

FEBRUARY 23, 2010
COLORADO PUBLIC WATER SYSTEM
TRAINING ROUNDTABLE



SUMMARY REPORT



Colorado Department
of Public Health
and Environment

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1.0 Introduction

This report contains the findings from a meeting of a diverse group of Colorado businesses, agencies, schools, and nonprofit organizations that provide training services and assistance to public water systems. This “Colorado Public Water System Training Roundtable” was convened on February 23, 2010 by the Capacity Building Unit (CBU) of the Safe Drinking Water Program at the Colorado Department of Public Health and Environment (CDPHE).

The purpose of CBU is to provide training, technical assistance, and management support services to public water systems so they can strengthen their ability to supply safe drinking water to the public. In this function, CBU directly provides services to public water system professionals, and utilizes set-aside funds from the Drinking Water State Revolving Fund (SRF) and other EPA grants to retain contractors to provide additional services. We take our stewardship of these resources very seriously and we are increasingly using data to support our decisions on priorities, especially for training services. It is important to us that our decisions are transparent and that training priorities are well-defined and well-communicated.

Each organization invited to participate in the roundtable is guided by its own unique mission and goals, and may be supported by a variety of funding sources. While CBU supports a large portion of the training and assistance available to public water systems in Colorado, the full scope of available training has not always been well understood or documented, and gaps in the training spectrum have not been clearly identified.

The Training Roundtable was convened to engender discussion among the diverse participants in order to:

- review and evaluate common compliance weaknesses at public water systems,
- build consensus on identified gaps in existing training services, and
- propose steps for developing a more cohesive, organized, and strategically aligned training and assistance network.

1.1 Background

Colorado is home to over 2,000 public water systems, each of which is subject to the requirements of the *Colorado Primary Drinking Water Regulations* and other state regulations requiring certification of system operators. Regulations cover all aspects of the delivery of safe drinking water to the public, including proper design of physical infrastructure, water quality monitoring and reporting, and training and certification of personnel responsible for facility operations.

Safe drinking water doesn’t happen without a well-trained workforce. To strengthen the ability of public water systems to supply safe drinking water to the public and comply with regulations, specialized training services are supported statewide. In Summer 2009, CBU initiated a four-phase project to evaluate existing training services in Colorado, including identifying gaps between water system training needs and available training services in Colorado. The overarching goals of this work have been to

ensure that the best training services are offered and that resources are utilized as effectively and efficiently as possible.

This four-phase project was designed to:

- Conduct a study of the most common failures at Colorado’s public water systems and identify their root causes;
- Establish a baseline and preliminary gap analysis of existing training and technical assistance services for public water systems;
- Convene a Training Roundtable to review and evaluate common compliance weaknesses at public water systems, build consensus on identified gaps in existing training services, and propose steps for developing a more cohesive, organized, and strategically aligned training and assistance network; and
- Apply project results to develop a five-year strategic plan for CBU training services.

Under the first phase of this project, the CBU prepared the *Failure and Root Cause Analysis Project Final Report*¹ which analyzed trends in public water system failures over a three year period. The second phase resulted in the *2009 Baseline Assessment Report on the Status of Public Water System Training Opportunities in Colorado*², which provides a summary and evaluation of what operators need to know, current training offerings, compliance weaknesses at public water systems, and potential opportunities for training program improvement.

This report on the *February 23, 2010 Colorado Public Water System Training Roundtable* provides a summary of the third phase of this project.

1.2 Report Overview

This report was developed to provide comprehensive documentation of the process utilized, data collected, and ultimate findings from the Training Roundtable, and contains the following sections:

- Training Roundtable Methodology
- Data Analysis
- Summary and Conclusions

The content of this report, along with the *Failure and Root Cause Analysis Project Final Report* and the *2009 Baseline Assessment Report on the Status of Public Water System Training Opportunities in Colorado* will be used to develop a five-year strategic plan for CBU training services for Colorado.

¹ Oxenford, Jeff and Williams, Sharon Israel, Capacity Building Unit, Safe Drinking Water Program. September 2009. *Failure and Root Cause Analysis Final Report*.

² Griffin, Margo and Williams, Sharon Israel, Capacity Building Unit, Safe Drinking Water Program. January 2010. *2009 Baseline Assessment Report on the Status of Public Water System Training Opportunities in Colorado*.

2.0 Training Roundtable Methodology

The Training Roundtable brought together over 40 representatives of businesses, agencies, schools, and nonprofit organizations that provide training and assistance to Colorado’s public water systems. The three goals for the day-long event were: to review and evaluate common compliance weaknesses at public water systems, to build consensus on identified gaps in existing training services, and to propose steps for developing a more cohesive, organized, and strategically aligned training and assistance network. Through a series of carefully facilitated presentations, discussions, and brainstorming exercises, the Training Roundtable participants provided ideas and recommendations to enhance Colorado’s public water system training program and support CBU’s five-year strategic planning efforts.

CBU kicked-off the Training Roundtable with a presentation on the *Failure and Root Cause Analysis Final Report and 2009 Baseline Assessment Report on the Status of Public Water System Training Opportunities in Colorado*. This presentation emphasized the shared goals of the training community and provided a common foundation for pursuing training program improvements.



Following the CBU presentation, participants were led by an expert in group facilitation techniques for the remainder of the day’s activities. Training Roundtable participants worked in five teams of eight participants to complete a series of brainstorming activities, using flipcharts and stickies to organize and document their results. The specific brainstorming methodologies employed during the Training Roundtable are described below. A complete list of the Training Roundtable participants is provided in Attachment A.

