

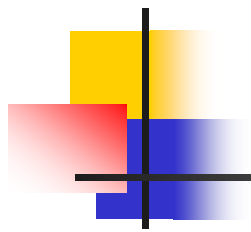
WORKFORCE DEVELOPMENT INITIATIVE



SAN FRANCISCO PUBLIC UTILITIES COMMISSION

West Coast Water Utilities Workshop
On Workforce Development

San Jose, CA
May 30, 2008



PROCESS

TOOL

- WORKFORCE DEVELOPMENT PLANNING
- STAFF TRAINING
- KNOWLEDGE RETENTION

- NEEDS ASSESSMENT INTERVIEW FORM
- ANALYSIS OF COMPETENCIES NEEDED AND AT RISK
- WATER/WASTEWATER ENTERPRISE INFORMATION SYSTEM



WATER ENTERPRISE NEEDS ASSESSMENT

- 14 interviews with 23 staff members from 6 Divisions of the Water Enterprise
- Structured interview with a combination of multiple choice and open-ended questions
- A more detailed version of the research package used for today's workshop

35 MISSION-CRITICAL CLASSIFICATIONS IN 11 CATEGORIES AT RISK IN QUANTITY AND/OR PREPAREDNESS

MISSION-CRITICAL FUNCTIONS AT RISK

Civil Service Classification	OPERATIONAL FUNCTION AT RISK							
	Hydropower Quantity	Water Quality Quantity	Water Quality Reliability	Water Quality Value/Quality	Recreation Recreation	Customer Service	Safety, Security, Emergency	Regulatory
7488 Power Generation Supervisor	X							
7489 Senior Power Generation Technician	X							
7491 Power Generation Technician II	X							
7493 Power Generation Technician I	X							
7511 Principal Engineer	X	X	X	X	X	X	X	X
7511 Senior Engineer	X	X	X	X	X	X	X	X
7511 Engineer	X	X	X	X	X	X	X	X
7527 Assistant Engineer	X	X	X	X	X	X	X	X
7523 Assistant Process Engineer	X	X	X	X	X	X	X	X
7523 Junior Engineer	X	X	X	X	X	X	X	X
7529 ERM Assistant Supervisor	X	X	X	X	X	X	X	X
7519 Electrical Maintenance Technician	X	X	X	X	X	X	X	X
7543 Electrician		X	X	X	X	X	X	X
7584 Utility Plumber Supervisor II		X	X	X	X	X	X	X
7520 Utility Plumber Supervisor I		X	X	X	X	X	X	X
7588 Utility Plumber		X	X	X	X	X	X	X
7543 Sr. Waste Treatment Operator			X	X	X	X	X	X
7541 Waste Treatment Operator			X	X	X	X	X	X
7533 Maintenance Mechanic			X	X	X	X	X	X
7581 Automotive Mechanic			X	X	X	X	X	X
2489 Laboratory Services Manager			X	X	X	X	X	X
2488 Supervising Chemist			X	X	X	X	X	X
2487 Chemist III			X	X	X	X	X	X
2482 Water Quality Technicians III				X	X	X	X	X
2481 Water Quality Technicians II				X	X	X	X	X
9920 Apprentice				X	X	X	X	X
2483 Supervising Biologist				X	X	X	X	X
2484 Biologist III				X	X	X	X	X
2481 Biologist II				X	X	X	X	X
7279 Watershed Empire Supervisor				X	X	X	X	X
7470 Watershed Keeper				X	X	X	X	X
6922 Area Lead Manager				X	X	X	X	X
2486 Watershed Forester				X	X	X	X	X
2482 Utility Specialist			X	X	X	X	X	X
2148 Water Operations Analyst			X	X	X	X	X	X
TOTAL	10	14	22	30	22	19	25	25

CATEGORY OF WORK	
Number of Classifications	
Power Generation Operations	4
Engineers	6
Electricians/Electronic Maintenance	3
Plumbers	3
Automotive Mechanic	1
Machinist	1
Water Quality Technicians/Chemists	6
Biologists	3
Watershed Natural Resources/Security	4
Utility and Water Operations Analysts	2
Water Treatment Operators	2



THE CORE BUSINESS FUNCTION AT HIGHEST RISK WAS WATER QUALITY

	<i>FREQUENCY</i>
WATER QUALITY	30
Safety, Security, and Emergency Response	25
Water Delivery Reliability	22
Environmental Stewardship	22
Customer Service	19
Water Supply	14
Hydropower	10



