San Francisco Public Utilities Commission, USA

Interfacing Technologies, Canada

1. Executive Summary / Abstract

The baby boomer retirement is putting companies' productivity and readiness to the test. How quickly and efficiently they rearrange their operations to the generational swap, will set the competitive edge of companies in the next years. Creativity and determination are crucial to overcome the challenge. The San Francisco Public Utilities Commission (SFPUC) implemented a business process management and workflow solution to drive change efforts across its organizations. The SFPUC deployed innovative ways to capture the baby boomers knowledge and transmit it to the new generation; without missing a step in service efficiency and quality, the SFPUC prepared itself for major challenges such as environmental preservation.

2. Overview

The San Francisco Public Utilities Commission is a department of the City and County of San Francisco that provides water, wastewater, and municipal power services to San Francisco. The SFPUC has over 2000 employees and provides four distinct services: Regional Water, Local Water, Wastewater (collection, treatment and disposal), and Power to 2.4 million customers (1). Two great challenges faced the San Francisco Public Utilities Commission in 2009 to maintain its high level of operational competency. Stemming from the baby boomer retirement, the challenge of knowledge capture, knowledge management, and knowledge transfer were considerable. And secondly, the SFPUC encountered a reliability and accountability issue via the incorporation of a vast number of new generation utility workers in a short period of time.

The SFPUC implemented a business process management and workflow solution (Interfacing Enterprise Process Center® - EPC) to manage knowledge retention issues and establish new ways "to share information and collaborate across the organizations" (2). The SFPUC mapped out its processes with associated step-by-step procedures and made this information available for all utility employees to

use on an on-demand basis as reference documentation and training material. Additionally, SFPUC launched a serious analysis of roles and responsibilities across departments in order to distribute process ownership and assign clear task accountability. Supported by a holistic perspective of the organization and a visual representation of tasks, utilities workers improved their sense of ownership and readiness which in turn enabled the SFPUC to extend its accountability beyond its organizations to reach end users.

As well as a challenge, the retirement of a significant portion of the workforce also created an opportunity to increase SFPUC overall process productivity and adopt latest technologies. With a new process-orientated vision of its organization and sustainable business architecture, SFPUC was able to establish a clear path towards process execution. Leveraging the EPC workflow engine, SFPUC was able to "replace" several human centric manual tasks with automated services and monitor the performance of these processes over time. The analytical data collected provides management with the business intelligence to uncover inefficiencies and strive to achieve a continuous process improvement culture within SFPUC.

3. BUSINESS CONTEXT

The baby boomer workforce retirement concern is often discussed within the media but most companies have not yet faced the reality of the situation. San Francisco baby boomers make up a slightly larger proportion of the (San Francisco's) total population as compared to the state and country. As of the 2000 Census, baby boomers made up 27.2% of the country's population, 26.9 percent of California's population, and 30.5 percent of San Francisco's population.

As they age, current projections indicate that San Francisco's baby boomers will cause a significant increase in the senior population that mirrors the national trend (…) The July 2007 (the California Department of Finance) projections estimate that the aging of the baby boomers by 2030 will swell the population age 65 to 85 from 10 to 16 percent in California and from 13 to 18 in San Francisco as compared to the 2000 Census figures. ("*San Francisco Baby Boomers – A Breed Apart?*" report, prepared by the *Advisory Council to the San Francisco Aging and Adult Services Commission* (2008)).

Mirroring the baby boomers national scenario, the San Francisco Public Utilities Commission estimated in December 2008 that a 20% of its workforce would to be retiring in 2009. Moreover, because of the technical nature of the SFPUC workforce, this challenge was exemplified. As a result, the SFPUC acknowledged the

need to improve its practices to capture, retain, and transmit knowledge to respond efficiently to the generational swap that could jeopardize its operations.

4. The Key Innovations

4.2 Business

The SFPUC felt a necessity to shift from traditional practices of knowledge capture to methods that will improve SFPUC accountability and productivity in the new millennium. The SFPUC addressed the operational risk presented by the baby boomer retirement using an innovative manner. The SFPUC implemented a creative and ambitious business process management and workflow solution to address its knowledge issues and correct process inefficiencies across the organization.

