

Briefing

MEMORANDUM

February 5, 2019

TO: Transportation & Environment Committee
FROM: *KL* Keith Levchenko, Senior Legislative Analyst
SUBJECT: **Briefing: WSSC Innovation Program**
PURPOSE: To receive a briefing from WSSC staff on WSSC's Innovation Program

Attachments to this memorandum include:

- Briefing Slides Prepared by WSSC (©1-26)

The following WSSC officials and staff are expected to attend this meeting:

- Joe Beach, Deputy Director of Administration
- Sara Titus, Engineering Research Specialist, WSSC Innovation Program

Ms. Sara Titus of WSSC's Innovation Program will provide a briefing to the T&E Committee on its innovation program. As noted on Slide 4, the goals of the program are to:

- Reduce operating expenses, improve sustainability (i.e., resiliency, efficiency, and quality), and generate revenue;
- Inspire employee engagement; and
- Improve infrastructure (with a focus on the water and sewer networks, the water filtration plants, and the wastewater treatment plants (now called resource recovery plants)).

The briefing will discuss moving WSSC's culture toward innovation, update the Committee on several pilot projects already underway, note WSSC's research partners in this effort, and summarize WSSC's climate change adaptation and mitigation planning efforts.¹

Attachment

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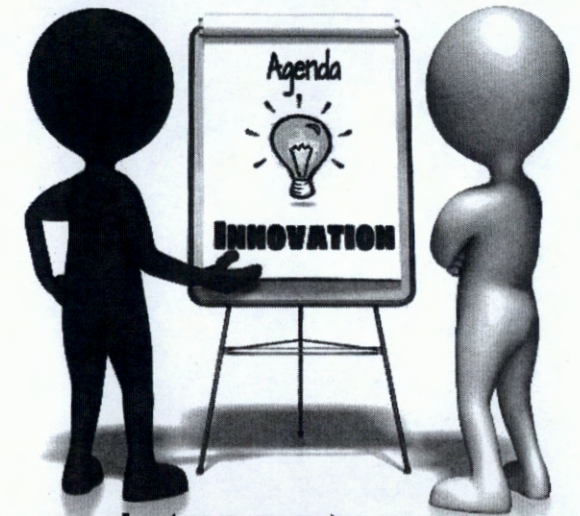
¹ Key words: #WSSCInnovation, new technologies, streamlining processes, utilities.

Engaging Innovative Thinking to Drive Customer Value

Sustainability for the Next 100 Years

Agenda

- ▶ Goals of Innovation Program
- ▶ Moving the Culture to Innovation
- ▶ Pilot Projects
 - Leak Detection
 - Enhanced Biological Phosphorus Removal (EBPR)
 - Peracetic Acid (PAA)
 - Future Innovation Pilot Projects
- ▶ Other Research Partners
- ▶ Climate Change Assessment and Adaptation

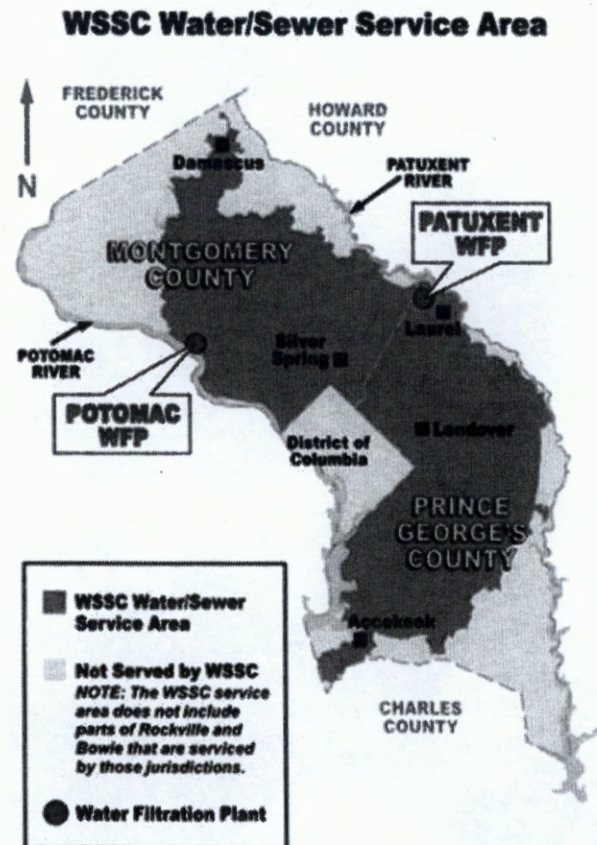


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Washington Suburban Sanitary Commission (WSSC)