2.1 SWOT Analysis of the Training Community

The first exercise of the Training Roundtable employed a strategic planning tool called a “SWOT Analysis.” SWOT stands for *strengths, weaknesses, opportunities, and threats*, where strengths and weaknesses are internal factors and opportunities and threats are external factors. Working in teams, the Training Roundtable participants developed responses to the following questions regarding the current status of the Colorado public water system training program:

- What is the training community doing well? (Strengths)
- What areas cause frustration? (Weaknesses)
- What opportunities for improvement exist? (Opportunities)
- What impedes your ability to achieve your training goals? (Threats)

2.2 Filling the Gaps

The second exercise employed a strategic planning tool called the “Japanese Five Hows.” The *five whys and five hows* constitute a questioning process designed to drill down into a problem and develop the details of a solution. This technique was originally developed by Sakichi Toyoda, the founder of Toyota

Industries Co. Ltd., often referred to as the father of the Japanese industrial revolution. Each Training Roundtable team was asked to select one of the strengths, weaknesses, opportunities, or threats identified in the previous exercise, and use flipcharts and stickies to brainstorm the following question:

- How can the selected strength, weakness, opportunity, or threat be addressed?

2.3 Brainstorming – Empowering Water System Operators

During the Training Roundtable event, several participants voiced a concern that water system operators need to feel more “empowered” in order to take full-advantage of training opportunities. These participants reasoned that there is little value in building a better training program if operators don’t feel passionate about their jobs and motivated to advance their job skills and careers. After some discussion, the Training Roundtable participants engaged in a brainstorming activity designed to generate a large number of ideas for empowering operators. The brainstorming technique used for this exercise was popularized in 1953 by Alex Faickney Osborn, an advertising manager and author, and includes the following four ground rules: focus on quantity, withhold criticism, welcome unusual ideas, and combine and improve ideas. Each Training Roundtable team responded to the following question:

- How can we empower water system operators?

2.4 Brainstorming – Roles and Responsibilities

The final brainstorming exercise of the Training Roundtable employed the same open-brainstorming technique described above. This time, each team addressed the following questions:

- What role should CBU fill?
- What role should the training community fill?
- How can we all improve communication and coordination?

2.5 Data Collection

During each brainstorming session, the Training Roundtable participants used flipcharts and stickies to organize and document their results. A complete list of each and every comment or idea collected on flipcharts or stickies during the Training Roundtable is provided in Attachment B. An analysis of the most common themes that emerged through the Training Roundtable is provided in Section 3.0.

3.0 Data Analysis

Following the February 23, 2010 event, CBU staff compiled and analyzed the results of the day's exercises. Each idea captured on a flipchart or sticky note was reviewed and thoughtfully organized. Overall, the results of the Training Roundtable showed participants' broad support for increased statewide leadership and training coordination. This important finding underscores the role that CBU has currently and will be able to leverage in organizing training services statewide in the future.



This section identifies and provides an analysis of six major themes that emerged during the Training Roundtable that can guide future planning for CBU training services. These findings should inform priorities established in future planning efforts.

3.1 Establishing “Need-to-Know” Criteria

The Training Roundtable participants voiced a common interest in better defining “Need-to-Know” criteria for water system operators, board members, and managers, and then ensuring all subjects are covered in available training. Comments associated with defining “Need-to-Know” criteria included, but were not limited to:

- Develop management “Need-to-Know”
- Determine consistent training goals/guidelines
- Define top training needs
- Coordinate to ensure all topics are covered
- Subjects discussed without explanation as to “why”
- Teach boards/managers/owners why the regulation is necessary, how it benefits public health
- Too much treatment focus, not enough basic operations
- Not addressing the target audience
- Basic math and communication skills
- Provide a variety of courses in different topics
- Provide trainings that are applicable to all levels of certification (A-D)
- Require management/board training

As described in the *2009 Baseline Assessment Report on the Status of Public Water System Training Opportunities in Colorado*, both Colorado Environmental Certification and Testing Incorporated (CECTI) and the Colorado Water Distribution and Wastewater Collection Systems Certification Council (Certification Council) have developed state-specific “Need-to-Know” criteria. This state-specific set of criteria, along with criteria maintained by the Association of Boards of Certification, is used to select relevant and appropriate test questions for inclusion on Colorado’s operator certification exams and for review and approval of training units.

While the existing Need-to-Know criteria are effective for use in supporting examinations and approving proposed training, they do not influence, either to encourage, discourage, or otherwise direct, the development of training content to meet the needs of the operator community where there is an unmet need due to lack of available training.

Based on comments received during the Training Roundtable, the CBU has an opportunity to enhance the public water system training program by leading or supporting an effort to leverage existing or new “Need-to-Know” criteria for operator, board members, and managers when developing and supporting training services. Using these criteria, new training courses could be developed or promoted where existing courses are inadequate to cover fundamentals or specialty knowledge areas.

3.2 Defining a Core Curriculum and Creating a Training Roadmap

A second common theme that emerged during the Training Roundtable was the need for a defined core-curriculum (or recommended set of courses) that aligns with the “Need-to-Know” criteria and a *training roadmap* to guide operators, board members, and managers through the recommended course work. Comments regarding a core curriculum and training roadmap included, but were not limited to:

- No roadmap towards needed education level
- Develop an orientation curriculum (entry point)
- Setup multi-tiered training programs beginning with workplace skills
- Core curriculum to be “shared”
- Review and confirm curriculum content
- Training curriculum oversight
- Develop training curriculum
- Review and confirm curriculum content
- Develop curriculum based on the “take home” message vs. in course message
- Develop course curriculum for many instructors to use
- More coordinated training courses – experts for certain topics
- Create a foundation of required course work (with requirements, rigor, and outcomes)

Based on comments received during the Training Roundtable, CBU has an opportunity to enhance the public water system training program by leading or supporting an effort to develop a core curriculum and an associated training roadmap for operators, board members, and managers. The training roadmap could be used as a tool to direct learners to the core courses that will best meet their educational needs at each level of operator certification or management experience and responsibility.