RISKS TO ADEQUACY OF EMPLOYEE KNOWLEDGE AND SKILL

	<i>NUMBER OF ASSESSMENTS DESIGNATING FACTOR AS HIGH-RISK</i>
CHANGING REGULATORY REQUIREMENTS	6
NEW FACILITIES, PROCESSES, PROCEDURES, TECHNOLOGIES, AND EQUIPMENT	6
Retirement	5
Inadequate documentation on facilities, processes, procedures, technologies, and equipment	5
Other turnover	3



KNOWLEDGE RETENTION IDENTIFIED AS PROCESS POSING HIGHEST LEVEL OF RISK FOR MISSION-CRITICAL POSITIONS

	<i>NUMBER OF TIMES PROCESS IDENTIFIED AS A CHALLENGE</i>
Classification	25
Recruitment/Selection	25
Staff Training	22
KNOWLEDGE RETENTION	35



RECRUITMENT/SELECTION PROCESS IDENTIFIED AS HIGHEST RISK TO ABILITY TO FILL MISSION-CRITICAL POSITIONS WITH QUALIFIED APPLICANTS

	<i>HIGH</i>	<i>MEDIUM</i>	<i>LOW</i>
Lack of adequate labor pool with appropriate qualifications	5	1	2
Lack of appropriate classifications for skills needed	5		4
Uncompetitive pay/fringe benefits	4	1	4
RECRUITMENT/SELECTION PROCESS	6	1	



SOME CHALLENGES ARE POSITION-SPECIFIC
(e.g., Water Treatment Operators) AND CALL
FOR A POSITION-SPECIFIC STRATEGY

SOME ARE ENTERPRISE-WIDE

- Planning, design, and implementation of technical training
- Recruitment/Selection process
- Inadequate documentation and knowledge retention



STAFF TRAINING CHALLENGE

HOW TO DESIGN TRAINING AROUND
BUSINESS NEEDS



THE QUESTIONS

- What do our water treatment operators need to know?
- How complete is their knowledge, and how close are the knowledgeable ones to retirement?
- What procedures need to be documented?
- What process problems need to be addressed before the process is documented?
- Where is additional training needed?



THE PROCESS

- A. Task identification by water treatment managers
- B. Confidential online surveys to determine staff preparedness, retirement risk, and process problems

San Francisco Public Utilities Commission Survey

Chemical Storage and Containment System

Enter your certainty when performing these tasks during Chemical Storage and Containment System startup or shutdown:

	Full Certainty	Partial Certainty	Conditional Certainty	No Certainty
Manipulate, adjust, and verify the Chemical Storage and Containment System.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Handle bulk and hazardous chemicals.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calibrate analyzers.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Perform preventive maintenance on Chemical Storage and Containment System.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