Provides water and wastewater services to Montgomery and Prince Georges Counties in Maryland

- ▶ 100 years of service
- ▶ 1.8 million residents
- ▶ 460K accounts
- ▶ 1000 SqMile service area
- ▶ 2 Water Filtration Plants
- ▶ 6 Water Resource Recovery Facilities
- ▶ 5,800 miles of fresh water pipeline
- ▶ 5,700 miles of sewer pipeline



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Focus of the Innovation Program

- Reduce operating expenses, improve sustainability (i.e., resiliency, efficiency and quality), and generate revenue
- Inspire Employee Engagement! Better leverage the creativity and problem-solving abilities demonstrated by our staff
- Improve Infrastructure! Targets improvements to:
 - Water Networks
 - Sewer Networks
 - Water Plants
 - Resource Recovery Plants

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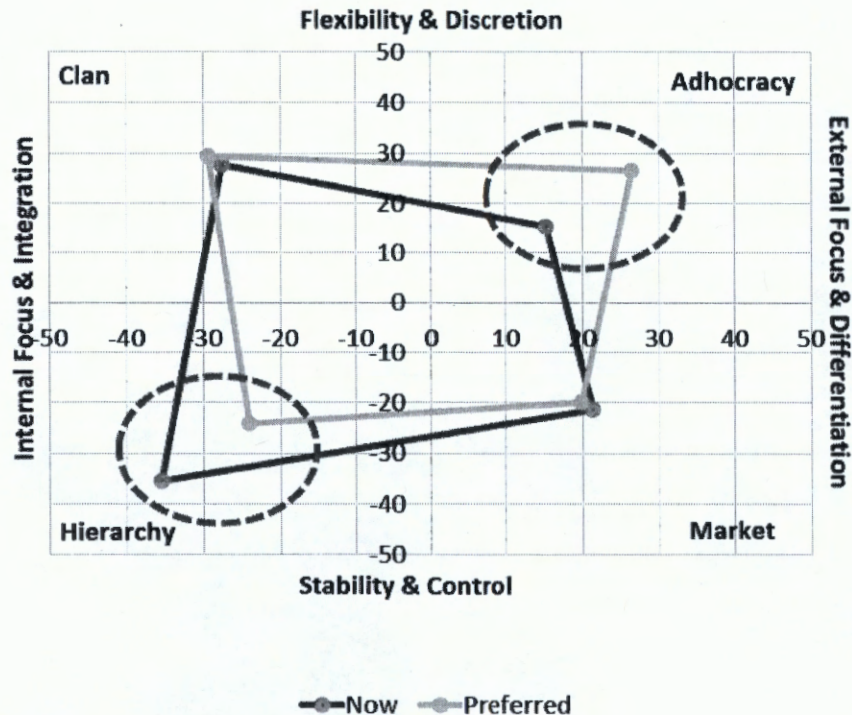
Develop Long Term Strategy

- ▶ Participated in Water Research Foundation (WRF) project 4642 to define a framework for an Innovation Program
- ▶ Developed an engagement survey to employees to benchmark current state of Innovation
- ▶ Held workshops with senior management to define long term goals
- ▶ Developing a 5 and 10 year plan for Innovation and Research

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Benchmarking

1 - Organizational Culture Takeaway



Maintain

- Clan (Family) and Market (Execution) perspectives
- Dominant Internal-Focus

Change

- Foster flexible teams and freedom
- Focus on results not bureaucracy

Changes ranked by perceived gap

- Management Style
- Working Environment
- Organizational Glue
- Strategy
- Leadership
- Success Criteria

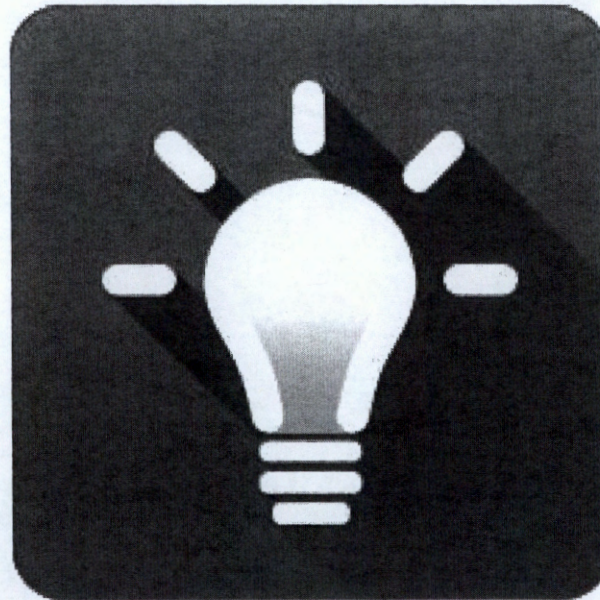
Changing Culture

- Define the Innovation Process
- Identify Resources
- Create Awareness – Internal Marketing
- Engage Employees – Hold Innovation Workshops
 - Introduce Innovation Hub
 - Share Innovation Program Successes
 - Brainstorm solutions to challenges impacting their work



