THIRD WEST COAST UTILITIES WORKSHOP ON WORKFORCE DEVELOPMENT
November 3, 2011
WELCOME & PURPOSE OF THE WORKSHOP

Jill Duerig
General Manager, Zone 7

Cheryl Davis
BAYWORK Chair
Bridging the Gap to Support Our Workforce Goals

Tim Worley
Executive Director, Cal-Nevada AWWA
Why does this issue matter?

• “Creation, acquisition, and management of information is central to the new economy”
  – *National Academies, 2001*

• Customers’ expectations
• Managers’ expectations
• Changing workforce is a reality
The 30,000-Foot Perspective

• Workforce development: more than just filling positions

• Preparation for the job
  – New employees
  – Existing employees

• Information technology is BOTH part of the challenge, and part of the solution
What *are* our workforce goals?

Existing workforce  New employees

Knowledge transfer

Training *FOR* new technology

Training that *USES* new technology

Training to *THINK AND WORK DIFFERENTLY*
What is the IT Gap?

For Existing Workforce:

- Learning *new technologies* themselves
- Learning *new practices* to do the same or different things
- *Using technology* to transfer knowledge
IT Gap for Existing Employees

Example: Advanced Metering Infrastructure

- From simpler, routine tasks like reading meters...
- To more analytical tasks like interpreting data to anticipate potential problems
- From knowledge gained over years of experience
- To marrying that knowledge with the power of technology
What is the IT Gap?

For New Workforce:

• First we have to find and attract good people

• Use IT to reach people where they are
  – Social media
  – Don’t forget traditional media, face-to-face
  – Websites such as Work for Water
What is the IT Gap?

For New Workforce:
• Rapidly build the knowledge base—How? Who?
• And vendors, too

It takes ALL of us!
Tools for Building the Bridge

- Traditional classroom training (In-person)
- Workshops / Educational Events (In-person)
- Hands-on field experience (In-person)
- Using Information Technology
  - On-line training (Remote)
  - Webinars (Remote)
  - Virtual reality
Bridging the IT Gap

• We face two simultaneous challenges:
  – Transferring knowledge that is staying the same
  – Learning the things that are changing

• IT is part of the challenge AND part of the solution

• What’s critical is a culture of continuous learning

• Education providers need to step it up

• There’s more than enough work for everyone
Thank you for inviting me

Dr. Tim Worley
California-Nevada Section, AWWA
Rancho Cucamonga, CA

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(909) 291-2102
THIRD WEST COAST WATER UTILITIES WORKSHOP

GEOGRAPHIC INFORMATION SYSTEMS (GIS) & GLOBAL POSITIONING SYSTEMS (GPS)
The Experience of Building a GIS for a Wastewater Treatment Plant

Tim Hayes
Senior Geographic Systems Specialist - Geographic Information Services Team Leader
San Jose/Santa Clara Water Pollution Control Plant
City of San Jose Environmental Services Department

“Knowing where things are, and why, is essential to rational decision making”
ACCOMPLISHMENT:
One-Stop Shop for data on all Pipes, Duct Banks, Fiber Optic Lines, Valves, and more.

MAKING A DIFFERENCE:
✓ 24/7 quick and easy online access to maps which identify isolation valves to close during a leak!
✓ Training aid for new staff!
✓ No more spending hours searching through mountains of drawings!
✓ No more dependence on the “old timers”!
✓ Know what is buried where!

GIS is a Decision Support System
CHALLENGES OVERCOME:

- Many inaccurate, misplaced, missing drawings
- Knowledge drain (retirements, etc...)
- No system in place for records/data management
- Undocumented pipes and valves

GIS is the “glue” which holds all the pieces of the puzzle together

KEY TO SUCCESS:

- Think long-term (*years, not months*)
- Must have dedicated and innovative staff
- Must have Plant leadership support
- Limit the use of outside consultants
- Must have software/hardware systems in place

“Rome was not built in a day”
How GIS Improves the Reliability of Our Wastewater Collection System

Carl Von Stetten
Geographic Information Systems (GIS) Analyst
Central Contra Costa Sanitary District
GIS Provides Significant Staff Time Savings