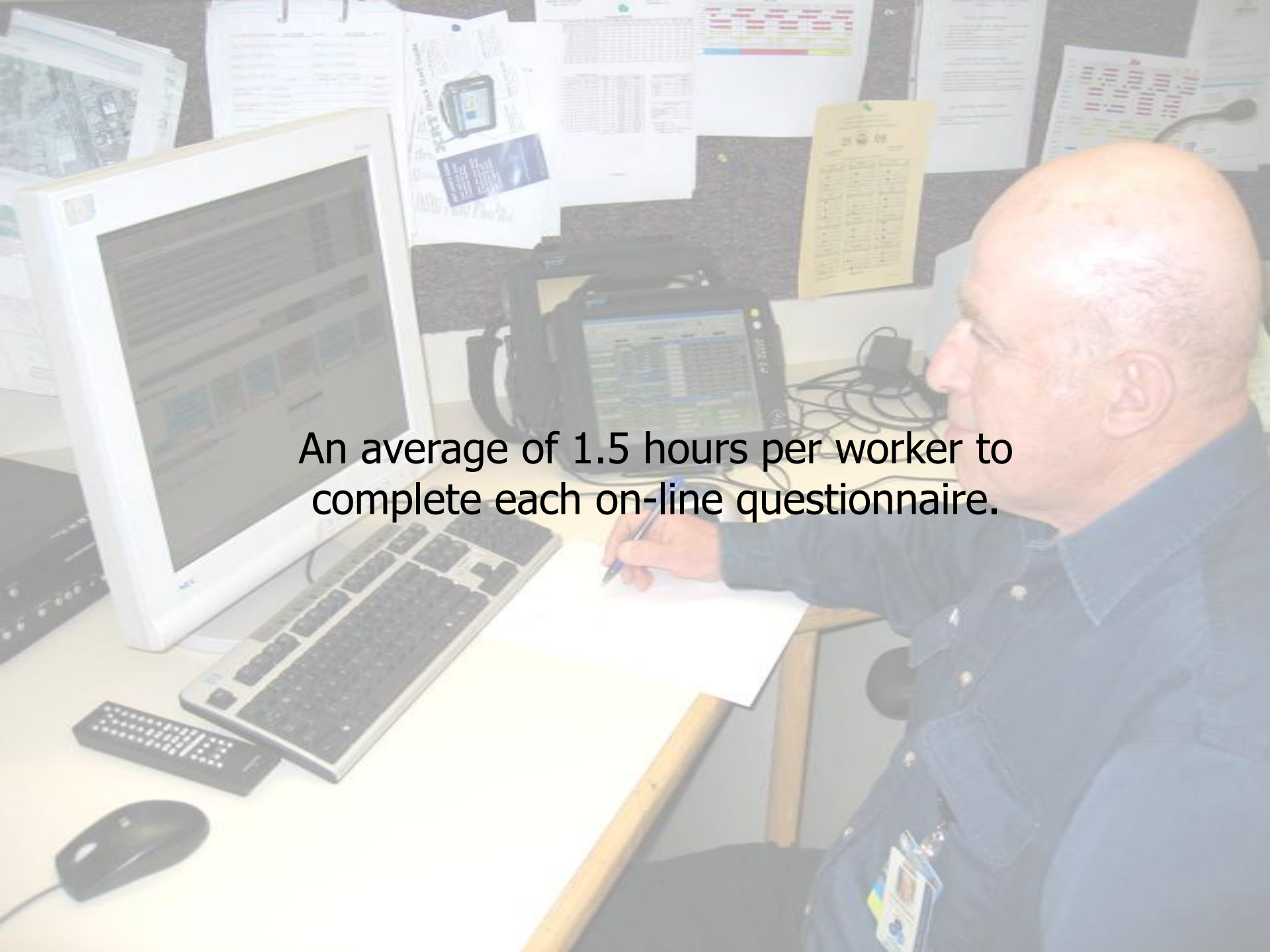
Overall Assessment

	What is your average CERTAINTY performing these tasks?	How COMPLEX are these tasks?	How FREQUENTLY do you perform these tasks?	Are written PROCEDURES and STANDARDS available?	How IMPORTANT is performing these tasks to the standard?	How often do you experience PROBLEMS completing these tasks?
Overall	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