Innovation Hub

- Online tool developed through e-Builder for employees to submit new and innovative ideas.
- Process provides:
 - Idea Tracking
 - Expert & End-User Evaluation
 - Pilot or Lab Testing
 - Implementation Support
- Selection Basis:
 - Specific Evaluation Criteria
 - Level of Impact
 - Best Chance of Success



Ongoing Pilot Projects

- ▶ Leak Detection
 - Acoustic
 - Satellite
- ▶ Enhanced Biological Phosphorus Removal
 - Seneca Plant
 - Parkway Plant
- ▶ Peracetic Acid Disinfection
 - Parkway Plant



Completed Leak Detection Pilots

Echologics
Echoshore-DX



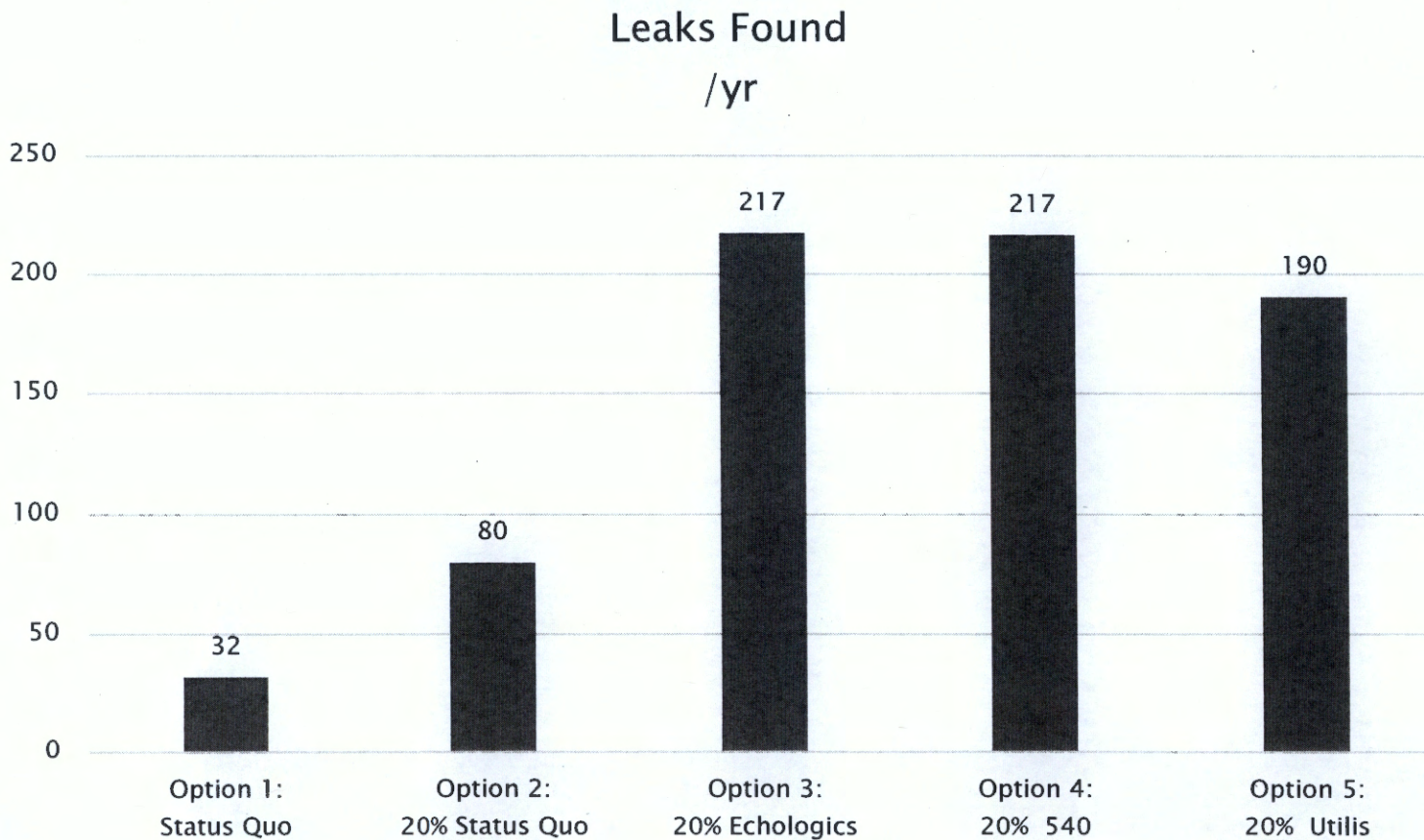
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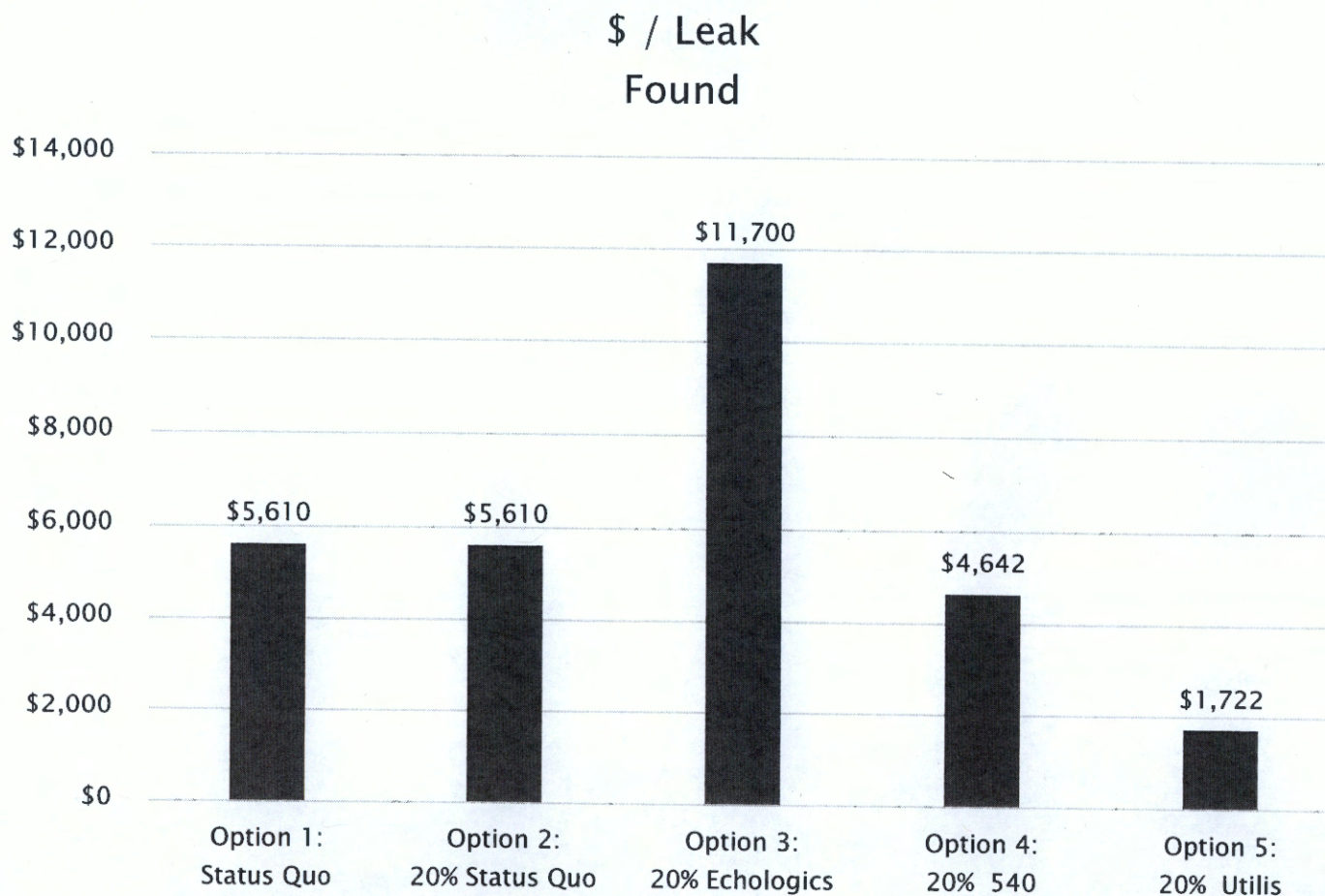
Utilis



