Challenges and the Short & Long-Term Strategies for Use of Non-Potable Water

Montgomery County

Water Quality Advisory Committee

September 12, 2011
Objectives of the Presentation

- Communicate WSSC’s concerns
- Promote the concept of “beginning with the end in mind” - consistent water quality standards for intended end use
- Present WSSC’s short and long term strategies
1. Background about WSSC
2. Non-potable Water Sources
3. Non-potable Water Uses
4. WSSC’s Authority
5. Concerns
   a. Health Concerns
   b. Legal Concerns
   c. Technical Concerns
   d. Financial Implications
   e. Perceptions (Green Initiatives)
6. Logical Process for Safe Use of Non-potable water
7. WSSC’s Short Term Strategy for Approval Process
8. Next Steps – WSSC’s Long Term Strategy
Background about WSSC

- Established on May 1, 1918
- Bi-county water/sewer agency
- 3 reservoirs – 14 billion gallons
- 2 water filtration plants – the Patuxent (56 MGD) Potomac (285 MGD)
- 7 wastewater treatment plants - capacity to handle 74.1 MGD
- Blue Plains- cost sharing
- 5,500 miles of water main
- 5,400 miles of sewer mains
WSSC’s Mission

We are entrusted by our community to provide **safe and reliable** water, life’s most precious resource, and return clean water to our environment, all in an ethically and financially responsible manner.
Potable Vs Non-Potable

• Potable Water - meets or exceeds drinking water standards (for today’s purpose, we are only talking about potable water provided by WSSC)

• Non-potable water - does not meet drinking water standards (then what standards should it meet?)
Non-Potable Water Sources

- **Reclaimed Water**
  Class IV effluent of a regulated municipal waste water treatment facility distributed for various non-potable uses, regulated by MDE.

- **Harvested Rainwater**
  Water collected from rooftops, parking lots and other impervious surfaces.

- **Graywater**
  Wastewater generated from baths, showers, washing machines, and sinks, excluding toilets and kitchen.

- **Groundwater**
  Underground water (typically from shallow depths) near building foundations.

- **A/C Condensate**
  Water collected from air conditioning condensate

Other sources: e.g., laboratory RO system reject; eyewash stations recirculation water
Non-Potable Water Uses

- Irrigation
- Flushing toilets and urinals
- Washing animals
- Washing buses
- Boiler make-up water
- Other uses, to be explored
WSSC’s Authority

WSSC has two roles related to Non-potable Water:

I) Water Purveyor

II) Plumbing Code Authority
WSSC’s Authority Cont.

• WSSC is not responsible for safety and reliability of non-potable water.

• Other agencies (e.g., MDE; local Health Departments; Local Environmental Protection Departments) need to take this responsibility.

• In Montgomery County, DEP is leading the County’s efforts.
Concerns: Non-Potable Water Use

- Health
- Legal
- Financial
- Technical
- Perception
Health Concerns

Varying health risks may arise from accidental ingestion, inhalation or dermal contact with non-potable water.

- Groundwater may be contaminated
- Local rainwater data indicates a low pH
- Rooftops and patios are subjected to bird/animal waste and decomposing carcasses may be unsafe
- Rainwater stored in cisterns or recycled graywater - if untreated, may contain bacteria, viruses or other contaminants
• Section 602.2- IPC: “**potable water** shall be provided to all plumbing fixtures”

• Section 804.1.12: “no person shall discharge or cause the discharge of **any storm water**, surface water, ground water, roof runoff or subsurface drainage.”

• Section 608.6.1- IPC: “**cross connections** between a private water supply and a potable public water supply are prohibited.”

• Section 608.8 – IPC: “in all buildings where two or more water distribution systems are installed, each system shall be **labeled** as either potable and non-potable

• Minimum/acceptable **water quality standard** not defined
Technical Concerns

- Make-up potable water is used in all non-potable water use cases
- WSSC’s most important responsibility is to protect water supply from cross connections between potable and non-potable water
Technical Concerns

Sewer Metering

• Non-potable water needs to be metered for calculation of sewer charges
• Graywater systems do not require a sewer meter because the original source passed through the domestic meter.
• Multi-source re-use water that includes a graywater creates complicated sewer metering.
• Metering backwash from treatment process may be a challenge.
Financial Implications

- The non-potable water projects, if designed and maintained properly, maybe costly compared to WSSC water
- Storm water management costs may offset this high cost
- There may be minor revenue loss for WSSC due to less use of potable water
Implications of Approval

- WSSC’s approval may suggest system is safe (at the start and forever), even if it may not be.
- Approvals can set a precedent for future requests.
- If we go forward, at risk, and no negative issues arise, WSSC could be seen as being innovative.
Perceptions: “Green” Image

Implications of Disapproval

- Public perception; that we are protecting revenue vs. the environment.
MD “Green” Trends

Current Trends in Maryland
(MDE Purple Pipe Initiatives)

Class I and II Effluent – MDE has “guidelines” for irrigation in areas with restricted public access

Class III Effluent – MDE has “guidelines” for Agricultural Applications of Non-Food Crops and Golf Course Irrigation

Class IV Effluent – MDE is working on guidelines for any land application or commercial building toilet flushing and mechanical supply.