The SFPUC provides water, wastewater, and municipal power services to 2.4 million customers(1), throughout a complex net of processes and procedures orchestrated in different schedules across the SFPUC departments; thus, effort coordination and collaboration among departments are essentials to provide quality work. The business process management approach facilitated the SFPUC to identify work crossovers by mapping processes and procedures from a process-centric perspective across departments, which increased visibility between departments and transformed a cluster of processes and procedures into a holistic process framework. Supported by its cross-functional flowcharts, the SFPUC was able to identify gaps in work handovers and tasks redundancies. Carrying on its BPM initiative, the SFPUC demolished silos, and initiated a change of culture across its departments.

In the event of losing a great number of its workforce and having to incorporate a junior workforce in record time, the SFPUC needed to maximize its resources to cope with the knowledge challenge, plus enhance the quality of its overall services (for example, obtaining ISO14000 certification). As a result, the SFPUC pushed the envelope higher and went beyond optimization of some of its processes to automate steps that were manual, costly and added no value to its citizens (e.g. travel reimbursement process). With this tactic, the SFPUC alleviated budget and employees' workload to transfer resources to where they were more needed; for instance, in the field, serving the citizens of San Francisco and surroundings.

The SFPUC BPM initiative gave employees vision into their processes and encouraged them to provide feedback into new ways to be efficient. The SFPUC did a great leap towards its competitive advantage incorporating technology to fill the gaps and correct inefficient handovers of work. This new visual-oriented solution,

built to be more intuitive and error-proof (represented by business process management and video technology) established a new way to capture knowledge and transmit it within the SFPUC, which appeals to the next generation of tech savvy workers as well as caters the internet entry-level users (baby boomers).

4.3 Process

Like many government bodies, little incentive to share knowledge was given, resulting in a bureaucratic dynamic in which employees were hesitant to expose their underlying business processes. This lack of visibility created elevated operational risks with the baby boomers retiring from the organization. The SFPUC relies on utility employee's know-how and skills to deliver effective services. In addition to routine tasks, the SFPUC has inspection processes and procedures that due to their complex nature take about 45 days to complete, and are often not conducted on a regular basis (once every 5 – 15 years). Further emphasizing the need to properly document and manage each process as a means to eliminate the current knowledge transfer gaps. (2)

New employees rarely have all of the knowledge needed to operate or maintain a specific system, facility, or piece of equipment. Furthermore, in a world where government policies, regulations, technologies, infrastructures, and customer expectations are continually changing, there is no guarantee that experienced employees have received the information they need to perform reliable work. Even utilities that actively manage their physical infrastructure sometimes pair high-tech equipment with old-school approaches to information management -the shortcut for documentation is "Ask Fred"- (3).

SFPUC turned to business process management software to unite people, processes, and technology. For instance, the work order flow of the SFPUC's wastewater enterprise, as mapped using a BPM tool, provided step-by-step manual linking instructions on how to complete each task with the documents used to complete the task. The deliverable for this task cluster is a work order request that is accurate and complete before it is assigned to a maintenance planner and the field staff members who perform maintenance work. This system included processes with hand-offs to other city departments. (3)

Beyond knowledge management, a key driver for the San Francisco Public Utilities Commission BPM program was to minimize/remove tasks which were the source of employees' discontent. The intent of this strategy was twofold; decrease the turn-over rate of new employees entering SFPUC, and secondly, increasing the likelihood of the current workforce electing to delay their retirement. They selected the Travel Expense Reimbursement process as the first process to auto-

mate within the organization. The reimbursement process was prioritized as mission critical because of four primary reasons:

- Lengthy, costly, manual nature of the process.
- 80% percent of the workforce runs this process.
- Increasing the workforce job satisfaction.
- Process cost brings no added values to the citizens of San Francisco.
- Required compliance financial controls and audit trail.

Leveraging EPC workflow, the SFPUC reduced time and costs associated with a processes' development and implementation. For example, the standardized expense reimbursement process of the wastewater department asked employees to print out a form, complete it by hand, and attach to it the receipts. Then, employees had to physically walk the documents over to their supervisor workstation for approval. Supervisors were required to manually review and approve every expense item and then physically remit the expenses for 3 additional levels of approval before the controller was able to issue the reimbursement.

