

2008 WRRI Annual Conference

An Innovative Concept for a Dual Water System in Older Cities

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Aging Systems

An Innovative Opportunity for a Dual Water System in Older Cities

Two Major issues facing most water utilities

- ◆ Aging Pipes
- ◆ Aging Workforce

Last 30 to 40 years

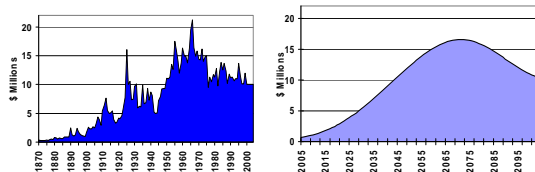
- ◆ Focus on water supply and treatment and regulatory compliance
- ◆ Less emphasis on infrastructure maintenance.
- ◆ Result, many aging systems have been neglected.

Result

- ◆ Many of the oldest pipes in the ground need to be replaced or rehabilitated.
- ◆ More importantly, the proper function of these pipe systems depends on:
 - ◆ valves, pumps and other mechanical components that, in many systems, are over 100 years old.
 - ◆ Not yet a crisis, but piping systems desperately need attention.

Replacement needs reflect an echo of earlier demographic patterns
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AWWA "Dawn of the Replacement ERA"

Anytown USA - Population 250,000
Water Main Construction Future Pipeline Replacement Needs



Water Distribution System Estimated Renewal and Replacement Cost
City of Durham, NC in 2004

- Average yearly expenditure over the last 20 years was \$226,000
This equates to a 1,396 year replacement schedule
- Yearly funding should average \$5,000,000
- 162 miles of unlined cast iron mains
- Poor condition of distribution system directly affects water quality

Historically

- ◆ The first public water systems were developed primarily for fire protection
- ◆ Supplying drinking water was a secondary benefit

Problem

- To accommodate the needs of fire protection, pipes and storage tanks tended to be larger.
- Results in extended residence times that can cause a degradation in drinking water quality
- Water system must be sustainable both physically and financially

Problems with Long Detention Times

- ◆ *Growth of biofilm on the insides of the pipes that react with the disinfectants, reducing their effectiveness, and creating growths that harbor pathogens*
- ◆ *Also, leads to tuberculation and reduction in the hydraulic capacity*

Dual Water Systems can help meet future needs

- ◆ Increasing water supply
- ◆ Increasing discharge of treated wastewater
- ◆ Potential use of reclaimed water for non-potable purposes
- ◆ A substitute for high quality raw water supplies used to meet potable water supply needs

Challenges for Dual Water Systems

- ◆ High cost of building a dual water system
- ◆ Distance between source and demand centers
- ◆ Larger volumes relative to potable demand
- ◆ Potential use for fire suppression requires larger pipes for dual system

Need to Study New Approaches to Drinking Water Service Delivery

- ◆ **“From a public health perspective we cannot afford to continue our current practices. Dual systems and the water supply conservation they provide, along with distribution systems carrying only well-treated drinking water, dictate the need to study new approaches.” Dr. Dan Okun**

Dr. Daniel Okun's Dual System



A Unique Opportunity

- The good news!
- Aging conventional systems offer modern cities a unique opportunity to create the foundation for a dual water system in the central core of the City

Dual System Can:

- ◆ shorten detention times in potable system
- ◆ produce higher-quality water
- ◆ reduce trihalomethanes (THMs) and haloacetic acids (HAAs),
- ◆ minimize "red water" calls and odor problems,
- ◆ save energy,
- ◆ save money
- ◆ conserve potable water.

Temporary Water Line Used During Relining Operation



Rehab and Replacement of Aging Systems

- ◆ Developed during a routine pipe rehabilitation process.
- ◆ Instead of installing the temporary piping required to bypass distribution lines while they are being cleaned, relined or replaced,
- ◆ utilities can install permanent, stainless steel, small-diameter pipe that provide for the potable water needs of their customers.

New Drinking Water System

- ◆ New smaller lines can function as the drinking water distribution system
- ◆ Existing large-diameter fire lines can be converted to provide high-quality reclaimed water to meet all non-potable water needs.

Benefits of Conversion without addition of reclaimed water

- ◆ Even if not converted immediately to reclaimed water, the addition of a smaller diameter system will yield immediate improvements in water quality
- ◆ by reducing detention time in the potable system
- ◆ while continuing to provide fire protection through the larger diameter pipes.

Benefits to Systems with Challenging Water Treatment

- ◆ Raw water supplies that may contain endocrine disruptors (EDs) and pharmaceuticals and personal care products (PPCPs), or other contaminants.
- ◆ Small volumes of potable water can be more economically treated with reverse osmosis (RO), membranes, or other methods to reduce these and other potential compounds of concern.

Other Benefits

- ◆ Smaller diameter drinking water distribution systems can create shorter detention times and help reduce THMs and HAAs.
- ◆ Smaller-sized elevated storage tanks, or more reliable redundant pumping for the new, smaller system, may reduce installation costs.
- ◆ By using stainless steel, the “C” factor can be improved and the pumping costs lowered while producing higher water quality and reducing customer complaints.

More Potential Benefits

- ◆ Additional savings by eliminating the ammonia feed to meet regulations on both the new potable system and
- ◆ Existing system rehabbed for reclaimed water use.
- ◆ Locational running averages (LRA) for THMs and HAAs should be lower, making regulatory compliance much easier.

Crisis or Legacy

- ◆ The infrastructure problems we face as utilities and service providers are not crisis issues, but legacy issues.
- ◆ It is a legacy we will leave our children, our grandchildren and our great grandchildren.
- ◆ The question is what legacy we will leave them – an aging, failure prone system with an increasing, insurmountable debt, or a system that is financially and structurally sound and meets future needs in a way they can afford to support?
- ◆ The choice is ours to make.

Sustainability

- This land is not ours. We did not inherit it from our ancestors
- It has been loaned to us by our children
- KENYAN PROVERB

• **QUESTIONS??**