3.3 Setting Standards for High-Quality Courses -- and Building a Clearinghouse of Courses that Meet these Standards

The Training Roundtable participants voiced a need to develop and implement “standards” for high quality training, and to make high-quality course curricula and materials known and accessible to

potential trainers. Comments regarding developing and maintaining quality training included, but were not limited to:

- Lack of ownership of who decides what quality training is
- Set standards/goals
- Inconsistent quality of training
- Info dumping does not equal skill building
- Teach more hands-on classes
- A lot of “poor” training out there
- List of recommended resources for managers, operators - clearinghouse
- Create training clearinghouse that is current/maintained and identifies/satisfies industry need
- Blended learning (on-line, classroom, and hands-on)
- Provide emerging technology information and training
- Utilize adult learning techniques and advanced technology to deliver training
- Encourage learner participation during training using hands-on activities
- No more small print power point charts! Prepare classes from student’s perspective
- Somehow foster critical thinking
- Be interactive
- Develop hands-on or scenario-based training
- Make trainings that are interactive and hands-on
- Include “ethics” in the courses
- Develop course objectives and measurement of effectiveness
- Develop and provide the training material - that being specific to audience
- Developing training that is skill based
- Review curriculum and recommend exemplar media
- Create training clearinghouse that is current/maintained and identifies/satisfies industry need
- Forced content tends to follow the strengths of the instructor
- Lack of training for boards, city council, managers, decision makers
- Not enough hands-on opportunities

Based on these comments, the CBU has an opportunity to enhance public water system training by leading or supporting an effort to set standards for high-quality training and maintain quality training materials. This effort may include reviewing courses for required content, relevant materials, and excellent instructional design, and developing a “clearinghouse” for approved or recognized courses. Training modules and materials could be maintained in a centralized location and made available to approved trainers.

3.4 Developing and Supporting Excellent Instructors

The Training Roundtable participants voiced a need for developing and supporting excellent instructors. Comments included, but were not limited to:

- Develop a list of qualified trainers for specific topics for systems to call
- Take advantage of retirees
- Leverage retirees
- Recruiting new (younger) operators to the career path (Training of the Trainers)
- Volunteers – take advantage of their expertise
- Trainers that are passionate and qualified
- Teams of master operators mentor in area
- Train the trainers
- Seek out new/younger ops as trainers
- Offer “Train the Trainer” certification to increase the number of qualified operators willing to teach
- Use pro’s to at least augment if not instruct

Based on these comments, CBU has an opportunity to enhance public water system training by leading or supporting an effort to recruit new instructors, and support and train both new and existing instructors in this field. This effort may include developing a mentor program with willing utilities and/or retirees; better leveraging contractor support, school systems, and non-profit organizations to provide training; and supporting and empowering trainers by providing “train the trainer” courses on adult learning theory or specific technical, managerial, or financial topic areas.

3.5 Coordinating Training Offerings and Schedules

The Training Roundtable participants indicated a need for coordinating statewide training offerings in terms of content, location, and timing. Several participants suggested developing and maintaining a common webpage and/or training catalog to document, track, and schedule training offerings. Comments on coordinating training offerings included, but were not limited to:

- Accessibility for remote operators
- Taking training to rural areas for point of delivery (both through lectures, hands-on)
- Lack of centralized catalog
- Publish a training catalog – even publish on website
- Coordinate with each other to avoid duplication of services
- Coordinate statewide training efforts
- Coordinate training resources to minimize duplication
- Coordinate so that all locations are covered
- Coordinate to ensure all topics are covered
- Training curriculum oversight
- Training Catalog

- Maintain database of training opportunities
- Communicate to ensure comprehensive training available
- Provide a variety of courses in different topics
- Be willing to take training to non-metro areas
- Cooperate with other training agencies to avoid redundancy and/or exclusions
- Collaborate with each other to develop a single training resource schedule or catalog
- Maintain a data-bank of TUs and a common calendar of training events
- Collaboratively work to fill the gaps of training needs
- Common training catalog
- Better list of training that's offered
- Training calendar

Based on these comments, CBU has an opportunity to enhance public water system training by leading or supporting an effort to coordinate training offerings in terms of content, location, and timing. This could include identifying underserved areas and promoting training specifically to target those regions of the state. This effort may also include a management or administrative role in tracking and scheduling statewide training courses, developing and maintaining a training community web page, and/or developing and distributing a training catalog.

3.6 Cultivating a Supportive Training Environment

In addition to the five major themes outlined above, the Training Roundtable participants identified important ancillary elements of a successful training program including:

- Coordination among the training community,
- Public outreach and education, and
- Operator empowerment and recognition.

Each of these elements could complement the core training program. According to the Roundtable Participants, training community coordination may involve future Roundtable meetings, improved communication regarding planning and scheduling training efforts, and common “buy-in” to a centralized training program. Community outreach and education may involve the creative use of media or community events to increase awareness of the importance of our water system operators. Operator empowerment and recognition may range from communicating a “simple thanks” to more elaborate recognition and career development programs. CBU recognizes its ongoing role in supporting these efforts.

4.0 Summary and Conclusions

A well-trained workforce is essential for the sustainable supply of safe drinking water to the public. To strengthen the ability of public water systems to supply safe drinking water and comply with regulations, the Capacity Building Unit (CBU) of the Colorado Safe Drinking Water Program supports specialized training services statewide. In Summer 2009, CBU initiated a four-phase project to evaluate existing training services in Colorado, including identifying gaps between water system training needs and available training services. The overarching goals of this work have been to ensure that the best training services are offered and that resources are utilized as effectively and efficiently as possible.

