

This presentation premiered at WaterSmart Innovations

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8 Years of AWWA Water Audit Data - What Next?

City of Rio Rancho, NM
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Introduction

- City of Rio Rancho
 - 32,000 active meter connections
 - 90,000 people
 - 1 water source
- Now 9 years of data from AWWA water loss spreadsheet (2006-2014)
- What does it all mean?

Why Rio Rancho does water loss accounting?

- Improve operations
 - New W.C. employee,
 - Limited water resource,
 - Large losses,
 - Fastest growing city in NM
- No mandate!

Status (2008-2012)

- Data Validity
 - Variables left at 2007 levels
 - Defaults were used
- System Management
 - Leak detection program started but not maintained
 - AMR installation
 - Billing updates maintained

2013

- Requested by management
 - Need to do statistics/data validation
 - Interpretation of results 2006-2012
- Hired consultant to assist
- Review of all 7 years and complete 2013
 - Updates – changed defaults to calculated estimates in 2013
- Service line replacement program

Water Balance Info for Calculation

System Input Volume (corrected for known errors)	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption (including water exported)	Revenue Water
		Unbilled Authorized Consumption	Billed Unmetered Consumption	Non-Revenue Water (NRW)
			Unbilled Metered Consumption	
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Customer Metering Inaccuracies	
			Systematic Data Handling Errors	
		Real Losses	Leakage on Transmission and Distribution Mains	
			Leakage and Overflows at Utility's Storage Tanks	
			Leakage on Service Connections up to point of Customer metering	

Brief Introduction to AWWA Audits

- Water pumped – water billed = water loss
- Unaccounted for water vs non-revenue water
- Use of versions 4.0, 4.2, 5.0