Pilot Results / Predictions



Pilot Results/Predictions



Leak Detection Pilot – Next Steps

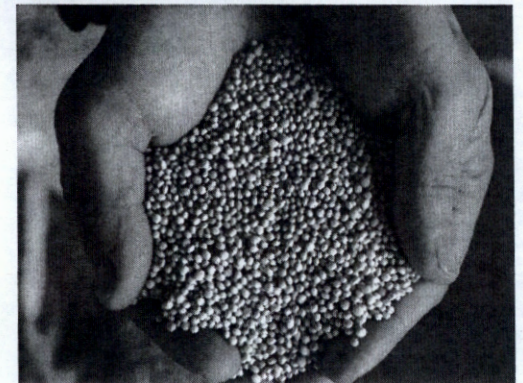
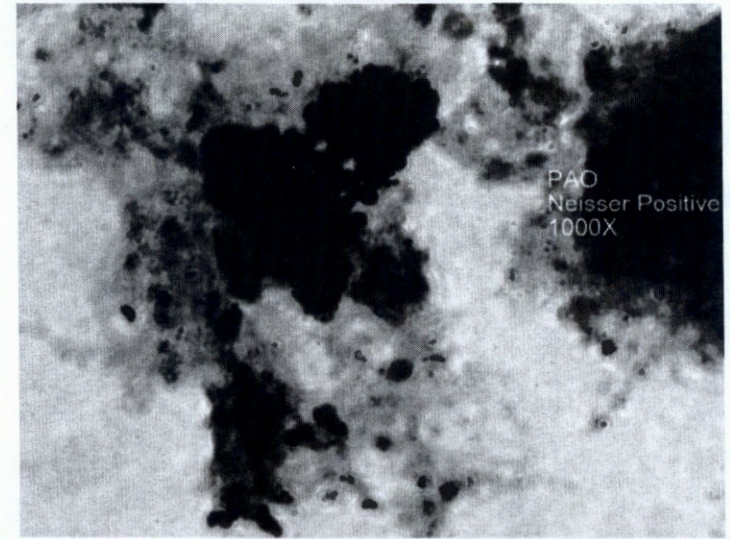
- ▶ Perform Phase 1 of Implementation with Utilis
 - Utilis to provide Points of Interest (POI) for 1,000 miles of pipe (20% of our system.)
 - Verify which POIs are leaks
 - Validate 2018 pilot results on a larger scale
 - Determine if this technology will continue as part of our longer term leak detection approach.

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Enhanced Biological Phosphorus Removal (EBPR) Study Seneca

Benefits:

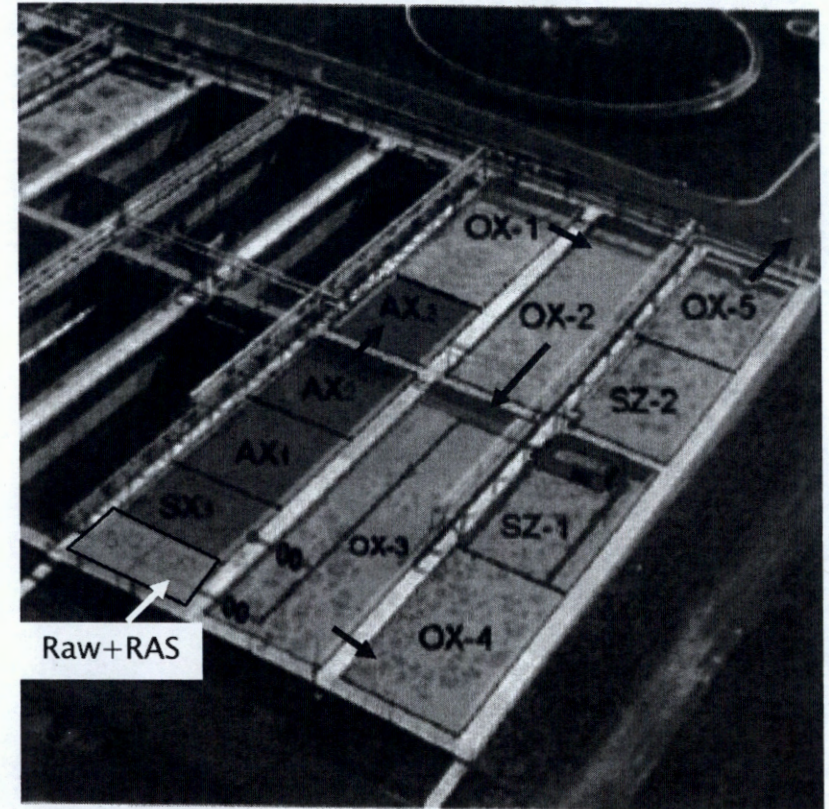
- Reduce alum chemical cost;
- Reduce solids hauling cost;
- Enhanced sustainability; potential for resource recovery (reduce P in biosolids).
- Improve future Piscataway Bio-Energy facility performance.