This four-phase project was designed to:

- Conduct a study of the most common failures at Colorado’s public water systems and identify their root causes;
- Establish a baseline and preliminary gap analysis of existing training and technical assistance services for public water systems;
- Convene a Training Roundtable to review and evaluate common compliance weaknesses at public water systems, build consensus on identified gaps in existing training services, and propose steps for developing a more cohesive, organized, and strategically aligned training and assistance network; and
- Apply project results to develop a five-year strategic plan for CBU training services.

CBU completed the first phase of this project in September 2009, and the second phase in January 2010. The *Colorado Public Water System Training Roundtable* under the third phase of this project was convened on February 23, 2010. The development of this report concludes the third phase.

Through the Training Roundtable, CBU gained valuable ideas, feedback and information from over 40 representatives of businesses, agencies, schools, and nonprofit organizations that provide training and assistance to Colorado’s public water systems. The findings complement earlier work to analyze related data, and together they form a body of knowledge that will be used as a foundation for future planning.

Overall, the results of the Training Roundtable showed participants’ broad support for increased statewide leadership and training coordination. This important finding underscores the role that CBU has currently and will be able to leverage in organizing training services statewide in the future.

Collectively, recommendations from Training Roundtable participants were categorized into six overarching themes:

- Establishing “Need-to-Know” Criteria,
- Defining a Core Curriculum and Creating a Training Roadmap,
- Setting Standards for High-Quality Courses -- and Building a Clearinghouse of Courses that meet these Standards,
- Developing and Supporting Excellent Instructors,

- Coordinating Training Offerings and Schedules, and
- Cultivating a Supportive Training Environment.

Each of these themes has a place in CBU's strategic planning efforts to support and provide training services over the next five years. Preliminary work has already resulted in a proposed 2015 Training Model which will be applied to future training. The model will include four elements: established curriculum, excellent instructional design, relevant material, and outstanding instructors. We are also already pursuing increased coordination for training offerings and working to support the training environment.

As we conclude this third phase of a four-phase project, we look forward to a future with fewer acute system failures, compliance violations, and system deficiencies, and a stronger operator workforce in Colorado. We sincerely thank all the Training Roundtable participants for sharing their vision, passion, and experience with us during the Training Roundtable event, and for their ongoing dedication and commitment to providing safe drinking water and improving public water system training in Colorado.

Attachment A: Public Water System Training Roundtable Participants

Public Water System Training Roundtable Participants

Public Water System Training Roundtable

“SHARED VISION”

February 23, 2010

Participants

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Public Water System Training Roundtable

“SHARED VISION”

February 23, 2010

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Jim Medlock

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Attachment B: Public Water System Training Roundtable Results

Public Water System Training Roundtable Results

Public Water System Training Roundtable Results

This appendix provides the results of the brainstorming activities conducted during the Training Roundtable. *Each and every* comment or idea collected on flipcharts or stickies during the Training Roundtable is listed herein, resulting in the duplication of data and the emergence of many common themes. The topic “categories” presented in the section also reflect the topic categories developed by the brainstorming teams; however, many categories presented in this sections have been merged to simplify data review and analysis.

B.1 SWOT Analysis of the Training Community

The first brainstorming exercise of the Training Roundtable involved a “Strengths, Weaknesses, Opportunities, and Threats” or “SWOT” analysis of the Training Community. The results for all five brainstorming teams are combined by topic below.

➤ **Strengths –What is the training community doing well?**

- Variety of different programs
- Variety of organizations giving training
- School’s formality
- Community college programs
- Online training
- Courses moderately priced
- Many classes offered in different places
- Mobile Training Units
- Future distribution training fields
- High school – hands on training
- State Health – Ensuring that communities comply (coaches)
- Scholarships to ww/w school
- State taking the leadership role
- Work force development
- Strong programs in metro areas (CO Springs – Fort Collins)
- Quality training provided by qualified operators (peer to peer)
- The number of currently certified operators
- Coordinated clearing house for Training programs
- We have several profits and non-profits that deliver quality training
- The addition of on-line training as one option (self-paced)
- Strength of base education system (community colleges)
- Diversity of Training Topics
- Better study materials

- Active professional organizations (partnerships)
- Better funding
- Standardized, validated testing
- Obtaining certification compliance
- Broad range of courses available
- Attempting to provide training at multiple locations across the State
- TU approval process user friendly
- Self examination process (today) is good
- Several options, types of training (i.e., internet, classroom, online)
- Ongoing technical support
- Safety training
- Emergency response
- Flexibility
- Universe of trainers (“community”)
- Technology
- Opportunities via OCPO database
- Knowledge – “Super Human” efforts by instructors
- Foundation – Infrastructure – Some “Need to Know Criteria”
- Spots of innovation
- Commitment to training by CDPHE
- Passion to develop

➤ **Weaknesses –What areas cause frustration?**

- One operator systems hard to access training events
- Training budget being cut
- Get into the field without the basics
- Not addressing the target audience
- Smaller systems suffer (lack of resources)
- Subjects discussed without explanation as to “why”
- Certification process re-examined
- Operator literacy
- Management Training
- Educating the Board
- Informing the public that water distribution/treatment exist
- Not meeting the total array of needs that operators must have
- Geography – Not enough opportunity for training once you get out to the rural – Sustainability of training in rural
- Forced content tends to follow the strengths of the instructor
- In some cases, people look at it as a job not as a career (critical thinking)