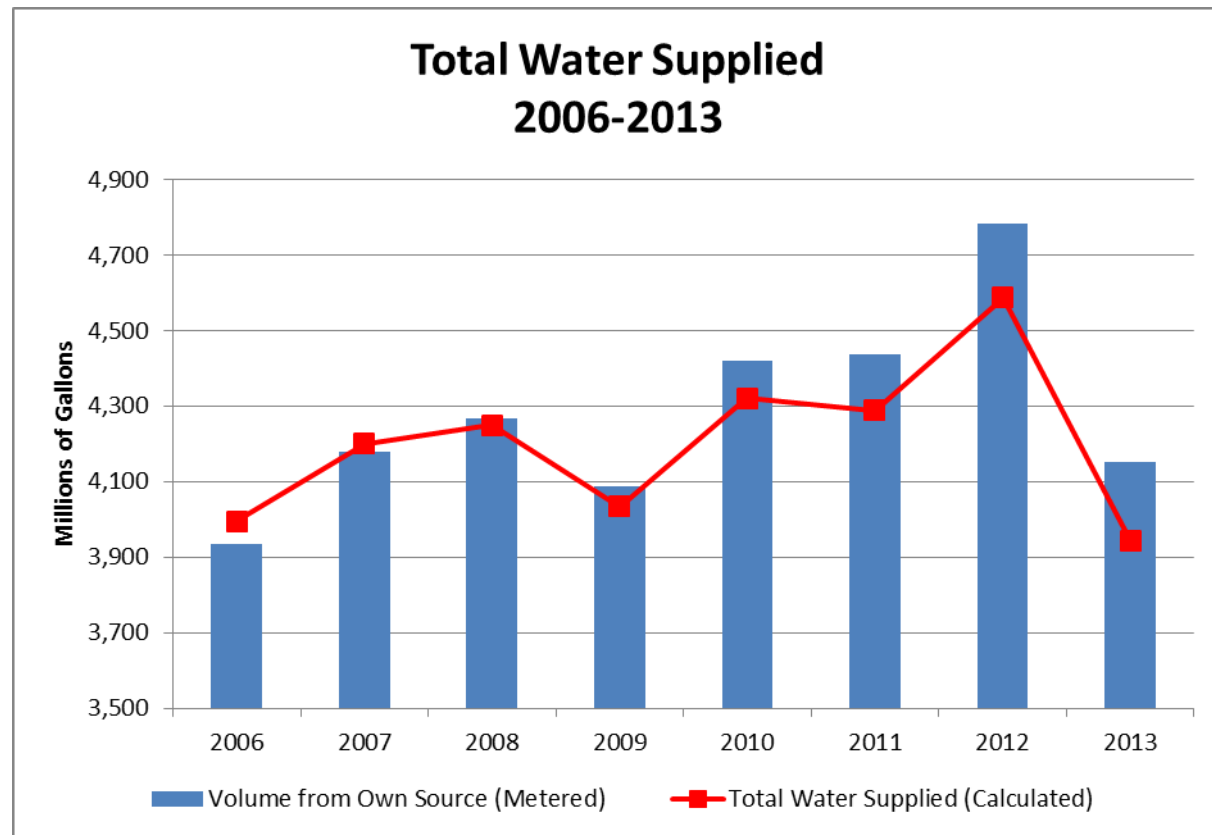
System Input Volume

- Water from own sources
 - CORRECT FOR KNOWN ERRORS
- Imported water added
- Exported water

Results – Total Water Supplied

- Master Meter Error
 - First full testing in 2007
 - Partial test in 2011
 - Assumed under-reporting progression over time 2007-2012
 - New complete test 2014
 - Discovered over-reporting in 2014 (MAG meters)
 - Major error on Well #22