- Map book production moved from CAD drawings to GIS
  - Before GIS: 4 Full-Time Equivalents (FTEs) x 2.5 years to revise 750+ maps
  - With GIS: 2 FTEs x 6 months to revise 790 maps

- Web GIS portal improved renovation project planning and research
  - Before GIS: 2 months of staff engineer time to find and collect as-builds, maintenance, capacity, and CCTV inspection data; manually prepare planning maps
  - With GIS: 4-6 hours of staff engineer time to gather same data online; planning data already available as map layers
  - Training for Web GIS portal in 30 minutes or less!!!
Lessons Learned and Plans for the Future

• Other Benefits, Some Unanticipated:
  • Web GIS portal Permit Counter
    • Quick access to information improves customer service
  • Mobile version of Web GIS portal aids maintenance crews
    • Provides data for emergency response, including topography and nearby creeks
    • USA locating crews have accurate locations of pipelines
    • Sewer mains connected to medical facilities clearly identified with biohazard symbol
    • Providing CCTV inspection data promotes focused cleaning (quality)
  • Mobile version assists renovation project manager and right-of-way agents
    • While visiting homeowners, can show how project impacts them

• What’s Next?
  • Integrate various independent databases into enterprise GIS to improve information flow and reduce redundancy of data and effort
  • Deploy a mobile GIS-based maintenance management system to field crews using ruggedized tablets/notebooks, with GPS and routing for maintenance assignments
GIS AT San Jose Water Company

Jeff Hobbs
GIS Coordinator
San Jose Water Company
Innovations

- Web Portal
- GPS for Location
- Video
- Photo
Lessons Learned

- Change = Bad
- No Change = Bad
- Labels = Good
- Constant Feedback
Leveraging SCADA Beyond the Control Room

Clifford Chan
Manager of Water Treatment and Distribution
EBMUD
Benefits

• Easy access to operational data
• Integration with other data systems
• Leverage value of data
• Energy management
• Regulatory reporting
• Engineering analysis and planning studies
• Knowledge management
Lessons Learned

- Common vision, goals and objectives
- Define needs and standards
- Keep it simple
- Avoid the allure of technology
- Develop web-based tools
- SCADA and IT Department
SJW SCADA

- CONTROL SCREENS – (Office and Mobile)
- SYSTEM CONTROL CENTER “Not Needed”
- DATA COLLECTION – (While in the Field)
- EMAIL NOTIFICATION (Smart Phones)
- WORK ORDER CREATION – (Data Sharing)
- LAPTOP VS TABLET
Control Screens – Data Collection

SAN JOSE WATER COMPANY

SEVEN MILE STATION
PLC Power Fail: NORMAL
Generator: 1 OR

GREAT REGULATOR
17.1 FT
1.06 MG
17.0 FT
5.23 MG

REGULATOR
10° REGULATOR
MILE 006
MILE 007

9TH REGULATOR
MILE 008

8TH REGULATOR
MILE 008

7TH REGULATOR
MILE 009

NORTH BASIN
SOUTH BASIN

GREAT REGULATOR VALVES:
SEND A “ZERO” SETPOINT, THEN WAIT 5 MINUTES BEFORE SENDING A CLOSE COMMAND

Control Panel

SEVEN MILE REGULATOR 2
STATUS
PERCENT
CLOSED
0.0

CONTROL MODE
AUTO
ECON

MANUAL CONTROL
OPEN
CLOSE

AUTO SETPOINTS
20.5
23.5

ECON SETPOINTS

AUTO ERROR
NORMAL

ECON ERROR
NORMAL

CONTROL VARIABLE
ID
CURRENT
VALUE
MIN
MAX
GREER_TWR_RES1
333
22.5
0.0
40.0

SCAN STATE
ECON STRING
ON SCAN
GREAT_TWR_RES1 CV.SUMMER_WEEKDAY_START_0[55]

CURRENT FLOW SETPOINTS
AUTO/MANUAL
ECON
PID %
5.0 MGD
5.0 MGD
100

FLOW SETPOINTS
OFF PEAK
PARTIAL PEAK
PEAK
5
5
5

NOTE: SETPOINTS TAKE 60 SEC TO UPDATE
SAN JOSE WATER COMPANY

Control Screens – Data Collection

[Image of control screens and data collection interface]

