Survey of Processes, Programs and Investments Required for Implementation of Effective Technical Training and Staff Development Programs

Purpose of the Survey

One of the primary challenges of the water/wastewater industry at this time is to provide the staff development and technical training programs needed by staff in order for them to perform quality work. The purpose of this survey is to document the processes that are being used by water/wastewater utilities that are doing outstanding work in this area, as well as the investments they are making in order to develop quality programs and products. These findings will be published in a BAYWORK report, and posted to the BAYWORK website, for the benefit of the water/wastewater industry.

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1. Please provide the following information about your utility:

   a. *Please check all functions provided by your utility.*

Water	Wastewater	Power	Stormwater/ Floodwater
X	X		X

   We also provide regional services for solid waste, air quality, parks and regional land use planning.

   b. How many staff members are employed by your utility?
   ~1400

   c. Please describe how different types of training/staff development are handled in your organization, in terms of roles and responsibilities (with an organization chart to help illustrate, if possible).

   Currently there are two groups that provide safety and "business/soft" skills training. Our Corporate Safety division manages all safety training, including development, delivery (in-house or externally provided) and tracking of training (such as confined space, lockout, chemical handling, etc.

   Our Human Resources department manages all business/soft skills training, including development, delivery (in-house or externally provided) and tracking of training (such as leadership skills, project management, tendering and contracting, minute taking, interview skills, supervisory skills, etc.).

Utility technical training is managed through our Operations & Maintenance department. We have done extensive development and implementation of formal technical training and procedures development for our water treatment facilities and are currently in the process of expanding across our entire department (wastewater treatment, watersheds, water distribution, wastewater collection, quality control (labs), and maintenance).

d. If your utility has access to any communication technology that would allow for remote participation by SFPUC staff in this site visit (e.g., teleconferencing, videoconferencing, webinar, or skype), please describe.

We can do telephone conferencing. We can do NetMeeting, webinar or other screen sharing, easiest is if you host and we connect in. We are not set up for videoconferencing or skype.

2. Please describe how you prioritize the projects you work on in regards to documentation, staff development, and technical training.

   a. Who participates?
   Typically engineering staff are involved in the project management and field/plant subject matter experts are involved as much as possible in the planning, scoping, development and implementation as they typically hold the knowledge and will be the ones using the materials so must have them engaged throughout.

   b. What forms, survey, analysis, workshop, documentation, etc. are used to support the prioritization process?

   We have developed spreadsheets that we use for assessing risk (see below) and also for preparing a prioritized development plan.

   c. What criteria are used as a basis for prioritization of specific tasks or processes? (Check all that apply)

   ☐ Employee Safety

   ☐ Regulatory Compliance

   ☐ High Volume

   ☐ High Consequence of Failure

   ☐ Other (please explain):
   We have undertaken a formal risk analysis of tasks which considers the likelihood of the task going wrong (based on task complexity and probability) and potential consequences (related to health/safety, public disruption, environment and/or economic factors). We have then used these risk results to prioritize both the development of procedures and the development of technical training materials.

3. What demonstrated knowledge, skills and abilities do you look for when hiring new employees to do instructional design, development and delivery?

We currently partner with external consultants to develop our technical training materials and facilitate the development of procedures.

4. What organizational rewards (e.g., job advancement opportunities) if any are provided to staff who receive technical and/or staff development training?
   Our technical training program is not currently linked to job advancement. We are in the process of having our training materials certified for CEU credits with our provincial Operator Certification agency.

5. What type of culture change do you believe are necessary in order for training and staff development programs to support successful succession management? In your opinion, has your organization made strides toward implementing such changes, and if so, how? If your organization collects data which relates to advancement in this area, which data do you collect, and how do you measure your advancement?

   As part of our technical training program we are identifying and documenting all required job competencies. We have use the AWWA Water competency model as a starting foundation for this. Where possible, we are linking the technical training modules to competencies so that staff can assess where they are at in their development and what the gaps are for them to progress into a different role within the organization.

6. Have you incorporated regulatory compliance procedures and documentation into your operating and maintenance work order system?

   Regulatory compliance is considered throughout our training and procedures materials whether related to safety regulatory compliance (i.e. confined space documentation) or utility-related regulatory compliance (drinking water quality, environmental discharges, etc.)

7. What different formats for documentation, staff development, and training materials have you considered and used in your training programs? What have you found to be some of the pros and cons of different approaches?

Material	**Considered** *(check all that apply)*	**Used** *(check all that apply)*	**Pros**	**Cons**
Written SOPs	yes	yes	Easily accessible and updatable; consistent format	Not as easy to use/understand; takes longer than a video
Video SOPs	yes	no	Very clear and easy to use/understand	Bandwidth requirements/challenges, especially at remote sites; resource intensive to develop and edit
Online training				
Video	yes	no	Very clear and easy to use/understand	Bandwidth requirements/challenges, especially at remote sites; resource intensive to develop and edit
Interactive	yes	yes	Engaging, customized to our facilities and our target audience, easily accessible (even for shift workers) and updatable; consistent format/content; not dependent on trainer/room scheduling	Higher costs to develop and maintain than an online powerpoint
Tutorial	Yes (on how to use the online training program)	yes		
Avatar	no	no		
Materials to be used in a classroom setting				
Powerpoint	yes	yes		
Student guides	yes	yes		
Video	yes	No (although we have used videos		resource intensive to develop and edit

		from chemical and equipment suppliers)		
Other (Please Explain)				
Simulations using computer technology	yes	yes	Excellent tools for control room staff	Costs to develop and maintain
Field guides	yes	yes	Builds on theory learning to practical application (often kinesthetic learners); allows self-paced learning	
Scenario based training	yes	yes	Builds on theory learning; develops team skills, communication skills; good for explaining complex concepts and process interactions	Requires time from trainer/facilitator and trainees
Skills Demonstration Assessment Guides	yes	yes	Builds on theory learning to practical application (often kinesthetic learners)	Time from experienced staff to do field assessments
Webinars	no	no		
Skype	no	no		
Podcasts	no	no		
Videoconferencing	no	no		
Mentoring	yes	Yes (informally through field training)		
Other (explain):				

8. Please provide information for any training program or product produced in each applicable category where documentation/training materials have been produced.