Calculated Total Water Supplied Adjustment for Meter Error

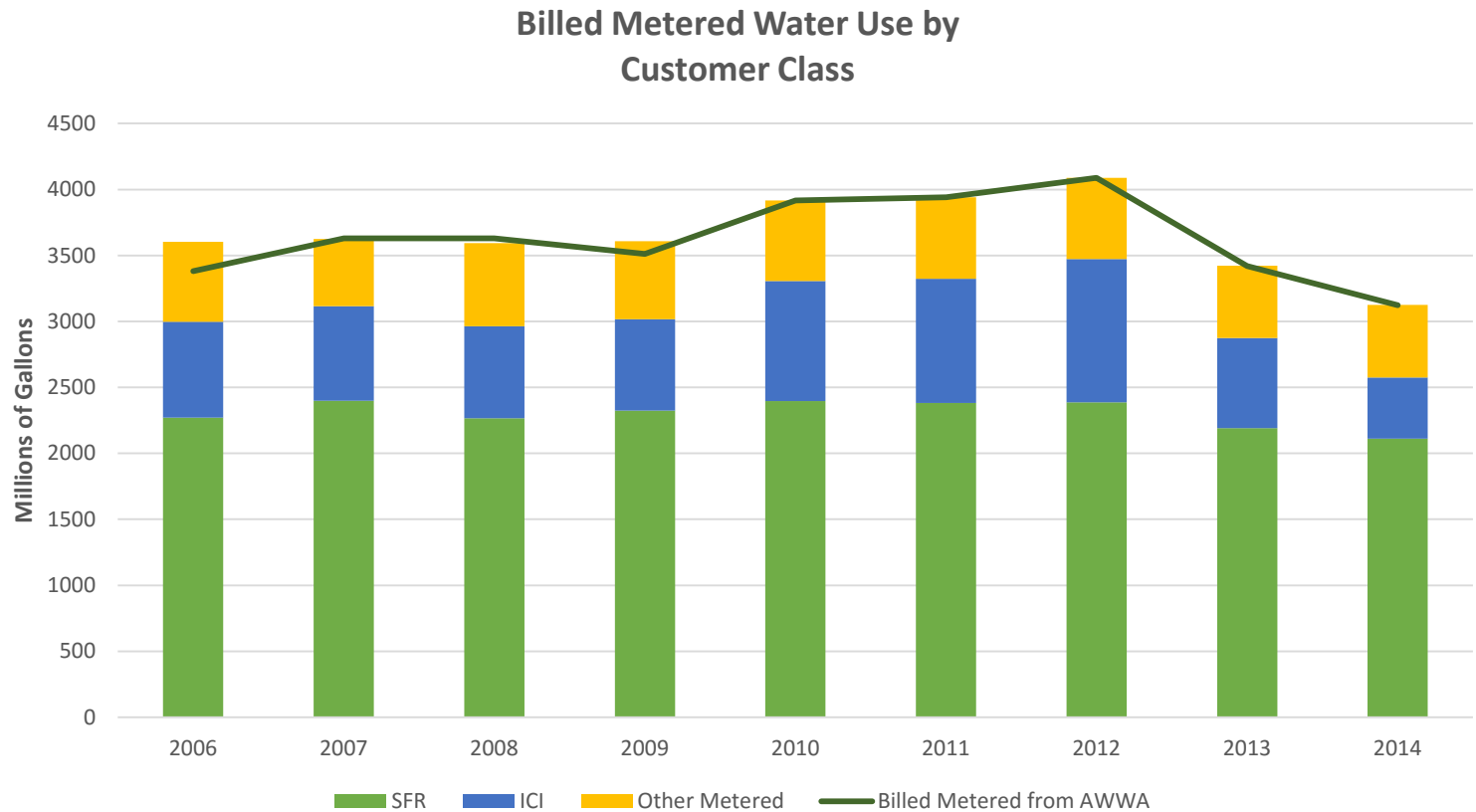




Authorized Consumption

- Revenue
 - Billed Metered – 100%
 - Billed Un-Metered - none

Authorized Consumption = Revenue Water



Authorized Consumption = Non - Revenue Water

- Unbilled and Authorized in Rio Rancho
 - Fire Department
 - Fire Hydrant and water line flushing
 - Arsenic Treatment
 - Sewer line flushing

Authorized – Non-Revenue Findings

- Fire Hydrant Flushing –
 - Diffuser installed 2008
 - Under-estimating by 30%
- Arsenic Treatment came online in 2008
- Sewer Flushing –
Data since 2014
- Fire Department –
Under-reporting



Results - Unbilled Unmetered

- 2008-2012 used software default values
- 2013 updated to calculated values
 - Fire hydrant flushing
 - Fire department
 - New treatments (arsenic, RO)
- 2014 used calculated values

Unmetered Unbilled Authorized Uses 2006-2013

	Flushing from Main Lines and Fire Hydrants*	Treatment		Fire Department	Totals
		Arsenic treatment	RO Well#12		
2006				809,875	na
2007	8,510,404.5			1,082,000	9,592,404.5
2008	1,128,388.3	871,238**		985,750	2,985,376.3
2009	594,409.4	7,224,719		880,750	8,699,878.4
2010	2,388,258.6	7,752,987		1,020,750	11,161,995.6
2011	6,377,150	8,499,460	6,267,200	872,875	22,016,685
2012	3,042,240.5	8,988,533	44,169,600	949,875	56,200,373.5
2013	1,085,245.2	10,012,402	46,089,280	826,500	58,013,427.2

Water Losses = Non-Revenue Water

- Apparent Losses (paper water)
 - Unauthorized consumption (theft)
 - Customer meter inaccuracies
 - Systematic data handling errors
- Leak Losses (wet water)
 - Leaks on main lines
 - Leaks/overflows at storage tanks
 - Leaks on service lines before meter

Apparent Losses - Earliest Findings (2006-2007)

- Theft
 - Misuse of fire hydrant meters
- Systematic Data Handling
 - Found billing issues
 - Irrigation meters not in billing system (water use audit)
- Customer Meter Inaccuracies
 - Assumed 3% under-read error