WATER OPERATIONS SUMMARY

<table>
<thead>
<tr>
<th>Source</th>
<th>% of Total</th>
<th>MGD</th>
<th>$MG</th>
<th>Daily Trends</th>
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<tbody>
<tr>
<td>Ground</td>
<td>13.5%</td>
<td>11.2</td>
<td>2,103.79</td>
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<tr>
<td>Surface</td>
<td>0.8%</td>
<td>0.8</td>
<td>0.00</td>
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<tr>
<td>Import</td>
<td>86.7%</td>
<td>71.2</td>
<td>2,053.83</td>
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CURRENT OPERATING STATUS

- PG&E Season: Summer
- PG&E Rate Period: Peak
- Day of Week: Tuesday
- Day Type: Weekday

GROUND WATER

<table>
<thead>
<tr>
<th>Zone</th>
<th>% of Total</th>
<th>MGD</th>
<th>Daily Trends</th>
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<tr>
<td>Cambrian</td>
<td>93.6%</td>
<td>11.3</td>
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<tr>
<td>Columbus</td>
<td>0.0%</td>
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<td>T</td>
</tr>
<tr>
<td>Dore/Willow/Cox</td>
<td>1.1%</td>
<td>0.1</td>
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<tr>
<td>More</td>
<td>0.8%</td>
<td>0.8</td>
<td>T</td>
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KNOWN SOURCE WATER COSTS

- Montevina: $493,000
- Saratoga: $253,830
- Import: $210,000

IMPORT TARGETS & TOTALS

<table>
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<th>Pipeline</th>
<th>Target MGD</th>
<th>Current MGD</th>
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<tr>
<td>East Pipeline</td>
<td>55</td>
<td>54.51</td>
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<tr>
<td>West Pipeline</td>
<td>50</td>
<td>16.67</td>
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EXTERNAL REPORTS

- DPR: HISTORICAL PRODUCTION DATA
- COST MODEL: LAKES DRAINAGE RELEASE PLAN
- RUNNING RAINFALL: Daily Lake and DPR Numbers

[Excel spreadsheet showing monthly production levels]
## Control Screens – Data Collection

### LUMBER STATION

<table>
<thead>
<tr>
<th>Source</th>
<th>Rated Flow</th>
<th>Status</th>
<th>Mode</th>
<th>INH</th>
<th>Auto/Local</th>
<th>Start</th>
<th>Multi Start</th>
<th>Control Variable</th>
</tr>
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<tbody>
<tr>
<td>BSTR1</td>
<td>1000</td>
<td>OFF</td>
<td>ECON</td>
<td>NO</td>
<td>AUTO</td>
<td>OK</td>
<td>OK</td>
<td>LUMBS 2B GNT</td>
</tr>
<tr>
<td>BSTR2</td>
<td>700</td>
<td>OFF</td>
<td>ECON</td>
<td>YES</td>
<td>LOCAL</td>
<td>OK</td>
<td>OK</td>
<td></td>
</tr>
</tbody>
</table>

### PM Master 000077

- **PM Master No:** 000077
- **Status:** Active
- **PM Category:** ENGINE

#### Description
- **Graze pump bearings.

#### Asset ID
- E22189
- **Run to Failure**
- **Or Component ID**

#### Benchmark No
- B0000002
- **Scheduled Basis:** Run-Time
- **Schedule Type:** Daily
- **Last PM:** 4,600.34
- **Interval:** 500.00
- **Next PM Due:** 5,140.34
- **Current:** 4,600.34
- **DateTime:** 12/02/2009 03:00:00
- **Initial Schedule Date:** 11/03/2009
- **Next Schedule Date:** 02/27/2012
- **Last Complete Date:** 05/27/2011
- **Critical Reference Date:**

