BAYWORK: Principles and Products
Association of Boards of Certification
Wrightsville Beach, North Carolina ~ May 24, 2018

Catherine Curtis
Baywork Vice-Chair
Workforce Reliability Manager, SFPUC
Greetings from California!

Some statistics about CA wastewater treatment operators from Levi Fuller, a BAYWORK Executive Committee member:

- About 30% of certified operators in California are over 56 years old
- About 56% are over 46 years
- 38% of Grade IV and Grade V Operators are over 56 years old
- The certification exam passing rate for Grades 1 thru 3 seems to be good at about 65 -70%
- The exam passing rate for the Grade IV and Grade V exams seems to be declining. Only about 15.5% of operators passed the most recent Grade IV and V exams.

His take away: The industry needs to invest more resources in helping existing operators pass the Grade IV and Grade V exams. The “Silver Tsunami” for plant operators in California is still a concern for our industry.
**BAYWORK Roadmap**

**GOAL**: Operational reliability of Bay Area water and wastewater utilities will be supported by a high-performance workforce.

**STRATEGY 1**: Develop qualified candidates for mission critical jobs
- Organizational recruitment
- Candidate development
- Outreach

**STRATEGY 2**: Provide staff with the information they need to do quality work
- Competency analysis
- Documentation
- Staff development
- Technical training
- Knowledge management

**STRATEGY 3**: Modify work processes to optimize use of available staff
- Redesign work processes
- Improve use of information technology
- Modify job classifications and institutional working relationships

**STRATEGY 4**: Maximize cost-effectiveness of workforce reliability investments through collaboration
- Collaboration among utilities and with stakeholders (e.g., educational institutions)
## Mission-Critical Jobs

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrician</td>
<td>Wastewater Treatment Operator</td>
</tr>
<tr>
<td>Electronic Maintenance Technician/Instrument Technician</td>
<td>Water Distribution Operator</td>
</tr>
<tr>
<td>Engineer</td>
<td>Water Treatment Operator</td>
</tr>
<tr>
<td>Machinist/Mechanic</td>
<td>Wastewater Collections Operator</td>
</tr>
</tbody>
</table>
What’s In It For You?

Principles you can apply to your own opportunities for collaboration

Products available from the BAYWORK website
BAYWORK Principles

- Research-Based Action
- Continuous Innovation
- Cost-Effectiveness through Collaboration
- Knowledge-Sharing Among Peers
- Commitment to the Industry as a Whole
Research-Based Action

BAYWORK’s Career Roadmap reflects research done by BAYWORK with community colleges to determine what knowledge students need in order to be successful in vocational training programs.
Career Pathways Project: A Regional Approach to Employer-Driven Training in Water Utilities
Research Process

A 6-county survey of water and wastewater utilities to:
• Understand anticipated hiring needs
• Identify barriers to hiring
• Confirm skills, credentials required for high need roles

A survey of Bay Area community college programs to:
• Measure the current supply of qualified candidates in targeted programs/occupations
• Analyze gaps in career pathways from high school to journey level employment
After a close analysis of 9 mission-critical occupations, 3 rose to the top as high need, high volume and challenging to hire for:

- Electrician/Electrician technician
- Mechanic/Machinist
- Electronic Maintenance Tech/Instrument Tech

These roles cut across multiple sectors, adding to hiring competition, and maximizing the potential impact of career pathways programs.
1. Increase awareness of industry and trades
2. Increase readiness of youth and other job seekers for trades
3. Increase classroom training capacity
4. Increase entry level job opportunities for mission-critical positions
5. Address financial barriers to training leading to the trades
Continuous Innovation

➢ Workshops on Wheels

- EBMUD
- City of Hayward
- SFPUC
- Las Gallinas
- East Bay Workshop on Wheels
- South Bay Workshop on Wheels
- Oro Loma
- Delta Diablo
48 water and wastewater professionals from 24 agencies visited five Peninsula facilities in September, 2017.
Using Technology to Teach
Workshop on Effective Use of Technology

mIToolbox: Using Wiki Technology to Support Health and Safety Knowledge Management

Carolyn Jones
Manager, Health and Safety Program
San Francisco Public Utilities Commission
KNOWLEDGE TRANSFER TOOLKIT

http://knowledge.baywork.org/
Knowledge Transfer Toolkit

Goal of Toolkit

The goal of this Knowledge Transfer Toolkit is to help water/wastewater agencies learn from each other.

As with all BAYWORK How-To Guides, the goal of this guidebook is to help water/wastewater agencies learn from each other.

The information in this toolkit ranges from video descriptions of programs to specific checklists, analytical processes, and tools that have been used by agencies of different sizes and varying situations to address this shared challenge.