- No. of scheduled exams/year
- Accessibility for remote operators
- Not enough hands-on
- Too much treatment focus, not enough basic operations
- Inconsistent quality of training
- Dwindling funds to send operators to training
- Training is low priority for boards, owners, managers (financial, asset management)
- No incentive for board/owner training (no requirement)
- Lack of motivation to go beyond bare minimum (or to fix the broken windows)
- Lack of understanding
- Bad systems get best financial rewards
- Lack of administrative/management support
- Certification knowledge vs. operator required knowledge
- Lack of data demonstrating efficiency of training
- Board and Manager training on system sustainability and asset management
- Application of training
- Training is first to be cut in tough economic times
- Instilling a culture of passionate operators/excellence
- Lack of incentive to improve
- Access to funding
- Info dumping does not equal skill building
- Accessibility: Cost, location, and time
- Operator commitment to get training – public officials
- Trainers – Need to be better organized with TU approval
- TU motivated (pluses and minuses)
- No roadmap towards needed education level
- Lack of administrative and management training for public officials
- Training does not meet industry failures and violations

➤ **Opportunities –What opportunities for improvement exist?**

- Require management/Board Training
- Reimbursement for small systems training
- Mentoring program - tried in the past (unsuccessful)
- Provide utility networking
- Hands –on training – getting into the plants, know your audience
- Self assessment – How to know where you are in your level of knowledge, how to get where you want
- Lack of ownership of who decides what quality training is
- Large classes need to be available to all

- Specific, consistent training
- Everyone should be certified (mechanics, distribution workers)
- Take advantage of retirees
- Leverage retirees
- There will be electronic exams available
- Recruiting new (younger) operators to the career path (Training of the Trainers)
- Financial – EPA & State has \$\$ to provide training
- Taking training to rural areas for point of delivery (both through lectures, hands-on)
- Communication between Regulators & Educators (portal, calendar)
- Use enforcement /advisory as opportunity to promote TMF and other trainings
- Teach boards/managers/owners why the regulation is necessary, how it benefits public health
- Teach more hands-on classes
- Teach importance of distribution system to WQ
- Asset management, planning
- Cross training w/other public works staff to recognize potential problems
- Recognizing excellence in systems, operators
- Using outside resources to their best advantage
- Volunteers – take advantage of their expertise
- Board and Manager Training - State Mandated
- Develop management “Need-to-Know”
- Expand focus on training
- Plant maintenance training
- Self Assessment training
- Opportunities to share institutional knowledge
- Data interpretation and management
- Tenacity
- Statewide training committee, group, or council with common mission
- Blended learning (on-line, classroom, and hands-on)
- Common scheduling
- Remote training opportunities
- Link operator weaknesses to training schedules – Use sanitary surveys
- Develop an orientation curriculum (entry point)

➤ **Threats –What impedes your ability to achieve your training goals?**

- Staffing – Having the opportunity to leave to train
- Time
- Money

- Dollars
- Politics
- Proximity
- Encourage quality training as early as possible
- No consistency in required training
- A lot of “poor” training out there
- Poor information
- Trainers not certified -- feedback staying with them
- Vendors pushing products vs. education
- Operators retiring – capturing that valuable info
- Management not allowing utilities to train
- Lack of knowledge of regulations
- \$\$ to the right place with minimal “red tape”
- Recruiting younger people attracted to the field depending on rural vs. urban (also how much do we compensate them)
- Lack of training for boards, city council, managers, decision makers
- CIRSA not aware of liabilities (insurers)
- Consumer education
- Employer allowing employees time to instruct
- Not enough hands-on opportunities
- Geographic accessibility
- Support from utility senior management or city officials (\$) (encompasses time and money)
- Lack of centralized catalog
- Personnel shortages
- Trainers that are passionate and qualified
- Size/economy of scale training dollars
- Complexity of industry
- Multiple hats of operators at small systems
- Management of new regulations
- Lack of access to emerging technology
- Complacency of management
- Lack of resources – time and money
- Lack of support from Boards and Managers
- Operation/training schedule conflict
- Basic math and communication skills

B.2 Filling the Gaps

Once the strengths, weaknesses, opportunities, and threats perceived by the Training Community were identified, a brainstorming activity referred to as the “Japanese Five How’s” was used to identify tangible steps to address one “top issue” identified by each team. This exercise involves asking “How?” repeatedly until specific, manageable, attainable, realistic, and time-specific or “SMART” tasks are defined to address each top issue. The top issues selected by Training Roundtable participants for further evaluation are as follows:

- A. How to take training to rural areas,
- B. How to increase training accessibility for remote operators,
- C. How to leverage retirees,
- D. How to expand training from certification-based to overall system operation, and
- E. How to develop a comprehensive training program with blended instruction (i.e., on-line, classroom, and hands-on).

The individual team results for each “Five How” analysis are provided below.

A. How to Take Training to Rural Areas:

1) Peer to peer training

➤ How?

- Identify what’s not working
- Clearinghouse for coordination
 - How?
 - Referrals from the State
- Facilitate interaction between stakeholders
 - How?
 - Communication from CDPHE
 - Timeline for activities

2) Mobile Capabilities

➤ How?

- Inventory of existing resources
- Equipping labs and curriculum appropriately
 - How?
 - Knowing the audience (what they need)
 - Assessing trainer needs
- How to cover expenses?
 - How?
 - Identify funding resources
 - Arranging flexible delivery and use of \$\$

- 3) On-site Training using their facility
- 4) On-line distance education
- 5) Leveraging existing resources

B. How to Increase Training Accessibility for Remote Operators:

- 1) Take training to remote areas
 - How?
 - Mobile
 - How?
 - Fleet of mobile labs
 - How
 - Survey topics, do data collection
- 2) Use technology
 - How?
 - Webinars, CDs, DVDs, downloads, online classes
 - How?
 - Schedule curriculum development logistics, coverage (manpower)
- 3) Scholarships
 - How?
 - Apply funding source to priority recipients
 - How?
 - Screening compliance data
- 4) Group schedule
 - How?
 - Identify a central location and group members
 - How?
 - Target marketing to potential group
- 5) Shift coverage (man power)
 - How?
 - Intergovernmental Agreement (IGAs), Memorandums of Understanding (MOUs)
 - How?
 - Standard operating procedures (SOPs)

C. How to Leverage Retirees:

- 1) Instruct training classes
 - How?
 - who's available
 - How?