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EBPR Study Seneca

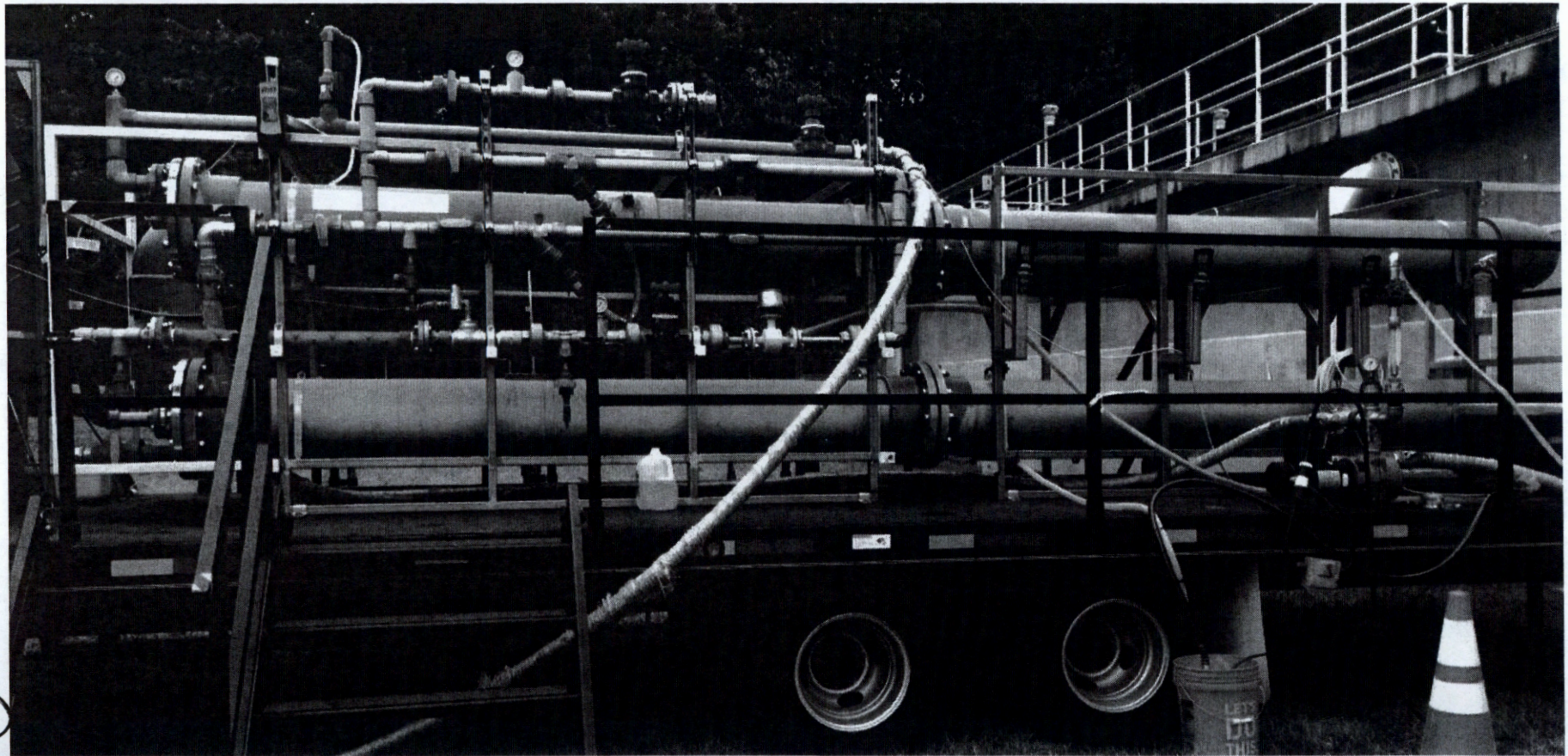
- ▶ Fermentation zone (no mixing) at beginning of the train (yellow box)
- ▶ Preliminary Testing
 - ~45% drop in alum use (~\$115K/yr for Seneca).
 - More stable alum dosing.



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Peracetic Acid (PAA) Disinfection – Pilot at Parkway

- Pipe Reactor Pilot test 7/16/2018 thru 8/3/2018



Peracetic Acid (PAA) Disinfection: Benefits

- “Organic” chemical
 - Does not persist in environment. Lower toxicity to aquatic life.
 - Breaks down to acetic acid, CO₂, H₂O.
- More powerful oxidant than chlorine
- Does not form chlorinated Disinfection By-Products (DBPs)
- No need for dechlorinating agent
- Much less maintenance
- Longer shelf-life (9–12 months)
- PAA price continues to drop (new production facilities)

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Future Innovation Program Pilot Projects