Figure 1. Automated Travel Expense Reimbursement Process

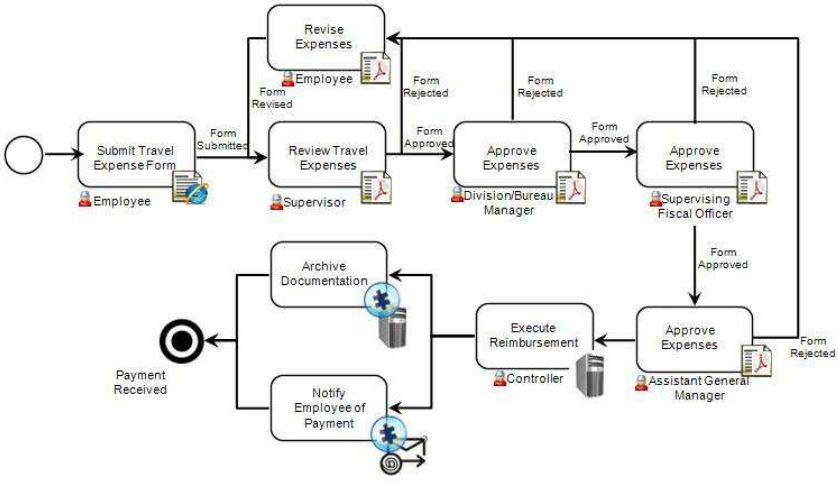
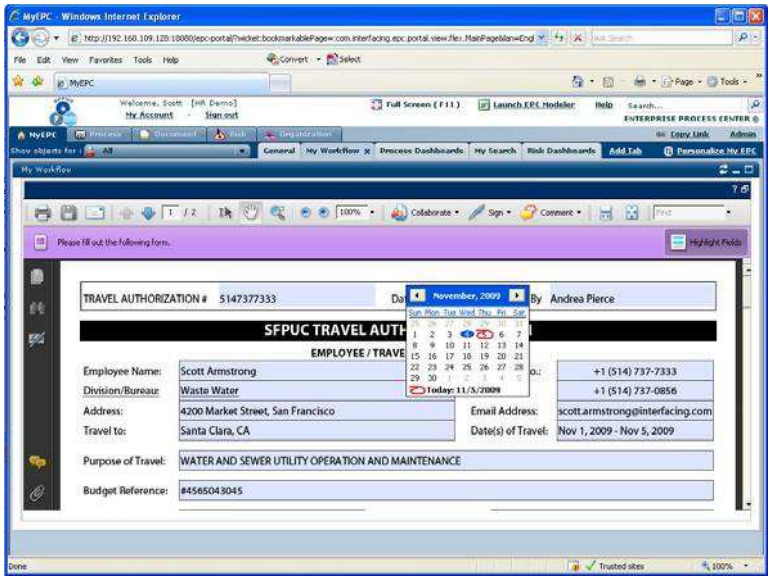


Figure 2. SFPUC Travel Authorization eForm (EPC Web Portal)



Using the travel reimbursement process as a successful proof of concept for the value of extending their business process management program beyond knowledge management and process optimization to include automation, SFPUC is in the midst of prioritizing and rolling out the workflow on other critical customer facing processes (eg. Energy Conservation Incentive Process)

4.4 Organization

The SFPUC started tackling the knowledge management problem using a wiki-tool to address employees' need for information sharing. Although valuable, the shortcoming of the wiki lied in the fact that documents lacked relevance. A document search query resulted in hundreds of entries found making it impossible to locate the proper required information, causing employees to return to the old "Ask Fred" approach.

The SFPUC is required to comply with regulatory permits for such diversified water and air quality standards group as CEQA, CEQ, NPDES, BAAQMD (4), and is currently also in the process of obtaining ISO14000 environmental management certification. As regulatory requirements constantly evolved, the SFPUC had difficulty with communicating new environmental regulations or permits required to staff. Thus, this lack of knowledge may result in employees in the field unintentionally violating a norm while performing work - a major liability risk for SFPUC.

The SFPUC mapped key processes, their steps, and for each step, visual maps displayed roles, responsibilities and deliverables using a business process management application. Each step was also linked to the documents (e.g., maps, forms, task videos, and permits) needed to perform the step. (3) Employees will refer to technology to fill in the gaps of information. The BPM application "took data and turned it into usable information" (2). The SFPUC employees became a "more engaged, highly performed workforce" and new employees showed a "shorter learning curve" (2). Business process management facilitated the SFPUC to implement and control specific business strategies (e.g. ISO 14000 certification).

5. HURDLES OVERCOME

Management

Although process mapping was nothing new to SFPUC, Business Process Management was an unknown concept which required validation for management to endorse an organizational-wide BPM initiative.

January 2009 SFPUC launched a 30 day proof of concept (POC) to deploy the Enterprise Process Center® BPM software within the IT group with the mandate to model and communicate the IBM Maximo asset management processes across organizational entities. These were flagged by management as critical to the organizational because SFPUC was in the midst of undergoing a major software upgrade from version 4.0 to 7.1; a major change that due to the number of touch points involved it was handled as a new implementation (2). Limited visibility of both the current and future Maximo processes posed a significant operational and change management threat to the organization.

