Update on MWRA Training Programs

November 18, 2015
Training Categories

MWRA Training

Succession Planning
Maintaining Knowledge and Skills
Acquiring & Maintaining Professional Licenses/Certifications
Professional/Career Development
Facility Rehab & Start-up Vendor Training
Safety
Ensuring Accountability and Workplace Conduct
Succession Planning

- Mobile Pumps
- Operator Job Shadowing
- M&O Rotation
- Certified Water/Wastewater Maintenance Technician Level I (IMI)
Maintaining Knowledge /Skills

- ASCE Managing the Design Process
- ASCE Design & Installation of Buried Pipes
- Specification Writing
- Environmental Compliance Strategies
- Wastewater Pumps & Hydraulics
- Fundamentals of Secondary Treatment
- Industrial Waste Treatment
- Chemical Delivery
- Hydraulics Institute – Pump System Optimization
- Hands-on Microbiology
- Sampling for NPDES Permit & Process Control
Acquiring and Maintaining Professional Licenses/Certifications

- Water and Wastewater Operator
- O & M Collection Systems
- Wind Turbine Climbing & Rescue
- CDL
- Hoisting
- Professional Engineer (PE)
- Underground Storage Tanks (UST)
- Backflow Device Inspector/Tester
- Certified Control Systems Technician (CCST)
Professional/Career Development

- Vehicle Maintenance Technical Training
- Supervisory Development
- Blueprint Reading
- Business Writing
- MIS Classes
Facility Rehab and Start-up Vendor Training

Spot Pond Covered Storage Start-up Vendor Training Overview
Safety

- OSHA 40, 24, 10, 8
- Hot Works Welding Safety
- Safety Awareness
- Confined Space
- Lockout/Tagout
- Electrical Safety for Non-Electricians
- MBTA & Keolis Right of Way & Track Safety
- Right to Know

Hot Works Welding Safety

MBTA & Keolis Right of Way & Track Safety
Ensuring Accountability and Workplace Conduct

- Ethics
- Diversity
- Harassment Prevention
- Drug and Alcohol Abuse
- Active Shooter
## North System Flow Shutdown – Event Overview

<table>
<thead>
<tr>
<th>Shutdowns</th>
<th># of Valves / Flow meters</th>
<th>Total # of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force Main Dewatering System*</td>
<td>NA</td>
<td>2*</td>
</tr>
<tr>
<td>Winthrop Terminal Facility*</td>
<td>21 / 6</td>
<td>18* (9 x 2)</td>
</tr>
<tr>
<td>North Main Pump Station</td>
<td>20 / 10</td>
<td>30 (10 x 3)</td>
</tr>
<tr>
<td><strong>Total</strong>*</td>
<td><strong>41 / 16</strong></td>
<td><strong>50</strong>*</td>
</tr>
</tbody>
</table>

*7 completed to date.

WTF: There is potential to eliminate 12 full North Systems shutdowns, may be able to limit shutdowns to WT flows only.
Summary of Shutdowns Through 11/17/15

- **Total of 11 shutdowns to date**

- **4 trial shutdowns**
  - 5/20 – Chelsea Creek & Winthrop Flows only
  - 6/10 – Ward & Columbus Park Headworks only
  - 6/24 – All North System Flows for 4 hours
  - 7/22 - All North System Flows for 8 hours

- **7 contractor shutdowns**
  - 9/1 5 hour: Install FM dewatering system
  - 10/20 8 hour: Remove 1st WT 48” FM Isolation valve
  - 10/26 approx 6 hour: Install 1st WT 48” FM Isolation valve
  - 11/2 5 hour: Remove 2nd WT 48” FM Isolation valve
  - 11/5 approx 7 hour: Install 2nd WT 48” FM Isolation valve
  - 11/9 5 hour: Remove 3rd WT 48” FM Isolation valve
  - 11/16 5.5 hours: Install 3rd WT 48” FM Isolation valve
DITP force main (between NMPS & WT and the Grit Facility) water level must be lowered by 40 ft, (approx. 500,000 gal) to safely remove valves at NMPS & WT
Temporary Dewatering Suction Manifold

- Temporary dewatering connection
- Dewater 500,000 gallons to Primary
- Approx. 60 minutes to dewater
- Accomplished with 3 - 10,000 gpm pumps
- Automatically controlled by level
Dewatering System Install / Shutdown on 9-1-2015
Winthrop Terminal Facility Valve Replacement

Completed to date:

• Three 48-inch Plug Valves on WTF Force Mains Replaced
  – Each valve - 19,000 lbs
    – 10 ft off flow / near ceiling
    – Restricted by fire service lines & conduits
  – 35 bolts (1.25” dia.) per side
  – 6 restraining rods
  – Dresser coupling with 30 bolts