- Statewide list with expertise
 - Contract work to retirees
 - source of funding
 - liability
 - make it easy
 - How?
 - Reimbursement for small systems
- 2) Perform work at utilities part-time
 - How?
 - who knows what
 - SME's
 - Availability/Capability
 - How?
 - Entity to own/authorize
 - System to find availability
 - As-needed basis (substitute teacher model?)
- 3) Expert Testimony
- 4) Mentoring

D. How to Expand Training From Certification-Based to Overall System Operation:

- 1) Identify Universe of Need
 - How?
 - Review existing training and define gaps
 - How?
 - Hold Roundtable to define the universe
 - Literature search (e.g., ABC criteria), curriculum availability/criteria
 - Survey systems
 - How?
 - Mass mailing, Email, Phone
- 2) Provide Board and Manager Training

E. How to Develop a Comprehensive Training Program with Blended Instruction (i.e., On-line, Classroom, and Hands-on):

- 1) Create a foundation of required course work (with requirements, rigor, and outcomes)
 - How?
 - Students agree to pursue career track, and attends classes
 - How?
 - Student review on-line training first, then classroom-based, then more hands-on

- Offer training in a variety of locations
 - Student obtains TUS and certification
- 2) Offer on-line, classroom, and hands-on training
 - How?
 - Determine what online training already exists – build on it
 - Coordinate with utilities for classrooms and lab space
 - How?
 - Develop common goals/ address utility needs
- 3) Develop curriculum and schedule classes
 - How?
 - Determine where need it
 - Determine when to offer classes (best times)
 - Determine what to offer (topics, objectives)

B.3 Brainstorming - Empowering Water System Operators

During the Training Roundtable, several participants voiced the need for water system operators to feel more empowered. Participants argued that operators would not benefit from a high quality training program if they don't feel that their roles are meaningful and that training is important. This assessment from Training Roundtable participants lead to a focused brainstorming exercise on empowering operators. The topic categories developed by Training Roundtable participants during this brainstorming session included: Outreach/Family/Public Education and Media/Consumer Education/Community Involvement; Recognition /Empowerment/Responsibility; Awards; Image; Career Development; Management Integration; Financial Support; Compensation; Career and Professional Development; and Networking. The specific ideas for empowering operators provided on flipcharts and stickies by Training Roundtable participants are listed below.

➤ Outreach /Family, Public, and Consumer Education/Media/Community Involvement

- Public outreach using tours
- AWWA, WEF and others – Push agenda nationally and locally
- Profile issues in inserts to water bills
- Raise public profile of the water industry
- News letter informing residents of components of operator jobs
- Consumer interaction
- “How much of a hero is a fireman without water?”
- Communicate value of water to public
- Star power – TV series about a water operator
- Public outreach – let them brag
- Visiting lecturers from industry to schools
- Public education campaigns – plant tours!
- Guest articles in newspapers by operations staff (with help) or columns on industry
- Public awareness/education
- Off-site Relations/ Functions
- TV Show - Under cover boss initiative. Use utility directors from other utilities to go in and pretend to be new employee.
- Public Education – Public should know what they do and why
- TV and radio commercials on what operators do and why
- Let community know who operator is
- You Tube videos of my life as an operator – Why I love it.
- Include education bullets in consumer bills
- Educate Consumer on day in the life of an operator
- Open plants to group tours – feature recycled water bottles filled with tap water

- Public education of “How a Water System Works”
- Career day at schools
- Family time at work
- In-house, friendly competitions
- Operators allowed to mentee school groups to inspire young people in their passion
- Set up internships and mentoring programs
- Re-instate site tours and show-on-road programs to middle/high schools
- Encourage connection to community (class presentations, plant tours, publicity, articles)
- Turn water off for a day
- Ad campaigns Statewide regarding “Your operator is a professional, respect him”
- Tours of plant
- Educate community about their value (like firefighters)

➤ **Recognition/ Empowerment/Responsibility**

- Community recognition
- Have a State operator recognition program
- Make the more desirable operators “superstars”
- Recognize employees at monthly meetings
- Ask how they are and mean it.
- Introduce them, show them off
- Operator competitions; winners awarded by the utility they work with
- Town-wide notifications when excellence is reached
- Get to know them
- Public recognition
- Internal recognition
- Celebrate their successes (cert./training)
- Operator of the year awards (like firefighter awards)
- Urge them to use their professional designation on communication
- Employee recognition
- Spend five minutes with them one-on-one
- Moment of recognition
- Spend as much time reporting the good work in water plants as we spend reporting the bad
- Treat as professionals
- Recognition in local media
- Recognize achievements regularly
- Give thanks to your operator
- Publicize annual compliance report highlighting systems that do well
- Pride fuels passion, thus recognize achievement
- Issue positive press releases on awards for water systems
- Catch operators being good and award them publicly
- Buy into goals (ownership)

