Lost Water, Lost Revenue:
A Guide to Effectively Reduce Non-Revenue Producing Water (NRPW) Loss
Lost Water, Lost Revenue:

- United States Estimated Daily Water Loss?
  6 Billion Gallons/Day (Source: American City & County)

- Lost Revenue for U.S. Utility Systems?
  $8.76 Billion Annually

- Unnecessary Capital Expenses Related to NRPW?
  $900 Million Annually
Georgia Water Loss:

- Georgia Public Water Systems withdraw approximately **1.5 Billion gallons** of water each day. *(surface & ground water)*

- Using an average water loss rate of 14%, Georgia Utilities lose:
  - **210 Million gallons** of water each day
  - **$840,000** each day in potential revenue
  - **$307 Million annually**
What is NRPW?

- Non-Revenue Producing Water (NRPW)
- Drinking water that has been produced (treated), but is “Lost” before it reaches the customer.
- Formerly referred to as “Unaccounted for Water (UAW)”
What is NRPW?

- **Total Non-Revenue Producing Water Loss** = Real Losses + Apparent Losses

- **Real Losses**: Leaks, main breaks, tank overflows, flushing, fire fighting, etc...

- **Apparent Losses** ("Paper Losses"): Meter errors, billing system coding errors, water theft, and unauthorized uses
NRPW Effects on Local Utilities:

- Water (PRODUCT) Losses of 10% to 35%
- Potential Revenue Losses of 5% to 25%
- Unnecessary Capital Costs for Additional Treatment and Transmission System Capacity
- Increased Water Rates to Offset Losses
- Difficulty in Acquiring Future Withdrawal Permits
Calculating your NRPW?

- Complete a Basic Water Audit
  A. System Input Volume = _______ MGD
  B. Billed Consumption = _______ MGD
  C. NRPW = A − B
  D. % NRPW = C/A

- Data must reflect same time period
- Use 3 month averages (off peak), if billing cycles prevent real time analysis.
Developing an NRPW Action Plan:

- Determine the Financial Impact to Utility System Revenues?
- Identify budgeted funds available to address NRPW issues.
- Develop an effective approach and NRPW action plan for your Utility System.
NRPW Action Plan Tool Kit

- Leak Detection Programs *(Manual/Auto)*
- Comprehensive Water Audits
- Meter Accuracy/Replacement Programs
- Account Coding/Billing Analysis
- Customer Classification Analysis
- Identification of Unmetered Connections
Reducing Real Water Losses:

- Water Leaks
- Main Breaks
- Flushing
- Fire Fighting
Water Leaks/Main Breaks

- Identify and Repair Leaks Promptly
- Maintain Repair Parts, Materials and Equipment in Stock.
- Establish and Track Response/Repair Times for Water Leaks, and Implement Programs for Improvement
Leak Detection Programs:

- Manual Leak Detection
  - Personnel/Equipment Costs
- Automated Leak Detection
  - Zone Isolation/Flow Monitoring
  - Meter/Monitoring Costs
- Public Outreach: Educate Customers on Leak Identification and Reporting
Leak Detection Programs:

- **The Usual Suspects:**
  - Older parts of the distribution system
  - Poor installations
  - Areas of high pressure
  - Vacant lots/terminated services
  - Creek crossings/areas of poor soil
  - Check storm drains/ditches during dry weather conditions
  - Storage tank overflows
Authorized Losses:

- Flushing program should be limited
  - Performed only to protect water quality
  - Include Flushing Volumes/Costs in Base Rates

- Request reports of hydrant usage from Fire Department staff.

- Fire Department budgets can include water usage, and reimbursement to Utility Fund.
Addressing Apparent Water Losses:

- Meter Errors
- Billing System Coding Errors
- Unauthorized Usage/Water Theft
Meter Errors:

- Test Source Meters Annually
- Residential Water Meters (65% of Total)
  - Test/replace on a ten (10) year cycle
  - Meter accuracy will decrease over time
- Commercial Water Meters (35% of Total)
  - Test every 2-4 years
  - Make sure appropriate meter in use
  - Compound vs Turbine, Size vs Usage
Meter Errors:

- Adopt meter sizing and selection standards
- Standardize meter brand/type
  - Simplifies repair and replacement
- Verify register calibration upon delivery
  - Cubic feet, 1,000 gallons, 100 gallons
- Fund Annual Meter Replacement Program
Meter Errors:

- Field verify meter sizes/type
  - Oversized meters will not accurately meter low flows
  - Use compound meters in variable flow applications
  - Turbine meters for high, constant flow
Billing System Errors:

- Conduct in-house audit to verify accurate account coding
  - Example, 1 ½” meter entered as 1”
  - Commercial vs Residential Rates

- Establish Customer Classes for Analysis
  - Residential, Restaurant, Office, etc...
  - Use billing software to compare/identify
  - Investigate irregular usage patterns
Water Theft:

- Bulk Water Theft from Fire Hydrants
  - More prevalent during construction boom
  - Water System Vulnerability
  - Involve Police, Fire, Inspections, etc...

- Unmetered Connections
  - Think you don’t have any.....guess again
  - Windshield surveys/land use
  - Accidental Connections (City/County)
NRPW Program Implementation:

How to make these tools work for your Utility...
Case Study No. 1

- Prosperity County, Georgia
- Population: 83,000 (330 Sq Miles)
- Water Customers: 14,000
- System Age: 40 years (75% >15 years)
- Average Water Usage: 4.6 MGD
- NRPW: 1.2 MGD (26%)
- Revenue Impact: $5,436/Day
Prosperity County, Georgia

- County’s Initial Approach
  - Find the BIG Leaks.....Few Found...
  - No Significant Impact to NRPW
  - Results: Unsuccessful

- Adopted New Comprehensive Approach
  - Effective Leak Detection Program
  - Meter Evaluation/Replacement Program
  - Evaluation of System Inter-Connections
  - Evaluate Billing System Coding Errors
Prosperity County, Georgia

- Success/NRPW Reductions Achieved:
  - Improper Meter Size/Type – Schools/Comm.
  - Replaced ALL Residential Meters
  - Leak Detection/Public Outreach
  - Polybutylene Service Pipe
  - Identified/Abandoned Old Interconnections
  - Identified/Corrected Customer Coding Errors
Prosperity County, Georgia

- **Revenue Recovery:** (14 Months)
  - To Date: NRPW Reductions of 6%
  - **Revenue Recovery:** $1,250/Day ($460,000/Yr)

- **Projected NRPW Program:**
  - Implement PB Service Replacement Program
  - Projected NRPW Reductions of 12%-14%
  - Projected Revenue Recovery: $2,720/Day
  - **Projected Revenue:** $992,000/Year
Case Study No. 2

- City of Metropolis, Georgia
- Population: 18,000
- Water Customers: 17,000 (County service)
- System Age: 80 years
- Average Water Usage: 5.4 MGD
- NRPW: 1.3 MGD (24%)
- Revenue Impact: $5,850/Day
City of Metropolis, Georgia

- City’s Initial Approach
  - Find the BIG Leaks.....*Sound Familiar?*
  - No Significant Impact to NRPW
  - Results: Unsuccessful

- Adopted New Comprehensive Approach
  - Effective Leak Detection Program
  - Systematic Replacement of Older Mains
  - Meter Evaluation/Replacement Program
  - Evaluate Billing System Coding Errors
City of Metropolis, Georgia

- Success/NRPW Reductions Achieved:
  - Through Researching Historic Service Records, City Identified Old/Problematic Water Mains
  - Achieved Political Support for Capital Replacement Program
  - Incorrect Meter Registers (100’s vs 1,000’s)
  - Statistical Analysis of Customer Classifications, Average Water Use – Meter/Coding Errors
City of Metropolis, Georgia

- NRPW Program Underway 3 Months

- Projected NRPW Program Goals:
  - Projected NRPW Reductions of 8%-12%
  - Projected Revenue Recovery: $2,440/Day
  - Projected Revenue: $890,600/Year
Common NRPW Program Mistakes:

- Looking for the BIG Leak....
  - Assumption is leaks are easier to find/fix
  - Reality: Harder to find, more expensive

- Disregarding Apparent Losses.....
  - Internal water audits are more economical
  - Immediate results, low Cost
  - Meter testing/replacement program
Common NRPW Program Mistakes:

- Fail to Gain Political Support:
  - Insufficient Funding in the Budget
  - Must validate revenue losses and projected return on investment
  - Document and report successes

- Fail to Maintain Program:
  - NRPW Reduction is a continuous process
Questions/Comments?

Thanks for your time, and please feel free to call,

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