#### Fleet PM Control No.
- 
- **PM Group Runtime Delay:**
- **PM Group Calendar Delay:**

#### Department
- **PM-EOATOT**
- **Area:** REJACCTS
- **BOID:** NAMEPLATE

#### Spec No
- 0000707
- **Spec Type:** BOOSTER
- **Spec Category:** NAMEPLATE
- **Serial No:** 1008 250-504

#### Lead Crew
- 
- **Downtime Type:**
- **Downtime:**
- **Downtime Hours:**
- **Approval Route:**

#### Location
- Lumber St Sta
SCADA Replicator/Corporate Data Flow

- Replicator mirrors the SCADA system to provide read only data
- Separate environment from the SCADA System
- Replicating incrementally to near real-time thus minimizing calls to the SCADA System
- Data moves from the Replicator to the corporate network through internal data bridges
- Data is consumed by model applications to make optimized pumping decisions
- Data is available near real-time for operational staff in a more consumer friendly manner through custom applications
- Data is used to prepopulate reporting thus eliminating the need for manual transcription from SCADA
- Data is used to generate automated permitting reports for the regulatory agency
- Data is centrally available to all users through data extract tools and reports eliminating the need for operations personnel to fill data requests
Benefits/Pitfalls

• Seamless integration between SCADA and the agency
• Reduce traffic to the SCADA system for non SCADA requests
• Extracted data is QA/QC and stored in a standard database available to the entire agency
• Since SCADA is limited in capacity and recycles on a periodic basis, all data can be stored in the corporate network for posterity

• Requires a fairly robust infrastructure and network
• Requires custom application developers on staff
THIRD WEST COAST WATER UTILITIES WORKSHOP

MORNING BREAK
THIRD WEST COAST WATER UTILITIES WORKSHOP

USE OF IT TO SUPPORT TRAINING & KNOWLEDGE MANAGEMENT
DISTANCE LEARNING USING VIDEO CONFERENCING

JAMES MCPHERSON
TECHNICAL TRAINING COORDINATOR
UNION SANITARY DISTRICT / BAYWORK
Distance Learning (DL)

- **Purpose** – Can we use DL to train
- **Problem** – Poor allocation/use of resources for common compliance training
  - Cost
  - Scheduling
  - Effectiveness
- **Facilities** – SFPUC HQ and Sunol Water Treatment Plant
Results (Heat Stress)

- Lessons Learned
  - System Startup and Operation
  - Audio Quality
  - Vendor Selection Considerations
  - Training Effectiveness
    - Kirkpatrick Level One – Training was effective and could be used for compliance requirements
    - Interaction between and within sites
    - Tailor instructional material to DL
    - Train your trainers
Webinars @ EBMUD

Key Lessons from the First 20 Months

Monthly New Employee Orientation Series

Edward Sullivan
EBMUD Security & Emergency Preparedness Section
GOAL: Comfortable & Confident New Employees

Seeking cost-effective solutions for mandatory new employee training

Quarterly - Group sessions for District-wide Organizational Overview

Monthly - Webinars on key topics
  • Critical Information needed ASAP by employees
  • Information benefits from live interaction

Let logistics & operational imperatives drive delivery methods
Let your cost/benefit drive technology selection
  • WebEx (online) + Arkadin (audio via telephone)

Allow participants to choose their location to attend – with presenter, at a workstation, or in small group remotely

Train your presenters & encourage practice

Make presentations both highly structured & highly interactive
  • Outline “outcomes” as well as agenda & methodology in intro
  • Use images often for impact
  • Engage participants in active two way discussions

Ensure participants have instructions in advance

Have a back-up plan!
What Have We Done?

• Created Video
  – How video can be used to support process documentation and staff training
• Explains the tasks necessary during
  – Pre-production
  – Film acquisition
  – Post-production editing
• Demonstration of the video TODAY
• How-to workshop in Spring of 2012
Success Requires

• How will it be used?
  – Clear understanding of how video will serve documentation or training goals

• What will it look like?
  – Clear definition of product desired

• What will we say?
  – Have a script

• How will we do it?
  – Strong logistical planning
Success Requires

• How can we create a product staff can learn from?
  – Technical knowledge in relation to both video technology and how people learn

• How do we go from footage to learning tool?
  – Careful editing to ensure product meets documentation / training goals