- Certain amount of independence to assist in buy-in
- Acknowledge their accomplishments
- If a system goes one year without a violation, CDPHE rep will show-up at Board Meeting to recognize system and operators with a plaque or certificate
- Site with Governor and legislation
- Rotary club recognition
- Newsletter
- Recognition by fire department
- Governor is operator one day each month
- Operator of the month by Governor
- Incentives for good work habits
- Ranking system – stickers on hard hats, etc.
- Employee recognition
- Evaluations
- Empower
- Specialized duties
- Involve the operator in decision making process
- Use operator feedback
- Ask them for guidance
- Ask them to lead a work task
- Empower to make decisions
- Include in key decision making (involved from start)
- Have operators take an oath which has them understand the importance of their job
- Greater decision-making authority
- Place at the table during planning
- Training opportunities
- Encourage presentations at conferences
- Ask opinion
- Encourage
- Include by name in long range planning
- Enable, empower
- Make excellence a culture
- Use as a trainer
- Ask for advice
- Know who they are
- Respect
- Operator appreciation day
- Recognition programs for operators that are accessible to all levels not just the big systems
- Post operator name in journal
- Do ceremonies to give out certificates the first time instead of just mailing them
- Recognition at or by city council
- Recognition at utility (employee of the month)

- Internal accomplishment recognition
- Operator recognition by CDPHE
- Adequate independence
- Using examples such as fireman, police recognition

➤ **Awards**

- Bonus for improvement suggested
- Gifts
- Take em' to lunch
- They're professionals – give business cards
- Excellence program – Link performance to training opportunities and rewards
- Reward outstanding operators
- Monetary rewards
- Have their ideas implemented
- Definition of excellence – cost or performance
- Excellence awards
- Rewards through merit
- Top Operator's Program
- Monetary awards
- Rewards (incentives)

➤ **Image**

- Change color of trucks
- Greater opportunity to be heard
- New vehicle
- Provide operators a uniform
- Do profiles of operators in some state publication, including profiles of small systems
- Role models
- Change perception of water's value
- PR - sell operations
- Uniforms with associated status

➤ **Management Integration**

- Required training for Boards and guidance as to job responsibilities for Boards and operators
- Employee evaluations written by both the employee and supervisor at the same time
- Meet the mayor program
- Operator for a day (for public officials)
- Asset management - show system
- Board required rate studies

- Clear idea of organization's mission
- Tools – to reduce reporting
- Give them the resources they need
- Have employer lead tour of plant for school kids
- Give operators an opportunity to discuss WTP issues at Board meetings – be heard!
- Educate Boards on how important their operators are and recognize them for a job well done
- Trade jobs one day of the year. Open trades with mayor!
- Monthly lunch with Board
- Routine meetings between manager and frontline staff

➤ **Career Development**

- Career path not a dead-end job, but possible mobility
- Focus on public health protection
- Present ideas/projects at conferences
- Management training – change culture in water systems
- Give them more responsibility
- Involve them with professional organizations
- Recognition by the industry once you've achieved a certain level (committee/write standard)
- Cross train them
- Provide training
- Mentor them
- Promote them
- Participate in school job fairs
- Provide training opportunities
- Develop strategy to highlight career importance

➤ **Financial Support**

- Pay for additional education
- Scholarship Program
- Better tuition reimbursement
- Scholarship for compliance

➤ **Compensation**

- Pay operators better in water – Operators in other industries make more!
- Pay raises
- Higher pay
- Salary
- Promotions
- Advancement

- Pay
- Compatible pay
- Promotions
- Bonuses based on percent of money saved by operational improvements
- Raise their salaries and benefits
- Improve pay
- Better compensation
- Adequate intangible compensation
- Pay them what they're worth
- Adequate salary and benefits

➤ **Career and Professional Development**

- Industry must examine its own personnel training support – before expecting community to value operators
- Mistakes (once) are learning experiences
- Illustrate how working in this field is a career path no just a job
- Setup multi-tiered training programs beginning with workplace skills
- Involve in professional societies
- Opportunities (time and pay) for additional training
- Providing of training
- Utility partnering for training, with publicity
- More community college or vocational programs
- Training
- Training
- Area training on requested concepts
- Do peer meetings – have peers do presentations for each other
- Start every training with “You are professionals...”
- Teams of master operators mentor in area

➤ **Networking**

- Exchange program with other systems – You run my system, I'll run yours

B.4 Brainstorming – Roles and Responsibilities

The final brainstorming exercise of the Training Roundtable involved an assessment of the roles and responsibilities of the CBU and the training community in developing a viable, relevant, and realistic approaches for training program improvement. Two teams of participants addressed the question “What Role Should CBU Fill?”; two teams addressed “What Role Should the Training Community Fill?”; and one team addressed “How Can We All Improve Communication and Coordination?” The specific ideas on roles and responsibilities provided by on flipcharts and stickies by Training Roundtable participants are listed below.

➤ **What Role Should CBU Fill?**

Recognition

- Excellence at a system is recognized by CDPHE, but how is the operator recognized? New idea?
- Reward/recognize great training or trainers
- Operator recognition program – present at a city council meeting – plaque, etc.
- Make commercials identifying/recognizing operator’s role in the community. Drinking water is basic to good quality of life.
- Recognize excellence
- Develop and oversee recognition programs
- Recognize systems for continued compliance

Coordination/Training Effectiveness

- Oversee and evaluate the effectiveness of training
- Determine consistent training goals/guidelines
- Publish a training catalog – even publish on website
- Organize unit dedicated to make skills training available to operators
- Develop a list of qualified trainers for specific topics for systems to call
- Utility “Craig’s List”
- Coordinate statewide training efforts
- Champion excellence work cooperatively with other assistance providers
- Implementing training ideas
- Develop statewide training strategy for water systems
- Define overall training organization requirements
- Coordinate training efforts statewide
- Identify new training techniques
- Measure training effectiveness
- Identify what training will satisfy compliance issues
- Seek input from stakeholders on training needs

- Coordinate training resources to minimize duplication
- Training curriculum oversight
- Training Catalog
- Maintain database of training opportunities
- List of recommended resources for managers, operators - clearinghouse
- Review and select instructors
- Review and confirm curriculum content
- Define top training needs
- Publicize courses – operator “grapevine” is not always efficient

Education

- Educate Boards about importance of water operators
- Train the trainers
- Focus on training of political boards