In this toolkit, information has been organized in two different ways. One is by topic (e.g., workforce reliability planning), giving the reader examples of tools used in this area by many different agencies. The second is by case study (showing how some agencies have pulled together many different types of tools to create a robust knowledge transfer program.

- On-line interactive book
- Provides direct on-line links to specific resources.

Chapter II
Information on knowledge transfer programs and tools that have been used by BAYWORK signatories and their learning partners.

Chapter III
Case studies on two agencies with strong knowledge transfer programs: Sacramento Municipal Utility District, a power provider in Sacramento, California, and Metro Vancouver, a water/wastewater/power provider in Vancouver, Canada.

Chapter IV
The opportunity to participate in the collaborative process by contributing information on knowledge transfer tools used by your agency.

Staff Preparedness: Lessons Learned from Star Utilities

Click to view webinar

Is your agency at risk of losing critical, undocumented knowledge? The BAYWORK webinar on “Knowledge Transfer - A Toolkit that can work for Water and Wastewater Utilities”

- Ways of the “Making the Cut” for BAYWORK through knowledge capture strategies, including strategies to identify knowledge gaps, which can be filled through experiences of others, training, or the development of new tools.

- Strategies for capturing and transferring workplace knowledge.

- Global Level, Senior Engineer & Grade 10, Water Resources Management, City of Vancouver, BC
CASE STUDY: BAYWORK

Knowledge transfer among staff of water/wastewater utilities has been a primary objective of BAYWORK since its inception in 2009.

The Operational Reliability Roadmap adopted by its founders reflects four strategies, one of which is providing staff with the information they need to do quality work. Click on image to view.

Ingrid Bella, Chair of Baywork, talks about Baywork with Robert Scott, Baywork Staff Preparedness Subcommittee Chair.
Knowledge Transfer System developed by SMUD

A knowledge transfer system that integrates use of a variety of tools has been developed by Sacramento Municipal Utility District in Sacramento, California. Their approach not only identifies useful tools, but also outlines the knowledge transfer responsibilities of managers, skilled incumbents, and learners (new hires or employees who have been transferred or promoted into new positions within the organization).

*Click on images to view.*

**Knowledge Capture at SMUD**

Gabe Lewall, M.S., M.Ed.
Senior Learning & Development Specialist
Organization & Workforce Development
Sacramento Municipal Utility District

**SMUD Knowledge Capture Toolkit 1**

Gabe Lewall with SMUD talks to Robert Scott, BAYWORK Staff Preparedness Chair, about their Knowledge Transfer System.
Contextualized Learning How-To Guidebook:
Helping Students Learn the Skills Industry Needs
What are the components of these contextualized learning modules?

The basic components of a contextualized learning module are a brief video, curriculum, and candidate development videos.

The brief video (starring subject matter experts from a water or wastewater utility) illustrates a specific math, science, or communication skill needed in order to perform the tasks required of a journey-level skilled trades worker in a specific job category (e.g., water treatment operator or machinist).

Click on images to view videos.
What are the components of these contextualized learning modules?

The basic components of a contextualized learning module are a brief video, curriculum, and candidate development videos.

The brief video (starring subject matter experts from a water or wastewater utility) illustrates a specific math, science, or communication skill needed in order to perform the tasks required of a journey-level skilled trades worker in a specific job category (e.g., water treatment operator or machinist).

Click on images to view videos.
Contextualized Learning Project

The curriculum package includes five components:
1. A Warm-Up Ticket,
2. A Worksheet for students,
3. A Cover Sheet,
4. A Solution Sheet, and
5. An Exit Ticket.

A Warm-Up Ticket includes the academic concepts that need to be assimilated by the students prior to solving the contextualized problem. Click on images to view videos and documents.

Each component is accessible, printable, and ready to use in a classroom.
BAYWORK Training Buffet

- Pick and choose classes
- Instructors from many utilities
- Contact hour credits
## Collaboration Among Utilities