The knowledge gained and shared, within such a short period of time, during the POC provided management with the justification required to move forward with the BPM program in support of its current largest organizational challenge -- the end of the "baby-boomer" era.

Business

In March 2009, the SFPUC management team, led by the assistant general manager, held meetings to define and prioritize mission critical processes (extra weight was given to those processes with a prevalent number of retirees.) Process prioritization was the one of the greatest challenges that the SFPUC encountered because according to SFPUC union laws, organizations are not entitled to ask an employee their date of retirement; therefore, management lacked data to make

well informed decisions. With this setback, it took management approximately 2 months of analyses to reach a consensus on process priorities.

Another significant challenge encountered by SFPUC was to identify the Subject Matter Experts (SME) for the mission critical processes. With then current process knowledge being ad-hoc as well as undefined process and task boundaries, overlapping responsibilities was common and accountability was resisted. Using the SIPOC methodology from Six Sigma, SFPUC overcame this hurdle by breaking out large-scale process knowledge into more manageable pieces (sub-processes) and associating ownership at different levels.

Organization Adoption

The greatest lesson learned by SFPUC was the importance to communicate clear and positive objectives to invitees of a process discovery workshop prior to commencement. During roll out, the first two days of workshops were unproductive because there was a vast amount of resistance from the attendees which posed immediate concerns for the overall BPM program. Analyzing the attendees' profound resistance to the initiative uncovered the root of the issue had been directly related to the workshop objectives phrasing. The messages circulated to the attendees provided no details of the objectives of the program as a whole and contained negative feedback phrases such as "this process is seriously broken". Groups entered the workshop sessions straight away on the defensive and were pre-prepared to prove they did in fact have process knowledge, obviously creating a hostile work environment.

All negative connotations were immediately removed from the communiqué and the overall objectives of the program (knowledge capture & retention, collaboration, process improvement) were also added. A simple change in message provided an instant transformation in attitude and overall workshop quality starting day 3 and going-forward. Attendees now view workshops as an opportunity to provide input into their operations and a forum for change requests and improvements.

6. BENEFITS

6.1 Cost Savings

"The cost of lost knowledge is hard to quantify – but the cost savings are evident" (2). The BPM and workflow initiative also supported SFPUC's ongoing paperless push to engage employees to be more environmentally responsible in their tasks. The benefits of paperless operations are: reduction in the real estate needed to store historical documentation, decreased printing costs, and less time to retrieve and distribute documents.

The addition of video technology to the process maps also led to cost reductions. For example, the Moulton Niguel Water District in Laguna Niguel, Calif., captured video of how its pumping and energy management practices were performed. Those videos were then reviewed by the staff members from departments ranging from maintenance and IT to engineers and electronic control technicians. Their observations were combines with additional data analysis, and the district was able to change its energy consumption practices in a way that resulted in dramatically reduced electrical cost (3).

6.2 Time Reductions

In July 2009, the wastewater department automated the travel expense reimbursement process and implemented electronic dynamic web forms with field validations -to reduce the number of key errors- that employees complete online and attach their corresponding scanned invoices for submission. The eform then moves though a multi-tiered approval phase where automatic e-mail notifications are sent as constant reminders and business rules enforce due dates with automated escalation actions. By automating the process, the throughput processing time from employee request to reimbursement is estimated (limited historical data) to be reduced by as much as 50%. Additionally, workers will now have the ability to track the status of their expense requests online – putting the knowledge into employees' hands instead of leaving them "in the dark" which causes aggravation and low morale.

6.3 Increased Revenues

As a public entity, increased revenues were not a critical success factor for SFPUC. The mission of the San Francisco Public Utilities Commission is to serve San Francisco and its Bay Area customers with reliable, high quality, and affordable water and wastewater treatment while maximizing benefits from power operations and responsibly managing the resources—human, physical, and natu-

ral—entrusted to its care. (6) The drive for the SFPUC to implement a BPM and workflow solution was to manage knowledge, correct inefficiencies and optimize processes to transfer resources to generate value to its citizens – all achieved throughout this program.

The SFPUC continues to be a technology leader within the public domain and is one of the few departments within the city of San Francisco to consistently close quarterly expenditures below allocated budget – viewed as a "profitable" department.