- ▶ Trenchless Pipe Rehabilitation
- ▶ Automated water system flushing
- ▶ Artificial Intelligence for Pipe Condition Assessment
- ▶ Drones for monitoring Remote Areas



Technology Highlight: Primus Line

Problem: High Pressure
Trenchless Pipe Rehab

Impact: Water or Sewer pipe
replacement where
location makes work
difficult

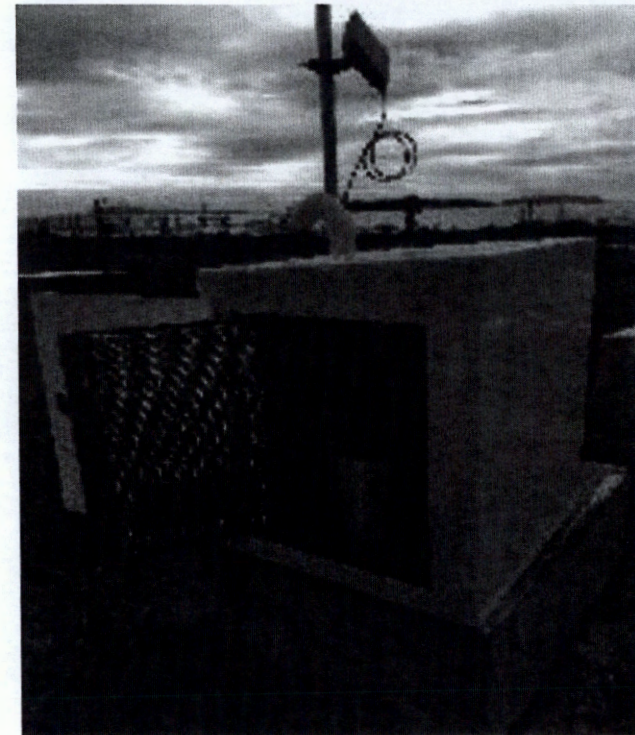
Status: Preliminary discussions
with vendor



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Technology Highlight: HydroGuard

- Problem: – Low Chlorine Residual, Discolored water complaints
- Automated flushing systems improve water turnover and ensure quality of water delivery
- Automate sample collection and analysis
- Status: One unit installed