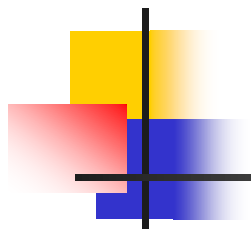
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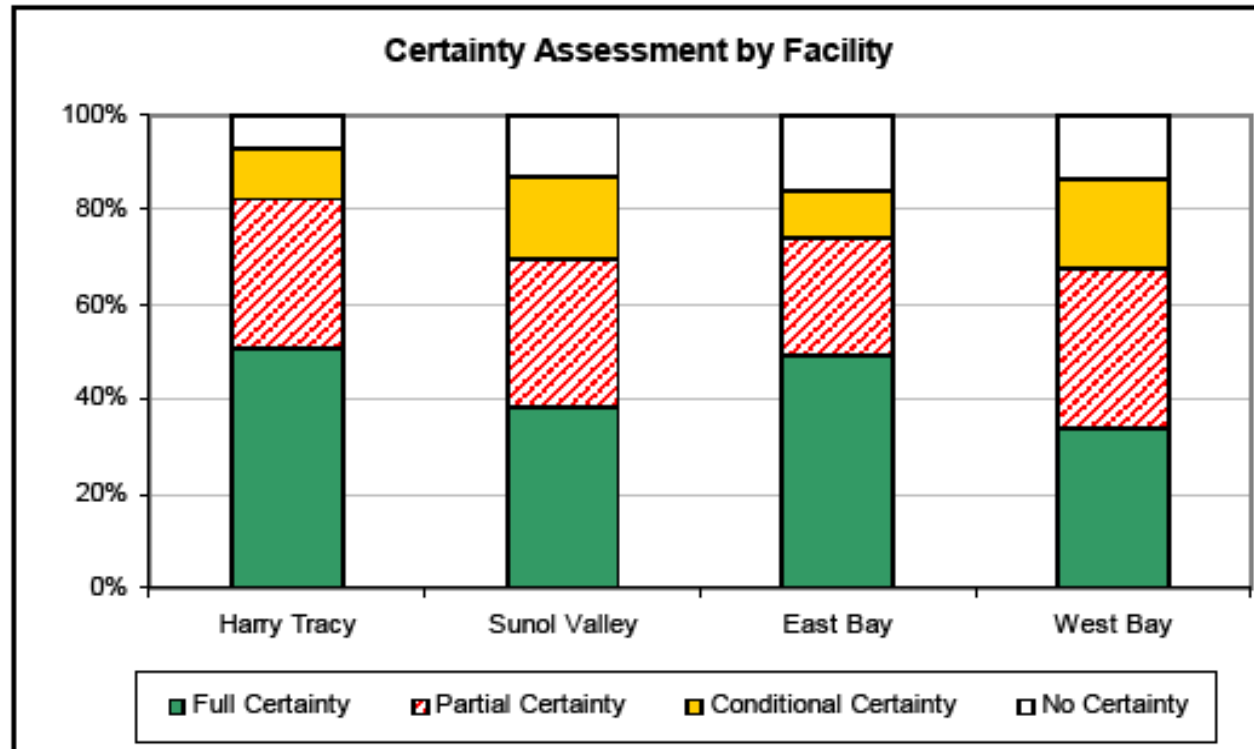
A man in a blue uniform is sitting at a desk in an office. He is looking at a computer monitor and writing on a notepad with a pen. The desk has a keyboard, a mouse, and a remote control. The background shows a bulletin board with various papers and a calendar. The text "An average of 1.5 hours per worker to complete each on-line questionnaire." is overlaid on the image.

An average of 1.5 hours per worker to complete each on-line questionnaire.