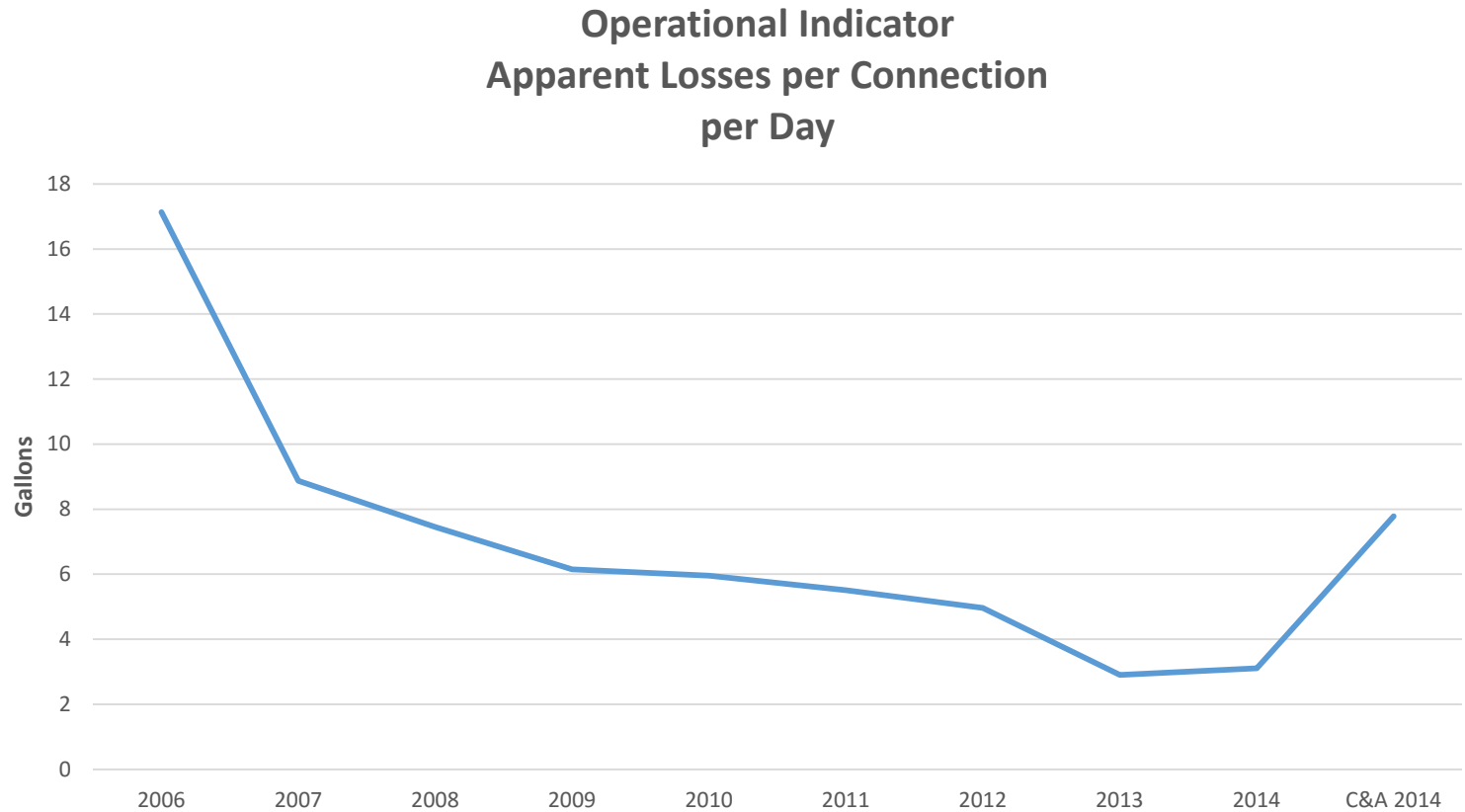
Apparent Losses - 2013

- Theft
 - Default value 0.25% water supplied
- Systematic Data Handling
 - 5 MG per year
- Customer Meter Inaccuracies
 - Recalculated based on % of new AMR installations

