water area characterization (data, monitoring, measures, stakeholders)?	Yes, and all additional data have been collected	Yes, and most additional data have been collected	Yes, and some additional data have been collected	
f. How does the performance of the various projects measure against their established targets or goals?	Performance for all projects matches targets/goals	Performance for most projects matches targets/goals	Performance for some projects matches targets/goals	Performance for no projects matches targets/goals
5. Is the SWP program evaluation and modification reported to internal and external stakeholders and the governing board?	Yes, a comprehensive evaluation report is given	A partial evaluation report is given		No

AWWA SWP Standard – Operational Guide

- Case Studies
 - Central Arkansas Water, Little Rock, AR
 - Southwest Connecticut and Groton Utilities, Groton, CT
 - Madison Water Utilities, Madison, WI
 - Philadelphia Water Department, Philadelphia, PA

AWWA SWP Standard – Implementation

- Stage 1 - Self assessments by utilities
 - Evaluation using worksheet in the guidebook
 - Help utilities prioritize activities
- Stage 2 - Desktop assessments by peer reviewers
 - Successful evaluation would be recognized at the section level
- Stage 3 – On-site assessment by peer reviewers with at least one independent outside reviewer (from another utility and without conflict of interest)
 - Successful evaluation would be recognized at the national level.

AWWA SWP Standard – Implementation

- The peer reviewer(s) will be trained by the author(s) of the G300 Standard Operational Guide at workshops hosted by AWWA sections
- The trainers will conduct the training on a voluntary basis. Travel expenses for the trainers will be reimbursed by the AWWA sections.
- The peer reviewer(s) will conduct the evaluations on a voluntary basis. In case of on-site assessments, travel expenses for the peer reviewers will be reimbursed by the water utilities.



AWWA Exemplary Source Water Protection Award

- **Purpose of the Award:** To recognize organizations in North America who have developed and are implementing exemplary source water protection programs.
- **Frequency of the Award:** Yearly, up to three awards, with the intent to distribute to organizations representing different water system size classifications based on the population served.
- **Eligibility:** Any organization or drinking water system that performs source water protection for drinking water supplies in North America is eligible to apply for the award.
- **Selection Criteria for the Award:** The award will be based on the criteria set forth in the AWWA Standard G300 for SWP.

AWWA Exemplary Source Water Protection Award

- 2010:
Small System: Remsen Municipal Utilities, IA
Medium system: Seelyville Water Works, IN
Large system: Massachusetts Department of Conservation and Recreation (associated with the Massachusetts Water Resources Authority)
- 2009:
Medium System: City of Big Rapid, MI
Large System: Louisville Water Company (ground water) and Metropolitan Water District of Salt Lake and Sandy District, UT (surface water)



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For Additional Information or Questions Contact:

Chi Ho Sham
The Cadmus Group, Inc.
(617) 673-7156
ChiHo.Sham@cadmusgroup.com