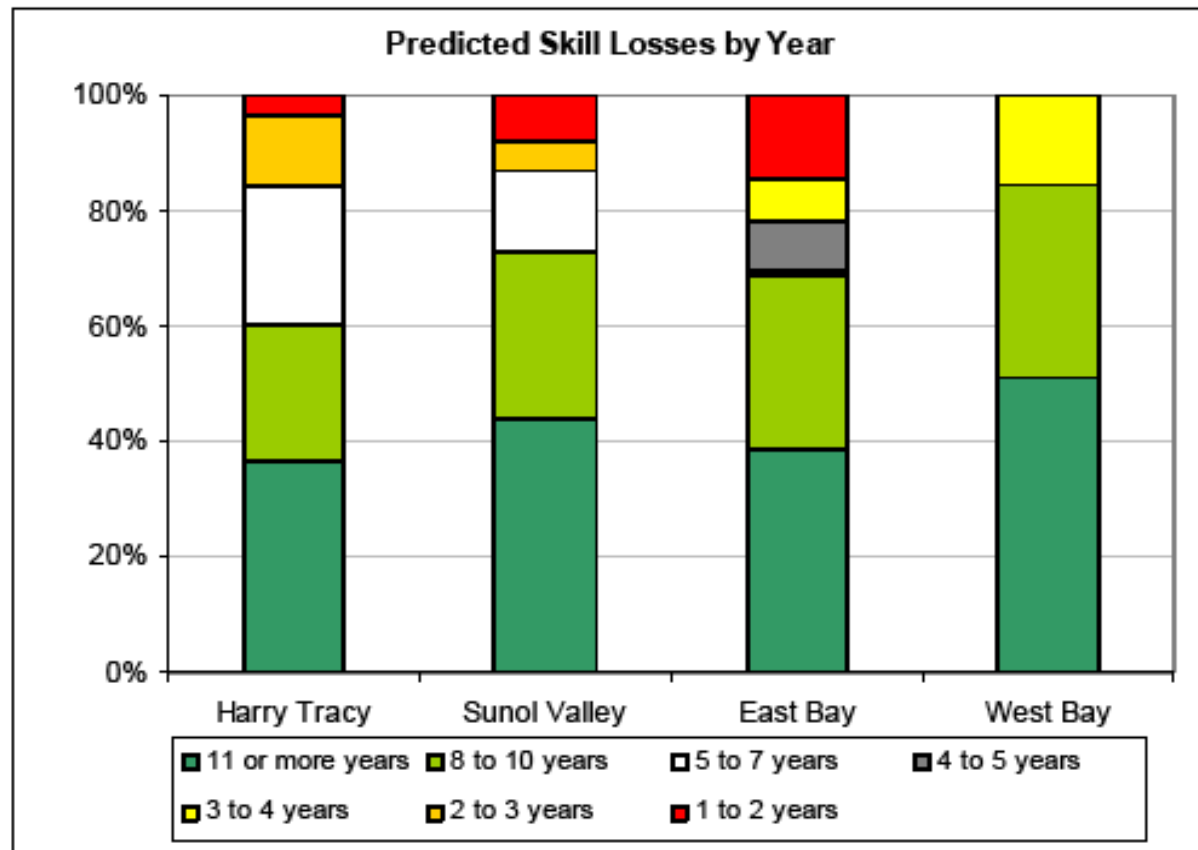
FINDINGS OF INTERLIANCE COMPETENCY ANALYSIS

Present Capability



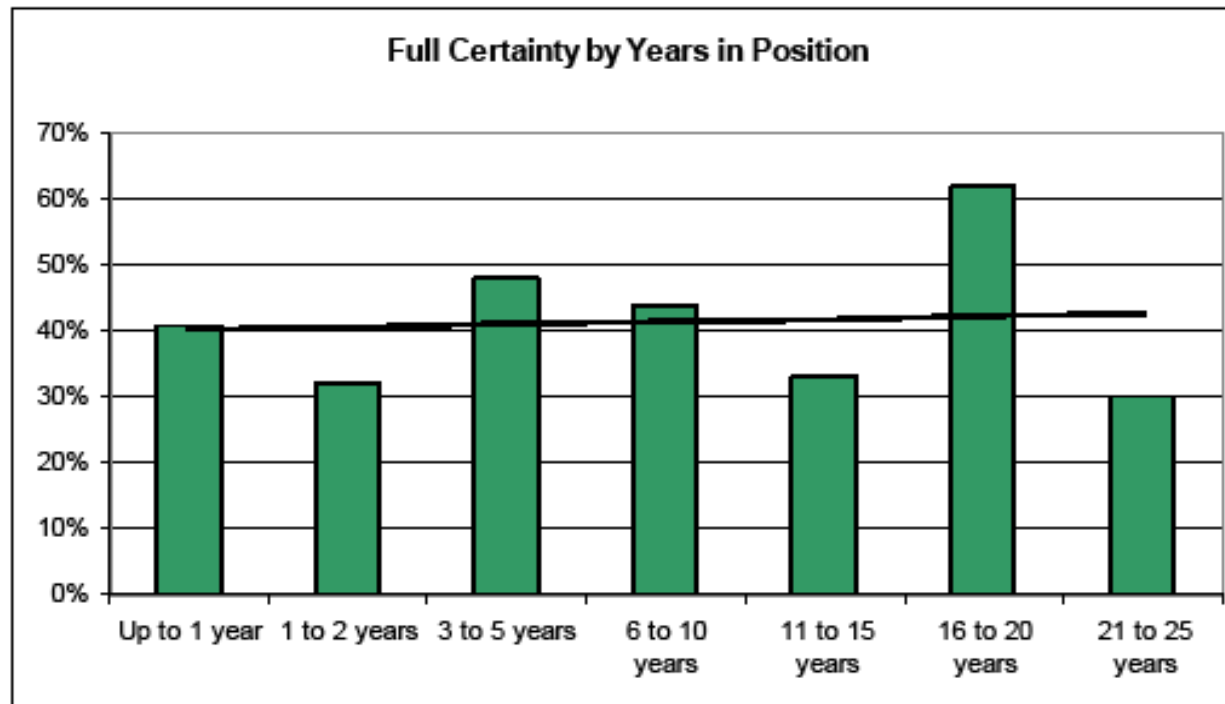
- Overall, respondents averaged full certainty for 44% of the equipment in their area of responsibility