Purple Pipe – standard color being adopted for pipe transporting reclaimed water (class IV effluent).
## Class IV Water Quality

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Draft- MDE Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD&lt;sub&gt;5&lt;/sub&gt; (monthly avg.)</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Turbidity (daily avg.)</td>
<td>2 NTU and &lt; 5 NTU all times</td>
</tr>
<tr>
<td>E.Coli (monthly mean)</td>
<td>1.1 MPN per 100 ml</td>
</tr>
<tr>
<td>Fecal Coliform (monthly mean)</td>
<td>2.2 MPN per 100 ml</td>
</tr>
<tr>
<td>pH</td>
<td>6.5-8.5</td>
</tr>
<tr>
<td>Total N (monthly avg.)</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Total Residual Chlorine</td>
<td>0.5-4 mg/L anytime</td>
</tr>
</tbody>
</table>
MDE Limitations- Use of Class IV

- A water use permit must be obtained
- Reuse shall not cause nuisance
- All reuse force mains and indoor plumbing should be purple
- Reuse is only approved for non-residential buildings
- Residential buildings with at least 10 units, managed by a company may also use class IV water
Non-Potable Water Projects in WSSD

• Many years ago, two M.C. schools inquired about rainwater for flushing toilets. Due to budget constraints, the system was never constructed.

• In the past two years, WSSC has been contacted on behalf of NIH; Walter Reed; and Bethesda Naval Hospital regarding non-potable projects.

• Currently, WSSC is looking at a few projects in both Counties with various applications for use of non-potable water.

• One M.C. project has received approval and another is in final review process.
One Example- an Existing Project in This Area

- T.C. Williams High School in Alexandria, Va. has been registered through the US Green Building Council's LEED Rating System
- The project includes a below grade 450,000 Gallon cistern to collect rainwater from the building’s roof
- Rainwater is disinfected by Chlorine and stored in a smaller tank for toilet flushing and irrigation
- Treated water is monitored and sampling is routinely conducted to ensure system operation
Use of Non-potable Water: Typical Approach

• Start with source of the non-potable water
• Pick and choose various treatment options
• Try to convince authorities that their system is safe
• No clear chain of oversight authority, maintenance, monitoring and reporting requirements.
Systematic Approach
Non-Potable Water Use

- Define the intended water use (end in mind)
- *Establish water quality standards for that use*
- Identify source of water’s initial quality/quantity
- Design water treatment to meet standards
- Define O&M requirements
- Establish qualifications to perform O&M
- Establish sampling, recordkeeping and reporting requirements
- Develop contingency plans in case of system failure
WSSC’s Short-term Approval Process

• A waiver may be submitted to the WSSC’s Chief Engineer
• Prior to submitting the waiver, applicant must contact appropriate state/county agencies to get an approved plan. Plan should include:
  – Approved source of non-potable water and meet MDE requirements for appropriation of surface or groundwater uses
  – Approved water quality standards that will be used for the intended use of non-potable water
  – Water quality data on raw non-potable water as well as a treatment design, certified by a P.E. to reliably meet applicable water quality standards
  – Approved operation and maintenance requirements, including operator certification requirements
  – Details of approved roles and responsibilities for recordkeeping and reporting requirements
WSSC’s Additional Requirements

- Sewer metering plan for non-potable water and verification that it meets "typical" domestic sewage, and it is free of toxic matters.
- Disposal plan for wastewater generated from the water treatment process to meet WSSC’s Prohibited Discharge Conditions and sewer charge calculations for the processing of wastewater.
- Supplemental water supply and backflow protection plan.
- Marking and labeling for non-potable water systems.
- Other relevant information, as requested by the WSSC or others.
WSSC’s Position

- Yes – Safe Systems: central management, treatment approved and monitored by responsible agencies
- No – Unsafe, un-supervised systems
- No – Residential
WSSC’s Long-Term Plans

- Pilot projects
  - EMOC Facility in Montgomery County- Rainwater
  - City of Takoma Park, Graywater and Rainwater
  - University of Maryland and Possibly Hampton Inn project in Prince Georges County

- Participate in work groups and collaborate with others to learn about the success and failure points

- Develop new code – eliminate the waiver process
The WSSC is in support of **safe non-potable water systems** to meet water conservation goals.

At the same time, we remain committed to ensuring the safety of the **public potable water system**.