Material	Sample product or program
Written SOPs	Use InfoPath for lockout procedures; use Word for all other procedures
Video SOPs	n/a
Online training	
Video	n/a
Interactive	Developed to SCORM, AICC standards. Currently using AMEC's OperatorSuite software as our Learning delivery platform as well as our Learning Management System and content management system. Have also used Camtasia for computer programs and control system training.
Tutorial	n/a
Avatar	n/a
Materials to be used in a classroom setting	
Powerpoint	Powerpoint
Student Guides	Use MS Word
Video	n/a
Other (Please Explain)	
Simulations using computer technology	
Field guides	Use MS Word
Scenario based training	Use MS Word and Powerpoint as well as screen captures from our control system
Skills Demonstration Assessment Guides	Use MS Word
Webinars	n/a
Skype	n/a
Podcasts	n/a
Videoconferencing	n/a
Mentoring	n/a
Other:	

Training/Staff Development Project Worksheet

Topic/purpose of training	Train staff on new 1800MLD water filtration plant
Name or Title of Training Product(s) or Programs Produced	Seymour Capilano Filtration Plant Technical Training Program and Procedures
Type of Products/Programs Produced	21 web-based training modules, field guides, skills demonstration assessment guides, 500 procedures
Date(s) Produced	Duration of project: July 2006 – May 2009

For this product or set of products or programs, please describe the following (if it is feasible to provide a flowchart or time line, this would be extremely helpful).

1. The process used to create it (them):

   Web-based training modules: provided consultant with various documents (process & instrumentation drawings, equipment lists, process descriptions, equipment manuals, etc.). Then worked collaboratively on the table of contents, followed by content development (by them), review (by our subject-matter-experts (SMEs)), and implementation (loaded by our IT department into our Learning Management System.

   Procedures: consultant facilitated workshops with SMEs, followed by field verification

   Field training: Collaborative development with consultant

   Scenario training: Primarily developed by our SMEs

   Troubleshooting Guides: Collaborative development with consultant

2. Professional services and/or contractual costs:
   Partnered with a technical training consulting firm (AMEC Training & Development). Project cost: $1M

3. Estimated staff time (by job category):

   - Project management: 1 person full time for project management and technical reviews
   - Subject Matter Experts (Plant operations and maintenance staff): Equivalent of 2+ subject matter experts throughout contract duration for content development and review

Plus administrative support (heavy document management requirements)

4. What issues did you run into that affected the amount of time it took to develop the product(s) or program(s), such as lack of specific skill sets, time allowed away from job to participate, etc.?

   - Subject matter expert availability
   - Availability and accuracy of source materials, such as drawings, equipment lists, process descriptions
   - Design and review process were resource intensive.

5. Any equipment and supplies that were required (including hardware/software):
   Ensured that field staff have access to a computer to access their training materials.

6. Incentives used to encourage staff to develop staff training material:

   A brand new plant afforded a unique opportunity and challenge to create the Training and Procedures program from the ground up. Plant Foremen were hired two years prior to plant commissioning and actively participated in the development of training materials. The anticipated influx of Plant staff and the drive to learn about the new facility they will working in plus to be ready for commissioning motivated staff.

7. Tracking system used to track costs associated with development of training tools:

   Project management reporting on deliverables and budget status

8. Support required for implementation of the training tool (e.g., providing equipment in the field to provide staff access to information, or change in work schedules to allow training time)

   - Web based training modules were designed to be completed within a short time frame (20- 30mins per module) so that they can be reviewed between field jobs

9. What have you done to ensure that training products/programs are used? (Examples would be providing access to field staff through mobile computers, requiring supervisors to track staff use of training materials and verification of knowledge gained, tracking use through a Learning Management System, and scheduling formal training sessions using materials.)
   - Field staff have access to all training materials through computers available on site
   - Supervisors have the ability to track staff progress via the Learning Management System
   - Trainees have the ability to track their own progress via the Learning Management System
   - Staff have been very interested and pro-active about doing their training and find the information helpful both during the training and afterwards as reference material

10. How do you evaluate the success of your training product(s) or program?

    At the present time, the metrics we are using are the pre and post test comparisons, statistics in the OperatorSuite™ management modules, as well as informal trainee and supervisor feedback.

11. Lessons Learned:
    a. Program planning
        - Program champion – senior mgmt buy-in
        - Include all stakeholders in scoping
        - Do the gap analysis (what is needed, what exists, where are the gaps)
        - Budget and resources (Will it be a Multi-year or Phased approach)
        - Technical limitations (Platform? Bandwidth? Hardware?)
        - SME and training scheduling constraints (shift workers, office workers)
        - Reference materials availability
    b. Know your audience - "Learners"
        - Base skills/knowledge
        - Target skills/knowledge
        - Consider different learning styles & needs
        - IT skills? Access?
        - Blended approach (web, field, classroom)
    c. Document templates
    d. Evaluate
        - Assess Return on Investment (Pre-Tests, Value of avoiding the cost of things going wrong?)
    e. Feedback on learning tools and learning content
        - Course evaluation