Key Concern - Skill Risk from Retirement



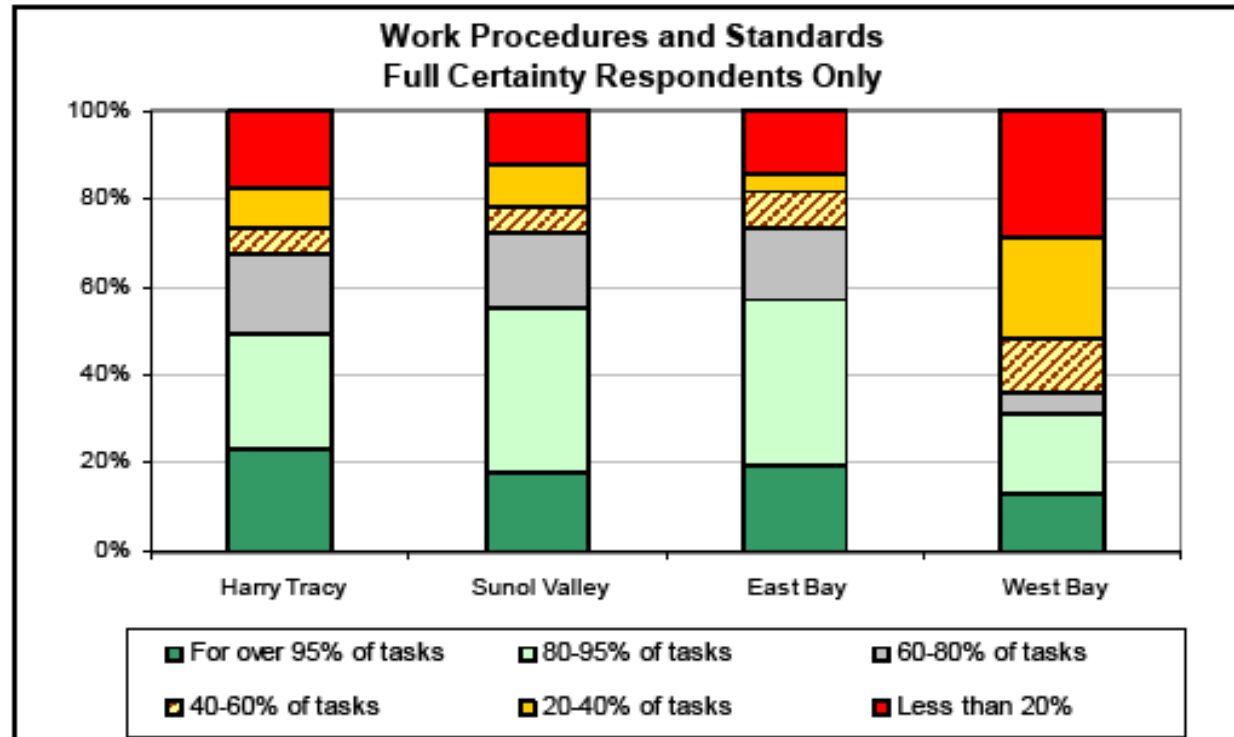
- Within three years, these facilities will lose 13 percent of their skills.

Learning Rate of the Organization



- Years in position is not a strong indicator of the level of full certainty.
- Unless a proactive approach is taken to skill development, the natural learning rate may not be sufficient to replace lost skills.

Lack of Work Procedures and Standards



- Benchmark data shows that error rates double when performing tasks without complete documentation.
- The highest error rates occur when people have incomplete documentation and partial or conditional certainty.



THE RECOMMENDATIONS

- Investigate processes with high problem rates
- Develop documentation where it is missing
- Develop a training plan based on identified needs