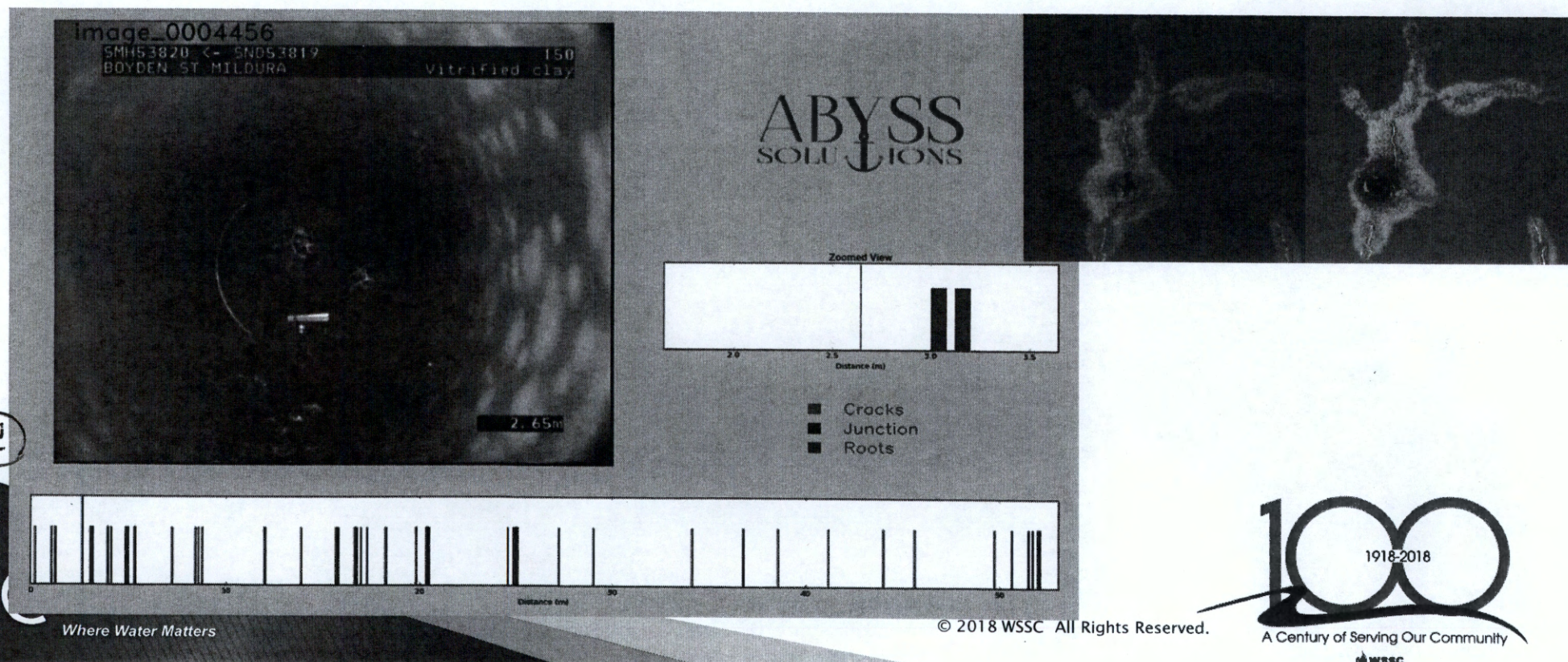


Technology Highlight: ABYSS SOLUTIONS

Problem: Pipe Condition Assessment

Impact: Can use Artificial Intelligence to evaluate CCTV video and track changes over time

Status: Preliminary discussions with vendor



Technology Highlight: Drones

Problem: Assessing Remote Areas Quickly

Impact: Drones have the potential to help with activities like trunk walks, emergency leak investigations, routine monitoring, and water quality sampling

Status: Pilot will start soon for trunk walks



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Other Research Partners

- Mid-Atlantic Innovation and Research Forum
 - Collaborate and pool resources
 - Partnership w/Water Research Foundation & area utilities

- VT Center for Applied Water Research and Innovation (CAWRI) – anaerobic digestion

- Rutgers University – Biofiltration with PhD student

- Penn State – Capstone Project

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Climate Change Vulnerability Assessment Adaptation and Mitigation Planning

- ▶ Climate change threats include rainfall, extreme storms and sea level rise
- ▶ Project includes facility level vulnerability assessment, adaption analysis, & mitigation planning – Green House Gas (GHG) Action Plan
- ▶ Estimates show both 10 year and 100 year storms rainfall depth projections are increasing. (7%–2040, 12%–2065, 21%–2100)

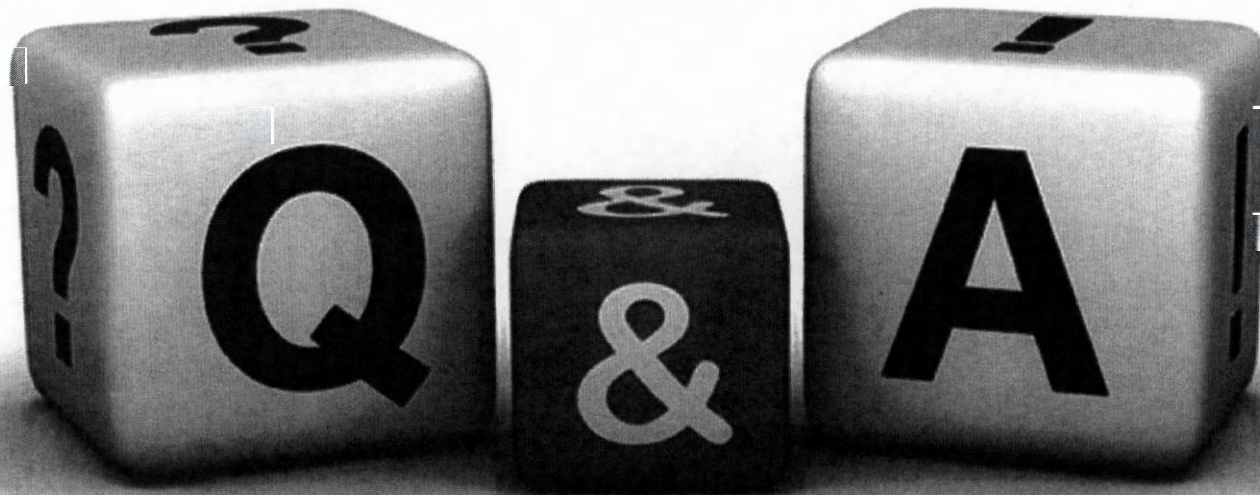
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Climate Change Vulnerability Assessment Adaptation and Mitigation Planning

- ▶ Project looks at all assets that are at risk and below recommended flood levels, determines level of service risk, and “the benefits to cost” of flood proofing alternatives
- ▶ Over 200 WSSC facilities in Geographic Information System (GIS) and 44 are near or in flood plain, 18 are prioritized for future flood modeling, 9 vulnerability assessments performed to date (4 WWPS, 4 WRRF & 1 WPS)

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Questions and Answers



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