



THE CITY OF SAN DIEGO



Water Policy Implementation Task Force

City of San Diego Public Utilities Department Water Loss Prevention

Jesus Meda, Deputy Director, Water System Operations Division

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Water Distribution System

- Average daily demand: 172 million gallons per day
- More than 3,300 miles of water mains ranging in size from 4 inches to 84 inches in diameter
- 49 water pump stations and 29 tanks/reservoirs
- More than 130 pressure zones with over 950 pressure regulating valves
- Approximately 25,000 fire hydrants
- More than 275,000 service connections and meters
- Service area elevation ranges from sea level to over 1,000 feet elevation



Water Loss Prevention

- Public Utilities Department is addressing water loss prevention through various means:
 - Active participation with the California Urban Water Conservation Council
 - On-going Department efforts and goals related to leaks and breaks
 - Capital Improvement Program Projects
 - Various in-house and consultant studies



California Urban Water Conservation Council (CUWCC) Participation

- The City is a signatory to the 1991 “Memorandum of Understanding Regarding Urban Water Conservation in California” (MOU)
- Contains 14 Best Management Practices (BMPs) that are statewide standards for achieving long-term water conservation (BMP 3 governs system water audits, leak detection and repairs)
- Signers pledge “good faith effort” to implement BMPs that are cost effective
- MOU created the California Urban Water Conservation Council as governing body



California Urban Water Conservation Council Participation

- In 2009, BMP 3 was revised to BMP 1.2-Water Loss Control
- New BMP 1.2 Incorporated the International Water Association and the American Water Work Association (AWWA) standard methods and terminology to perform water audits, including AWWA's 3rd Edition M36 Manual *Water Audits and Loss Control Programs*



IWA Standard Water Balance

System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non Revenue Water
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Customer Meter Inaccuracies	
		Real Losses	Leakage on Transmission and Distribution Mains	
			Leakage and Overflows at Storage Tanks	
			Leakage on Service Connections up to point of Customer Meter	



California Urban Water Conservation Council Participation

Department compliance with BMP 1.2-Water Loss Control

- Department performs and submits an annual Standard Water Audit and Water Balance using the AWWA Water Loss software
- BMP 1.2 has specific requirements to develop, validate, document and track various record-keeping and data components (such as leak repair times and volumes, real and apparent losses/etc)
- Over the next five-year period, agencies will be tasked with demonstrating progress in water loss control performance as measured by various AWWA software real loss performance indicators



On-going Efforts and Goals Related to Investigations and Leaks/Breaks

Public Utilities Department prioritizes the investigation and repair of water leaks, main breaks and fire hydrant knock-overs

- Department's goal is to investigate and repair reported distribution service leaks within three working days
- Department's goal is to respond and shut down main breaks and knocked over fire hydrants within one hour



Capital Improvement Program (CIP)

Public Utilities Department's Capital Improvement Program replaces aged infrastructure

- Department has replaced more than 50 miles of old cast iron pipe over the past two years (FY11 and FY12) and has 90 to 100 miles of cast iron pipe remaining to replace over the next few years
- Department's other infrastructure, such as asbestos cement pipe (2,100 miles in system) is also reaching the end of its useful life and is experiencing an increase in breaks/leaks which will also require replacement



Various In-House and Consultant Studies

In 2010, Public Utilities Department staff prepared a Non-Revenue Water Study

- Primary purpose was to assess the volume of water loss within the distribution system
- Utilized as a guide AWWA's 3rd Edition M36 Manual *Water Audits and Loss Control Programs*
- Developed non-revenue water data for apparent losses, real losses and unbilled authorized consumption
- Study results were incorporated into BMP 1.2 reporting and used to develop scope of work for future studies



Various In-House and Consultant Studies

Department has hired a consultant to prepare a citywide potable water meter evaluation and replacement study to address apparent water losses due to meter inaccuracies

- City has approximately 275,050 meters (273,700 small & 1,350 large)
- Small meters are currently replaced on a 24-year cycle or when there is an identified failure
- Large meters are tested annually and repaired as necessary
- Based on City testing information, it is estimated that 30 to 40 percent of the City's water loss is attributable to water meters
- AWWA recommends replacement of meters with accuracy limits less than 96 percent

This study is on-going and expected to be completed by the end of the year. Study results will be used to develop a cost effective replacement and preventative maintenance cycle.



Various In-House and Consultant Studies

Brady/IBM partnership study with the City

- Study on-going since January 2012
- Study employs complex system of data management, analysis, and computer algorithms in an attempt to pin-point leaks
- Study data is captured from utilizing 200 smart meters, 20 pressure loggers scattered throughout the studied pressure zone, existing meter read information, and existing flow meter information
- First iteration results in November were used to map potential leak locations
- However, no leaks on the pressure zone's mains were located
- This information was used to further refine the model
- Additional iterations are currently underway
- Study is expected to be completed in the spring



Water Loss Prevention Summary

- The City has historically conducted annual audits of “unaccounted for water” losses per the requirements of the California Urban Water Conservation Council’s BMP 3 (prior to 2010)
- After 2010 and per the requirements of CUWCC’S amended BMP 1.2 (water loss control), the City has completed standard water audits and balances every year
- City uses the water audits to assist with meter replacement strategy, system replacement and operational strategies to minimize water losses



Water Loss Prevention

QUESTIONS?