Technical Assistance

- Assist in locating/assisting systems in need of training
- Identify needs of Colorado’s systems
- Provide qualified and informed personnel to operate system while operators are participating in training
- Assess capacity needs/conditions – Annual “state of capacity” report

Public Outreach/Education

- Promote training through CDPHE media sources
- Student outreach
- Get the word out to boards, management, etc. on importance of well-trained operators
- Work with boards to promote excellence
- Help provide community outreach
- Align with AWWA and other State/National Programs (ex. Partnership)
- Coordinate with other states

Funding

- Distribute funds available to maximize training needs
- Find/identify funding for training
- Provide subsidized training to utilities on an as-needed basis
- Provide funding for small systems operator training
- Fund excellence and relevant training classes & that’s hands on
- Provide funding sources for operator and manager training
- Support communities with limited resources

Career Path Recommendations

- Recommend career path for operators
- With stakeholders, develop career path options for operators

➤ **What Role Should the Training Community Fill?**

Training

- Equip operators with tools to operate treatment plants
- Train the trainer
- Role model
- Educate the public
- Training community should increase outreach to the general public
- Assist in instilling pride, professionalism, and passion in the operators and managers being trained
- Bring training to the participants
- Provide emerging technology information and training
- Sponsor and or help with PR and community awareness campaigns
- Utilize ops s instructors
- Provide what's needed (tall order)
- Seek out new/younger ops as trainers
- Offer "Train the Trainer" certification to increase the number of qualified operators willing to teach
- Use pro's to at least augment if not instruct

Classroom Techniques

- Utilize adult learning techniques and advanced technology to deliver training
- Encourage learner participation during training using hands-on activities
- No more small print power point charts! Prepare classes from student's perspective
- Somehow foster critical thinking
- Be interactive
- Develop hands-on or scenario-based training
- Make trainings that are interactive and hands-on

Development

- Focus on fundamentals
- Training community should provide Capacity Building Unit direction or needed classes
- Develop training
- Provide trainings that are applicable to all levels of certification (A-D)
- Develop training curriculum
- State involvement (the training outreach, etc.)

- Training outreach, advertising, assistance, supply resources
- Communicate to ensure comprehensive training available
- Provide a variety of courses in different topics
- Proactive vs. reactive approach
- Include “ethics” in the courses
- Include ethics training
- Leadership in class offerings
- Recruitment of new instructors and training topics
- Training community should continue to play a role in RMSAWWA & RMWEA management
- Develop curriculum based on the “take home” message vs. in course message
- Incentive to share knowledge
- Develop course objective and measurement of effectiveness
- Develop and provide the training material - that being specific to audience
- Offer more peer mentoring programs
- Develop online tools to reach rural operator
- Developing training that is skill based
- Provide solid foundation for operators to build their careers

Assessment

- Identify and fill the need
- Provide feedback to CDPHE on changes, additions , improvements to training program
- Training community should continue to meet and operate under some structure
- Measure the success of training
- All training providers should use similar training evaluations and provide them to the State so that overall trends and results can be evaluated
- Continually assess if training is appropriate
- Review curriculum and recommend exemplar media
- Provide professional training – not someone who just knows information, but can’t teach
- Assessment of skills and competencies of people entering field
- Consult with small system ops to find out what small system ops do
- Request feedback from trainers to better identify future needs

Coordination/Collaboration

- Create training clearinghouse that is current/maintained and identifies/satisfies industry need
- Collaborate with CDPHE to identify training needs
- Communicate with the regulatory community on problem areas to address
- Be accurate and up-to-date with the regs
- Keep current on DW Regulations and how they affect the different types of water utilities
- Be aware of the necessary skills needed and train accordingly

- Standardize training competencies to improve quality
- Collaborate w/ CDPHE to identify funding sources
- Reach out to diverse stakeholders including CDPHE regarding curriculum needs
- Act as advisors to grant providers
- Be willing to take training to non-metro areas
- Develop course curriculum for many instructors to use
- Partner with utilities to provide outreach and promotion for people to enter the field
- Coordinate with each other to avoid duplication of services
- Cooperate with other training agencies to avoid redundancy and/or exclusions
- Collaborate with each other to develop a single training resource schedule or catalog
- Participate in future Roundtable discussions as necessary
- Maintain a data-bank of TUs and a common calendar of training events
- Work with colleges to allow non-credit training to be counted toward degrees
- Collaboratively work to fill the gaps of training needs
- Provide dates and venues for training
- Coordinate so that all locations are covered
- Coordinate to ensure all topics are covered
- Training community should encourage mentoring between large and small systems
- Outreach to operators, managers, public

➤ **How Can We All Improve Communication and Coordination?**

Web-Based Tools

- An on-line “Training Workroom” to post calendars, project updates
- Trainer database
- E-Newsletter w/ input from all training groups
- Common web-page
- Web page information
- Newsletter from CDPHE or OCPO as to training schedules to facilitate coordination

Meetings for Development

- Frequent meetings for development
- Roundtables
- Biennial Roundtable
- Face-to-face meetings at least annually
- Quarterly or biannual Roundtables or trainer-training conferences
- Meetings, etc.
- Regular Roundtable meetings
- Facilitate ad hoc group whose members cross agencies e.g., to address/provide input on particular topics

Develop Common Training Program

- Common training catalog
- More coordinated training courses – experts for certain topics
- Connection with the Community College system
- Set standards/goals
- Industry awareness
- Encourage trainer group interaction
- Seek input from the community on decisions re: program direction
- Better list of training that's offered
- Training calendar
- Statewide training consortium
- Core curriculum to be “shared”
- Plan training dates and locations with other trainers

Funding

- Encourage partnering on funding proposals
- Better understanding of funding