6.4 Productivity Improvements

The SFPUC centralized electronic knowledge base was used as a method to supplement job shadowing and overcome glitches due to lack of information which stall employees and threaten their performance in the field. Videos synthesize information by exemplifying the critical steps of processes and procedures; plus they can also be used to review by an employee who missed, were unclear on, or simply forgot a portion of a classroom or onsite training. Video procedures instill confidence in staff members that a procedure works, because they have actually seen it work. Finally, visual recording of the execution of an unusual process or procedure allows employees to watch a task that is rarely performed (e.g. a procedure that can only be performed in low-demand conditions). (3) The SFPUC strategy reduced employees' *downtime* due to insufficient access to data.

7. BEST PRACTICES, LEARNING POINTS AND PITFALLS

7.1 Best Practices and Learning Points

- ✓ The pre-built APQC Process Classification Framework within EPC provides a great benchmark for kick starting your BPM program.
- ✓ The pre-built ITIL process library provides great insight into best practice IT service management processes and controls.
- ✓ Workflow optimizes standardized processes by automating tasks that do not add value to processes and reduce the number of errors when executing a task.
- ✓ Business process management software facilitated SFPUC management staff to view the organization at different levels and process interaction and by clicking on the processes exposed more detailed information (e.g. documents, tasks).
- ✓ Being able to standardize and reuse processes across the organization, for example, an inspection video and an expense reimbursement process, reduces time and costs associated with development and implementation. Plus, practices across the organization are consistent.

- ✓ Video technology is an alternative for knowledge management that transmits consistent information across the organizations, and it can be used as a basis for reviewing and refining practices.
- ✓ Business Process Modeling Notation (BPMN) is an effective standard for business process management initiatives for both technical and business users by providing a notation that is intuitive to business users yet able to represent complex process semantics.
- ✓ Low level small-scale processes do not allow employees to understandtheir contribution to the whole organizational system and as a result, theyfeel less engaged in their work.
- ✓ BPM software can automatically generate end-to-end value stream maps optimizing the level of visibility within a process.
- ✓ Paperless operations cut costs associated with printing, paper storage and filing.

Pitfalls

- × Avoid ambiguous communication and use simple messages in which goals are clearly stated
- × Do not bite more than you chew -- prioritize your processes then divide and conquer
- × Do not try to run before you walk – first establish a sound business architecture before moving to process workflow automation
- × Your business is not a light switch -- you cannot flick a switch to turn all your processes into executables - select small scale processes to workflow/automate for quick wins to start and gain buy-in

8. COMPETITIVE ADVANTAGES

The changes that the SFPUC carried out across its organizations gave it a competitive edge over other government organisations and over those in the private sector, situating the SFPUC as a benchmark of its industry.

The SFPUC were invited by the Water Environment Federation to share their successful business improvement program at the 2009 Technical Exhibition and Conference (WEFTEC) in Orlando, FL. With the presentation entitled, "Tackling the Exodus of Knowledge as Utilities' Workforce Exits the Labor Market." The presentation outlined change efforts that are being implemented by Wastewater Enterprise. Two of the change efforts are content-centric focusing on IT tools and interfacing with technology. mIToolbox, a wiki software, used to capture,distribute and allow access to important data through a web portal that gives all staff access 24/7. And a Business process management software that allow SFPUC to capture its mission critical functions utilizing a mapping step-by-step process that will assign role responsibility to tasks and attach documents needed to do

quality work. “This practice provides training for present and future workers and will streamline our process and help us become more operationally efficient. (5)

The American Water Works Association Journal published a feature story, entitled “Using IT, Part 2: Achieving comprehensive knowledge preparedness in your workforce” about SFPUC business management initiatives to overcome a knowledge management challenge (October 2009 101:10.) The article discussed the IT tools available to help with three vital components of knowledge preparedness: Knowledge capture, knowledge management, and knowledge transfer.