Formalize Training

Sample Map of Training Modules

Orientation	SMB Progression - PPO					
<p>Company Orientation</p> <ul style="list-style-type: none"> • Total, values, and philosophy • How it fits in the Company, how they impact the Company • Welcome/Development Program Orientation 	<p>COB-OP-01: Circulating Water System</p> <ul style="list-style-type: none"> • Drain the system and/or subsystems • Fill and vent the system and/or subsystems from plant cooling water system • Inspect, service, and adjust the system components, auxiliary equipment and auxiliary equipment • Manipulate, align, and verify the system components and auxiliary equipment • Start up and place the system in service • Recognize and respond to all system load alarms and abnormal conditions • Remove circulating water vacuum system from service • Remove cooler water system from service • Remove circulating water system from service • Start up and place the system in service 	<p>COB-OP-02: Condensate Makeup Desalination</p> <ul style="list-style-type: none"> • Direct and coordinate the operation of the makeup desalination system • Fill and vent the system and subsystems • Manipulate and align the system components • Monitor water quality and take corrective action as required • Recognize and respond to system load alarms and abnormal conditions • Start up and place the system in service 	<p>PWS-OP-01: Feedwater System</p> <ul style="list-style-type: none"> • Drain the system and subsystems • Fill and vent the system and subsystems • Inspect, service, and adjust the system components and auxiliary equipment • Manipulate, align, and verify the system components • Recognize and respond to system load alarms and abnormal conditions • Start up and place the system in service • Start up and place the system in service • Stop and remove from service the boiler drum level transmitter • Stop and remove from service the boiler drum level transmitter • Stop and remove from service the boiler drum level transmitter 	<p>BOW-OP-01: Boiler Water and Steam System - Start Through</p> <ul style="list-style-type: none"> • Control and maintain boiler parameters within specified operating limits • Direct and coordinate the operation of the boiler water and steam system • Manipulate and align the system components • Monitor water quality and take corrective action as required • Recognize and respond to all system load alarms and abnormal conditions • Transfer from high pressure back to once through steam generator during start-up and shutdown 	<p>APP-OP-01: Ash Handling System - Boiler Fly System Startup & Shutdown and Operation</p> <ul style="list-style-type: none"> • Control and maintain the ash system within specified operating limits • Direct and coordinate the operation of the system • Manipulate and align the system components • Monitor, inspect, service, and adjust the system components • Operate the system and/or vacuum pump controls • Recognize and respond to all system control alarm critical alarms • Start down and remove the system from service • Start up and place the system in service 	
<p>HR Orientation</p> <ul style="list-style-type: none"> • Company benefits • HR policies and procedures • Employee assistance • Health and safety 	<p>COB-OP-03: Condensate System</p> <ul style="list-style-type: none"> • Control and maintain the system within specified operating limits • Direct and coordinate the operation of the system • Fill and vent the system and subsystems • Inspect, service, and adjust the system components and auxiliary equipment • Manipulate and align the system components • Monitor the system, including components and subsystems • Operate the system pump controls in manual and automatic modes • Recognize and respond to all system control alarm critical alarms and abnormal conditions • Start down and remove the system from service • Start up and place the system in service 	<p>COB-OP-04: Condensate All Recycled System</p> <ul style="list-style-type: none"> • Control and maintain system components within specified operating limits • Direct and coordinate the operation of the system • Manipulate and align the system components • Monitor water quality and take corrective action as required • Recognize and respond to system load alarms and abnormal conditions • Start up and place the system in service 	<p>PWH-OP-01: Feedwater System - Heaters - LTRM</p> <ul style="list-style-type: none"> • Monitor and protect the feedwater heater system • Operate high pressure and low pressure feedwater heaters, tanks, and drains • Remove water in feedwater heater or boiler drum from service 	<p>BCC-OP-01: Boiler Chemical Cleaning</p> <ul style="list-style-type: none"> • Align boiler chemical cleaning systems by chemical cleaning • Perform boiler chemical cleaning • Monitor progress of boiler chemical cleaning • Support boiler chemical cleaning • Remove from service all boiler chemical cleaning systems and subsystems following completion of boiler chemical cleaning 	<p>ARB-OP-01: Ash Handling System - Recirculator Ash System</p> <ul style="list-style-type: none"> • Monitor, inspect, service, and adjust the system components • Recognize and respond to all system control alarm critical alarms • Start down and remove the recirculator and air transfer ash system from service • Start up and place the recirculator and air transfer ash system in service 	
<p>Plant Orientation</p> <ul style="list-style-type: none"> • Layout of the plant • Plant systems • Lockout procedures • Housekeeping procedures • Organizational structure/who is who • Plant specific policies and terminology • Location of drawings, tools, test equipment, personal protective gear, MSDS, break tools, etc. • Job performance expectations 	<p>COB-OP-05: Condensate Polishing System</p> <ul style="list-style-type: none"> • Direct and coordinate the operation of the condensate polishing system • Fill and vent the condensate makeup system components • Manipulate, align, and verify the system components • Monitor water quality and take corrective action as required • Recognize and respond to system load alarms and abnormal conditions • Start up and place the system in service 	<p>COB-OP-06: Condensate Polishing System</p> <ul style="list-style-type: none"> • Direct and coordinate the operation of the condensate polishing system • Fill and vent the condensate polishing system components • Manipulate and align the system components • Monitor water quality and take corrective action as required • Recognize and respond to system load alarms and abnormal conditions • Start up and place the system in service 	<p>PWD-OP-01: Subcooled Steam and Heater Drainage System</p> <ul style="list-style-type: none"> • Manipulate, align, and verify the boiler drains and components • Monitor and protect the boiler drain system components • Recognize and respond to abnormal conditions and load alarms • Remove water in boiler drain from service • Service the boiler drain components • Strip a boiler drain for normal service or startup 	<p>APP-OP-02: Recirculator Precipitator</p> <ul style="list-style-type: none"> • Start down and remove the bag house system from service • Start up and place the baghouse system in service • Manipulate and align the electronic precipitator system components • Monitor and protect precipitator hoppers • Start down and remove the electronic precipitator system from service • Start up and place the electronic precipitator system in service 	<p>BBS-OP-01: Feedforward System</p> <ul style="list-style-type: none"> • Monitor, inspect, and adjust the feedforward system components and auxiliary equipment 	
<p>QRT (Safety Training)</p> <ul style="list-style-type: none"> • QRT (Safety Training) 	<p>APP-OP-03: Ash Handling System - Boiler Fly System Startup & Shutdown and Operation</p> <ul style="list-style-type: none"> • Control and maintain the ash system within specified operating limits • Direct and coordinate the operation of the boiler water and steam system • Manipulate and align the system components • Monitor, inspect, service, and adjust the system components • Operate the system pump controls • Recognize and respond to all system control alarm critical alarms • Start down and remove the system from service • Start up and place the system in service 	<p>COB-OP-07: Condensate Polishing System</p> <ul style="list-style-type: none"> • Direct and coordinate the operation of the condensate polishing system • Fill and vent the condensate polishing system components • Manipulate, align, and verify the system components • Monitor water quality and take corrective action as required • Recognize and respond to system load alarms and abnormal conditions • Start up and place the system in service 	<p>CSO-OP-01: Water Chemical Feed and Water Sample System</p> <ul style="list-style-type: none"> • Manipulate, align, and verify the system's components, per guidelines and water lab • Start down and remove the system from service • Start up and place the system in service • Strip boiler water chemical feed and water sampling system components 	<p>BOW-OP-02: Boiler Water and Steam System - Drum</p> <ul style="list-style-type: none"> • Direct and coordinate the operation of the boiler water and steam system • Manipulate and align the system components • Monitor, inspect, service, and adjust the system components • Operate the system pump controls • Recognize and respond to all system control alarm critical alarms • Start down and remove the system from service • Start up and place the system in service 	<p>APP-OP-04: Ash Handling System - Boiler Fly System Startup & Shutdown and Operation</p> <ul style="list-style-type: none"> • Manipulate and align the boiler fly feed system components • Recognize and respond to all system control alarm critical alarms • Start down and remove from service feed of boiler system • Start up and place feed of boiler system in service • Start up and place in service a coal feeder jacketed air • Inspect, service, and adjust the boiler fly feed system components 	