• How do we get our money’s worth out of this investment
  – Implement a plan
mIToolbox: Using Wiki Technology to Support Health and Safety Knowledge Management

Carolyn Jones
Manager, Health and Safety Program
San Francisco Public Utilities Commission
What We Did:

• Used customized version of Confluence wiki software
• Built Health & Safety sites for internal group & external organization use
• Goal – communicate information easily & quickly, meet client needs, flexible access
• Be a “deep” resource of information – policies, forms, training materials, newsletters, handbooks
Lessons Learned

- With wiki software, sites can be built by non-IT staff
- Forms, reports and information on safety practices are directly accessible to staff throughout organization
- Having central repository of information saves staff time
- Training materials are readily accessible to staff
- Internal group workspace facilitates collaborative development of work products
Smart Technology, Smarter Staff – Mobile Technology in the Workplace

Clifford Chan
Manager of Water Treatment and Distribution
EBMUD
Benefits

• Supports operations and maintenance
• Access to operational data (e.g., SCADA)
• Realtime information exchange
• Availability of references
• Better and more consistent inspections
• Video conferencing
• Emergency response
Lessons Learned

- Match technology with the tasks
- Work with the users
- Perform pilot tests with different technologies
- Web-based tools vs custom apps
- Develop security standards
- Technology continues to improve
Ken Salmon
IT Director
San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission (SFPUC)
<table>
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<tr>
<th>Select Mobile solutions</th>
<th></th>
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<tbody>
<tr>
<td><strong>Group</strong></td>
<td><strong>Software</strong></td>
<td><strong>Hardware</strong></td>
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<tr>
<td>Waste Water (WW) Warehouse</td>
<td>Datasplice</td>
<td>Intermec rugged PDA</td>
</tr>
<tr>
<td>WW Distributed Control System</td>
<td>Foxboro</td>
<td>iPad</td>
</tr>
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<td>WW Collections</td>
<td>Maximo</td>
<td>Panasonic Toughbook's</td>
</tr>
<tr>
<td>Water Automated Water Meters</td>
<td>Clevest, Aclara</td>
<td>Intermec rugged PDA</td>
</tr>
<tr>
<td>Customer Service</td>
<td>Clevest</td>
<td>Intermec rugged PDA</td>
</tr>
<tr>
<td>Commission</td>
<td>Directors Desk</td>
<td>iPad</td>
</tr>
<tr>
<td>Water SCADA</td>
<td>Wonderware, Netmotion</td>
<td>iPad, Motion Computing</td>
</tr>
<tr>
<td>Personal devices supported</td>
<td>email, calendar, contacts, Citrix</td>
<td>iPhone, iPad, Droid</td>
</tr>
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</table>
## Moving forward

### Proof of concepts to Hetch Hetchy, Natural Resources

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
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<tbody>
<tr>
<td>Motion Computing CL900 tablet Win 7</td>
<td>Atom processor, Semi rugged, 2 lbs, 2 cameras</td>
</tr>
<tr>
<td>Motion Computing FV5 tablet Win 7</td>
<td>Hot swap batt, rugged, cameras, RFID, barcode</td>
</tr>
<tr>
<td>iPad</td>
<td>Instant on, long battery life, cameras</td>
</tr>
<tr>
<td>SFPUC specific iPad, Droid, iPad app</td>
<td></td>
</tr>
</tbody>
</table>

Update our mobile strategy
RUNNING YOUR PLANT WITH HAND HELD DEVICES

Leonard Robb
Lead Operator and Operations Maintenance Coordinator
Littleton/Englewood Wastewater Treatment Plant
Establishing Design Criteria

- HIERARCHY OF DESIGN
- EASE OF USE
- TESTING THE SYSTEM PRIOR TO GO LIVE
- USER INPUT
- BRINGING THE SYSTEM ON IN STAGES
- REVIEW PERIODS
Learning the Hard Way

• WIRELESS VERSUS SYNCING
• EQUIPMENT WOES
• LEAVING YOURSELF A PROGRAMMING OUT
• CHECKING DATA QUALITY
• PROGRAMMING FOR MEANINGFUL REPORTS
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