Customer Meter Error - Calculated

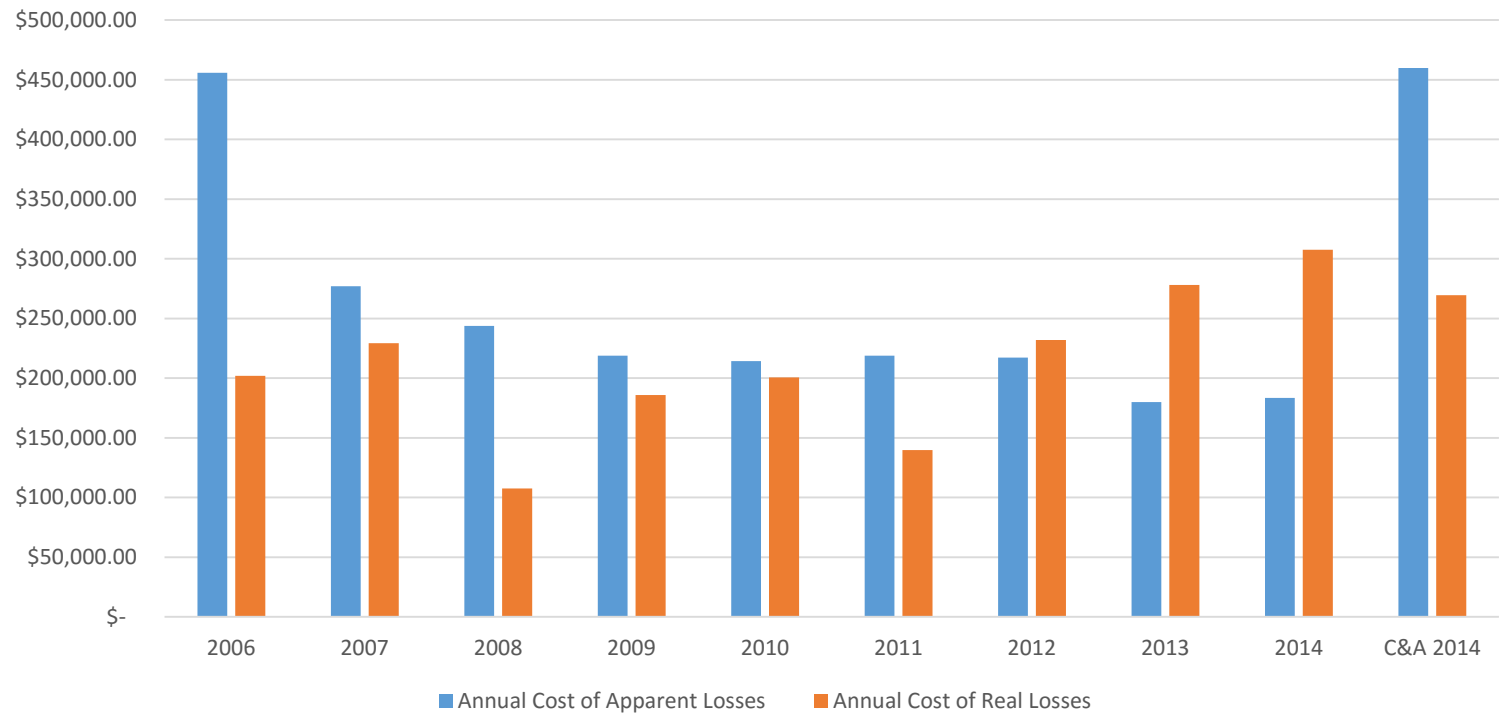
Year	AMRs Installed	Accumulative AMR	Active Meters in System	Percentage AMR's	Billed Metered MG	Estimated Customer Meter Error from old meters MG
2006	2,985	2,985	27,936	10.7	3380.878	90.57
2007	5,653	8,638	30,235	28.6	3629.974	77.75
2008	3,310	11,948	29,689	40.2	3630.336	65.13
2009	3,020	14,968	30,938	48.4	3512.000	54.37
2010	2,435	17,403	30,887	56.3	3918.000	51.36
2011	1,536	18,939	31,047	61.0	3997.469	46.77
2012	2,164	21,103	31,646	66.7	4088.530	40.84
2013	1,758	22,861	30,970	73.8	3419.559	26.88