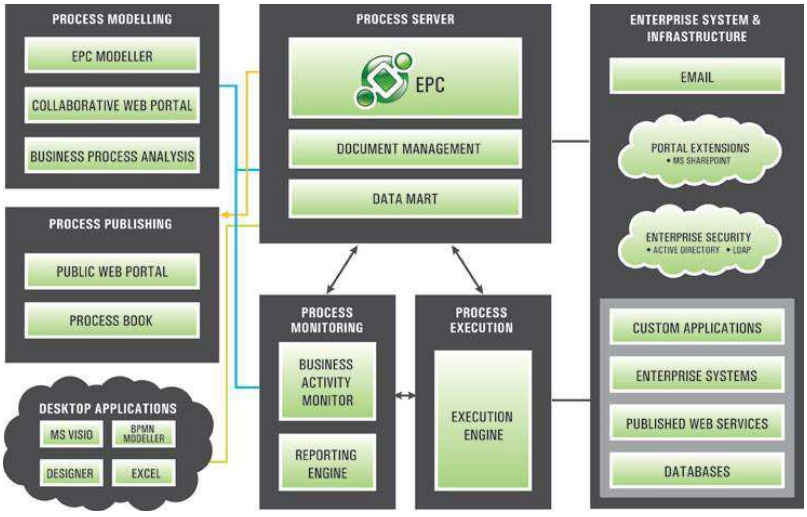
The SFPUC competitive advantage gives them an additional gain in the recruiting field presenting itself as a more appealing workplace, with greater chances to retain employees. The SFPUC is a more efficient and accountable organization, committed to offer better and competitive services for the citizens of San Francisco.

9. TECHNOLOGY

San Francisco Public Utilities Commission implemented the Interfacing Enterprise Process Center® business process management software in support of their innovative knowledge management program. Differing from conventional process repositories, EPC’s ‘smart’ process repository allows users to manage all objects from one central location, view all object uses and process touch points, reuse objects across processes, create user defined attributes on all objects, conduct impact analyses, and much more. EPC enables users to effectively take a step back from their business processes and view all related process components, providing a blueprint of their business operations. Using EPC, SFPUC was able to build a sound business architecture and establish a clear path towards process standardization and execution.

Enterprise Process Center® “is easy to use requiring little or no training for rollout therefore lowering resistance especially by our non-tech employees. It also allows us to easily train new employees with the knowledge relevant to their roles and responsibilities. (Finally,) it (…) appeals to the millennial generation and their learning style, we hope this will help us to attract and retain them as well.” (2)

Figure 3: Interfacing Enterprise Process Center Architecture



EPC functionality allowed SFPUC to:

- Map processes graphically in the easily understood Business Process Modelling Notation (BPMN).
- Comprehensively document end-to-end processes, capturing critical job knowledge.
- View process related documents, resources, assets, risks, controls, and all process touch points.
- Conduct resource capacity planning, activity based costing, bottleneck identification, critical path analysis.
- Automate selected human-centric tasks using web forms and Adobe pdf eforms.
- Automate selected system-centric tasks and execute Service Oriented Architecture (SOA) business and agile development strategies by aligning process workflow using services to integrate with existing systems within your organization.
- Adapt process instances on-the-fly as well as create ad hoc process execution (rewind, skip steps, etc.) for complete flexibility.
- Leverage an integrated English syntax business Rules engine
- Track & monitor processes performance via the integrated OEM Cognos BI module

10. THE TECHNOLOGY AND SERVICE PROVIDERS

Interfacing Technologies Corporation (founded in 1983) is a leading international provider of Business Process Management (BPM) software that allows business users to manage the entire lifecycle of a process. Interfacing's software and consulting services span the entire process maturity model: from static process modeling in their Free BPMN Modeler for MS Visio®, to their multidimensional collaborative BPM suite the Interfacing Enterprise Process Center® (EPC). Interfacing EPC supports a range of process management initiatives; documentation, simulation, governance (Risk/ Control), deployment (SOA), and monitoring. Interfacing's solutions focus on motivating business users to create a sustainable process culture across the organization through the implementation of best practice quality frameworks and methodologies (APQC PCF, ITIL, eTOM, Six Sigma, SCOR, ISO). (www.interfacing.com).

References:

1 -"San Francisco Public utilities Commission Delivers Easier-to-read Bills and Enhanced Customer Service." 2007.

2 – Andrea Pierce, PMP, CRM ITS - Business Applications and Development San Francisco Public Utilities Commission City and County of San Francisco.

3 - "Using IT, Part 2: Achieving comprehensive knowledge preparedness in your workforce." American Water Works Association. 2009.

4 – Name of some of the regulatory permits that the San Francisco Public Utilities Commission supports: California Environmental Quality Act (CEQA), Council on Environmental Quality (CEQ), National Pollutant Discharge Elimination System (NPDES), Bay Area Air Quality Management District (BAAQMD)

5 – "SFPUC Delivers Workforce Development Presentation at WEFTEC Conference" Catherine Curtis, Wastewater Enterprise. October 2009.

6 – "SFPUC Water Enterprise Environmental Stewardship Policy". San Francisco Public utilities Commission. FINAL DRAFT June 27, 2006