<table>
<thead>
<tr>
<th>Time</th>
<th>Training Rm. 1</th>
<th>Conf. Rm. 1</th>
<th>Conf. Rm. 2</th>
<th>Cafeteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 - 9 a.m.</td>
<td></td>
<td>RECEPTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 - 10 a.m.</td>
<td>Performance Management NOT Personnel Management - Sonja Stanchina, Human Resource Supervisor, CCWD</td>
<td>Wastewater Treatment Plant Compliance - James Ervin, Compliance Manager, City of San Jose</td>
<td>Storm Water Conveyance, Operations &amp; Trash Reduction - Dan Stevenson, Wastewater Operations Manager, City of Sunnyvale</td>
<td>Demystifying Workers’ Compensation - Shari Deutsch, Risk Manager, CCCSD</td>
</tr>
<tr>
<td>10 a.m. - 12 p.m.</td>
<td></td>
<td>Customized Technical Training from the Ground Up - Brenda Donald, Supervising Wastewater Control Inspector, SFPUC</td>
<td>Strategic Succession Planning - Derry Moten, Manager of Employee &amp; Organizational Development, EBMUD</td>
<td></td>
</tr>
<tr>
<td>12 - 1 p.m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 2 p.m.</td>
<td>Introduction to MBTI® Type Assessment: Enhancing Communication at Work - Catherine Curtis, Workforce Reliability Manager, SFPUC</td>
<td>Wastewater Treatment Plant Compliance - James Ervin, Compliance Manager, City of San Jose</td>
<td>Sanitary Sewer Collections Operations &amp; Emergency Response - Dan Stevenson, Wastewater Operations Manager, City of Sunnyvale</td>
<td>A Lighthearted Approach to Stress Management in the Workplace - Larry Olivan, Safety/Special Program Administrator, Oro Loma Sanitary District</td>
</tr>
<tr>
<td>2 - 4 p.m.</td>
<td></td>
<td>Water Quality for Everyone - Ana Corti, Water Quality Analyst Lab Director, City of Pittsburg</td>
<td>Strategic Succession Planning - Derry Moten, Manager of Employee &amp; Organizational Development, EBMUD</td>
<td>What’s Your Safety Attitude? - Larry Olivan, Safety/Special Program Administrator, Oro Loma Sanitary District</td>
</tr>
</tbody>
</table>
Utility/NGO Collaboration

What Opportunities are Available for Me in the Water and Wastewater Industry?
Check out the Electronic Maintenance Tech/Instrument Tech trade!

How can I learn more about the water/wastewater industry?
BAYWORK.org | wastewatercareers.org
Ask your school about career fairs, classroom guest speakers, and water facility tours
Internships, summer jobs, and apprenticeships
Teachers and counselors: find out about facility tours, internships, and industry-related instructional resources

Annual Income
Apprentice
LOW $44,000
HIGH $75,000
Journey-level
LOW $72,000
HIGH $94,000
*Source: BAYWORK Salary Survey 2014

Where can I get the necessary technical training?

HIGH SCHOOL (INTRODUCTORY COURSES):
Berkeley High School (hsbhs.berkeley.schololoop.com)
John O’Connell High School - San Francisco (jochs.slidz.ca.schoooloop.com)
Regional Occupational Programs/Adult Ed. Education (intro course)
Berkeley Adult School (hsbhs.berkeley.schoooloop.com)
Marin County ROP (marinschools.org)
Silicon Valley Career Technical Education (sce.byw.org)

COMMUNITY COLLEGES (CLASSROOM TRAINING ONLY):
City College of San Francisco (ccsf.edu)
College of Marin (marin.edu)
College of San Mateo (collegesanmateo.edu)
 Diablo Valley College (dvc.edu)
 Laney College (laney.edu)
 Los Medanos College (lmc.edu)
 Skyline College (skylinecollege.edu)
Solano Community College (solc.edu)
Sharing Our Knowledge

Las Gallinas
Oro Loma
City of Hayward
South Bay Workshop on Wheels
East Bay Workshop on Wheels
Website Resources - Videos

baywork.org/videos
Videos of Staff Telling Their Stories
Website Resources

VIDEOS

Chris Nicoletti, Mechanic
Union Sanitary District

Anna Garcia, Wastewater Treatment Operator
Dublin-San Ramon Services District

Jeff Madden, Water Treatment Operator
Zone 7 Water Agency

Maurice Harper, Wastewater Treatment Operator
San Francisco Public Utilities Commission

WORKSHOPS & EVENTS

Strategic Investment in Staff Knowledge
February 28, 2015

BAYWORK Training Buffet
November 15, 2014

East Bay II Workshop on Wheels
October 15, 2014

South Bay Workshop on Wheels
June 06, 2014

HOW-TO GUIDES

Workshops on Wheels Project
BAYWORK

Inter-Agency Use of Videoconferencing to Support Staff Training
BAYWORK

From M.O.S. to J-O-B
Environmental Protection Agency

San Francisco Public Utilities Commission – Staff Preparedness:
Lessons Learned from Star Utilities
San Francisco Public Utilities Commission

GOALS

Candidate Development
Develop qualified candidates for mission critical jobs
View details...

Staff Preparedness
Provide staff with the information they need to do quality work
View details...

Process Optimization
Modernize work processes to optimize use of available staff
View details...