KNOWLEDGE RETENTION – WHERE WE ARE NOW:

- Inadequate access to existing information
- Inadequate documentation on facilities, processes, procedures, technologies, and equipment
- Lack of decision support tools to help staff plan and implement complex processes
- Unreliable cataloguing and storage of valuable reports and documents
- No system that clarifies to staff what information they need to know to do their work, or how to find it



WHERE WE ARE GOING:

WATER/WASTEWATER INFORMATION SYSTEM
THAT WILL HELP STAFF FIND THE
INFORMATION THEY NEED TO PERFORM
THEIR WORK

KICK-OFF MEETING

Representatives from Water, Wastewater,
Information Technology Services, and
East Bay Municipal Utility District





PROCESS

Identify:

- Information needed by staff to perform their work
- Information available
 - Processes
 - Procedures
 - Permits
 - Maps and Graphics
 - Manuals
 - Training Materials
 - Videos
- Documentation missing
- Areas where training will be needed to supplement documentation



DATA COLLECTION FORM

DRAFT
WWEIS SURVEY ON INFORMATION NEEDED

Name: _____ Date: _____
Division: _____ Section: _____ Workgroup: _____

Please list information that workers in your workgroup should have easy access to in order to perform their work reliably (e.g., policies, procedures, operations and maintenance manuals, permits, regulations, maps, training materials, and decision support tools).

Information	Where it is stored	How it is stored	Who owns/maintains data?	Attribute or type of information	Facility	Additional documentation needed? Does it exist?	Further training for staff needed?			

Other people in your group or section you would like us to interview? _____



Website will be:

- Designed to access data from multiple sources
- Organized by organizational hierarchy
- Capable of searches by key words (e.g., name of facility)