Results – Apparent Losses



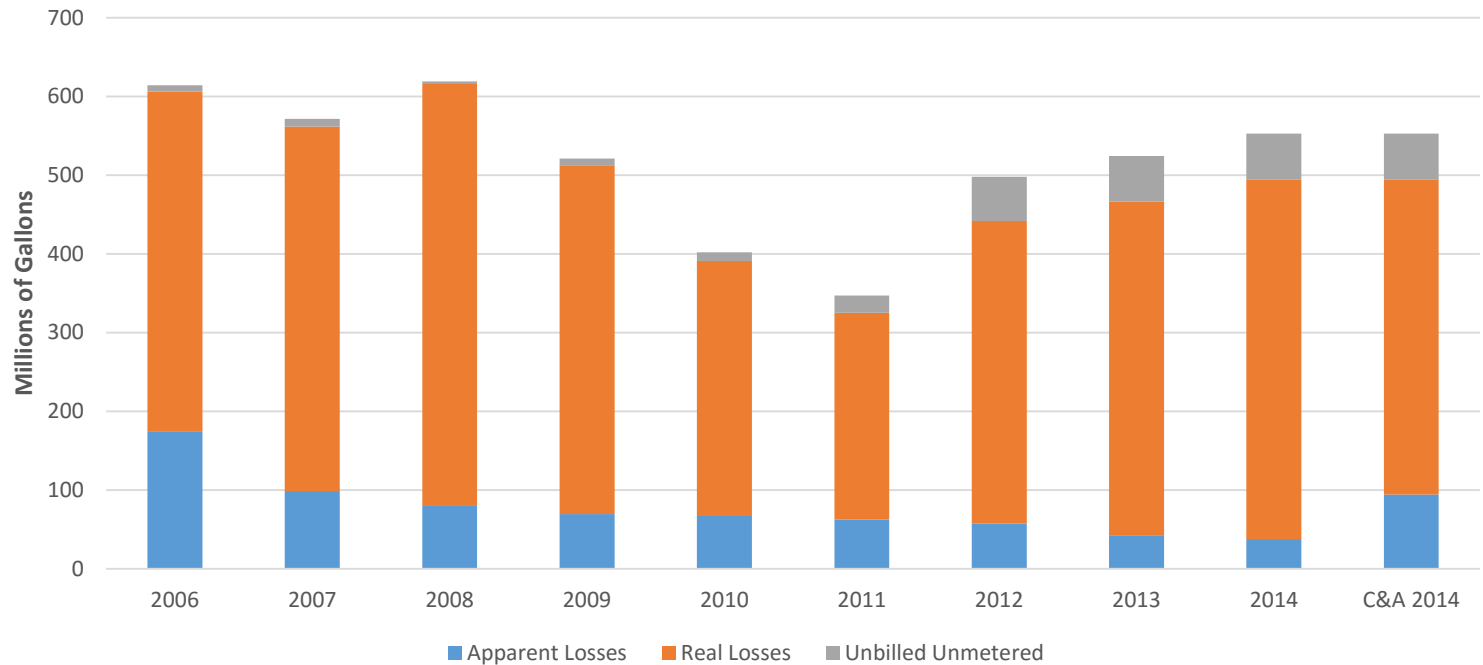
Results – Financial Indicators

Financial Indicators
Annual Cost of Apparent and Real Losses



Results Non-Revenue Water

Volume of Non-Revenue Water
2006-2014



Recommendations – System Management

- System Management
 - Test master meters annually
 - Implement end user meter testing
 - Continue/Increase rate of service line replacement
 - Reinstate leak detection program

Recommendations – Data Validity

- Data Validity
 - 68 out of 100
- Master Meters again!
- Better reporting/communication
 - Line and hydrant flushing reports
 - Fire Department reporting
 - Service/Main line leak reports



Overall Lessons

- Administrative - Use fiscal year not annual year
- Data Validity – Be Honest!
- Better data – better results
- Outside eyes can be helpful

Questions

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