Collaboration
Maximize cost-effectiveness of workforce flexibility investments through collaboration
View details...

baywork.org/resources
Resource Materials Available on Website

You don’t have to be there to win

East Bay II Workshop on Wheels
October 15, 2014

Resources from this Workshop
- East Bay II Workshop on Wheels Agenda
- Wipes Clog Pipes
- City of Pittsburg Water Treatment Plant Survey
- Mt. View Sanitary District Survey
- East Bay Municipal Utility District Survey
- Delta Diablo Sanitation District Survey
- Central Contra Costa Sanitation District Survey
- Zeolite Anammox Pilot Plant Presentation

Download Agenda
Commitment to the Industry

- All resources open source
- Available to utility staff on any inch of the globe
Working Locally
Trying to Help Wherever We Can

BE AN ENGINEER
EXPLORE YOUR CAREER IN THE WATER & WASTEWATER INDUSTRY.

I reduced energy use.
I rehabilitated 6 miles of pipelines.
I built a 66" steel pipeline crossing an earthquake fault.
I restored wildlife habitat.
I replaced an electrical substation.
I updated as-built mechanical drawings.
I updated a sludge removal system.
I ensured compliance with safe drinking water regulations.

BE INVAlUABLE

I'm a machinist.
I'm a wastewater treatment operator.
I'm an instrument technician.
I'm a wastewater treatment operator.
I'm a wastewater treatment operator.
I'm giving mother nature a helping hand.
I'm an electrician.

LEARN MORE AT baywork.org/careers/yourway/
All Materials Downloadable
<table>
<thead>
<tr>
<th>Top Ten Pages Visited</th>
<th>In 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home Page</strong></td>
<td>10,991</td>
</tr>
<tr>
<td><strong>Jobs and Internships</strong></td>
<td>14,764</td>
</tr>
<tr>
<td><strong>Find Training Locations</strong></td>
<td>2,954</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td>1,806</td>
</tr>
<tr>
<td><strong>Careers</strong></td>
<td>3,206</td>
</tr>
<tr>
<td><strong>Job Map</strong></td>
<td>2,566</td>
</tr>
<tr>
<td><strong>Electronic Maintenance Technician / Instrument Tech</strong></td>
<td>2,421</td>
</tr>
<tr>
<td><strong>Water Treatment Operator</strong></td>
<td>2,397</td>
</tr>
<tr>
<td><strong>Wastewater Treatment Operator</strong></td>
<td>1,763</td>
</tr>
<tr>
<td><strong>Instrumentation and Control (I&amp;C) Engineer</strong></td>
<td>2,421</td>
</tr>
</tbody>
</table>
### Website an International Resource

#### Site Visitors - Top Ten Countries (FY2016 to date)

<table>
<thead>
<tr>
<th>Country / Territory</th>
<th>Visits</th>
<th>Pages / Visit</th>
<th>Avg. Visit Duration (min)</th>
<th>% New Visits</th>
<th>% Leave After One Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>20,086</td>
<td>3.95</td>
<td>3:24</td>
<td>54.44%</td>
<td>37.88%</td>
</tr>
<tr>
<td>India</td>
<td>900</td>
<td>1.61</td>
<td>1:14</td>
<td>90.44%</td>
<td>77.67%</td>
</tr>
<tr>
<td>Philippines</td>
<td>263</td>
<td>1.44</td>
<td>1:25</td>
<td>92.02%</td>
<td>78.33%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>231</td>
<td>1.73</td>
<td>0:36</td>
<td>96.97%</td>
<td>74.89%</td>
</tr>
<tr>
<td>Canada</td>
<td>207</td>
<td>2.20</td>
<td>1:05</td>
<td>93.72%</td>
<td>69.08%</td>
</tr>
<tr>
<td>Russia</td>
<td>160</td>
<td>1.86</td>
<td>4:19</td>
<td>19.38%</td>
<td>18.75%</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>157</td>
<td>1.31</td>
<td>0:47</td>
<td>90.45%</td>
<td>84.71%</td>
</tr>
<tr>
<td>Turkey</td>
<td>157</td>
<td>1.14</td>
<td>0:12</td>
<td>94.90%</td>
<td>90.45%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>129</td>
<td>1.53</td>
<td>1:50</td>
<td>86.05%</td>
<td>77.52%</td>
</tr>
<tr>
<td>South Africa</td>
<td>112</td>
<td>2.18</td>
<td>1:20</td>
<td>91.07%</td>
<td>67.86%</td>
</tr>
</tbody>
</table>

#### 2017

- 2,435 Average website visits per month
- 14,955 Unique visitors to date
Questions?