• Allowed two Shutdowns (11pm to 7am) per valve
Winthrop Terminal 48” Valve Removal – Sequence of Work

Day(s) in Advance:

• Exercise/replace 70 bolts on valve
• Exercise/replace 6 restraining bolts
• Exercise/replace Dresser coupling – 30 bolts
• Arrange scaffolding
• Move service pipes/electrical conduits in way

Morning of Work:

• Set up crane - Rig Valve
• Verify dewatering system operation
• Remove 1/3 of bolts on valve
• Set rigging for blank flanges
• Inventory supplies, extra components available on site
Crane to Place Valves into Position

Crane used to aid work

Crane boom penetrates roof & 1st floor through 3 foot square opening to support valve in lower level

- 19,000 lb valve
- Pre-Rigged for drop/lift
- Must be level – only 0.5” to 1.5” space between piping
Winthrop Terminal 48" Valve Removal – Sequence of Work

Day of Work:

- 1 hr to dewater force main – confirm liquid level
- Maximum of 7 hrs to complete work
  - Remove remaining bolts (valve supported by crane)
  - Remove restraint rods
  - Remove dresser coupling – verify ample spacing
  - Drop valve
  - Install blank flange & mega-lug blank
  - Re-install restraining bolts
  - Install strong backs on blanks
  - Install jacks for lateral support between pipe sections
  - Restore pumping operation
Remove Existing Valves
Rig New Valve into Building
Install New 48” Plug Valve
Rig New Valve into Position / Make Final Connections
Install New Coupling Assembly
Future Valve Replacement Challenges – North Main Pump Station

- Larger valves – 60”
- Tight confining spaces
- Rigging from ceiling (no crane openings)
- No flange on elbow – pipe must be cut
- Still working in 7 hr construction window
- Once cutting begins – point of no return
- NS Flows can not be restored until blank is installed on force main.
MWRA Collection System – Only North Flows Impacted

North System Tributary Areas
- Winthrop Terminal Facility System
  - BWSC (E. Boston)
  - Revere
  - Winthrop
- Chelsea Creek Headworks System
  - Arlington
  - Bedford
  - Belmont (portion)
  - BWSC (Charlestown)
  - Burlington
  - Cambridge (portion)
  - Chelsea
  - Everett
  - Lexington
  - Malden
  - Medford
  - Melrose
  - Reading
  - Somerville
  - Stoneham
  - Wakefield
  - Wilmington
  - Winchester
  - Woburn
- Columbus Park Headworks System
  - BWSC (Downtown, S. Boston, Dorchester)
  - Milton
- Ward Street Headworks System
  - Belmont (portion)
  - Brookline
  - Cambridge (portion)
  - Newton
  - Waltham
  - Watertown
When are the Shutdowns Occurring?

- **NS Shutdowns scheduled between 11PM-7AM**
  - When flow conditions allow
  - All work Weather dependent
Critical locations will be monitored

Staff will be recording elevations every 15 minutes

Immediately notify the EOC when the elevation reaches a pre-determined elevation at each station
Elevation Readings at the Monitoring Locations

Staff record elevations every 15 minutes throughout shutdown.
Staff in the EOC monitor facility elevations to compare against model simulated system response.
Staff in the EOC monitor in system meters to compare against model simulated system response.
Emergency Response Drill
Wachusett Reservoir

November 18, 2015
Concern Over Train Travel by the Wachusett Reservoir

• Pan Am Railway line along the Wachusett Reservoir
• Typically two freight trains per day
• Carrying a variety of chemicals including crude oil
• Train derailments fairly common in the United States and Canada
The Participants

• MWRA
• Department of Conservation and Recreation
• Department of Environmental Protection
• Pan Am Railways
• South Wachusett Regional Emergency Planning Committee
• Federal Railroad Administration
• Transport Security Agency
• Environmental Protection Agency
• Mass State Police
• Mass Emergency Management Agency
• Mass Department of Transportation

• Mass Department of Fire Services
• Mass Fusion Center
• University of Massachusetts Amherst
• West Boylston Fire Department
• Boylston Fire Department
• Holden Fire Department
• Sterling Fire Department
• Clinton Fire Department
• West Boylston Water District
• Clinton DPW / Water District
• Boylston Water District
• Anna Marie College
Precautions Taken

- Monitor rail car contents
- Work with Pan Am Railways on track condition and train speed
- Work with the DCR on deploying booms
- Reservoir modeling by University of Massachusetts, Amherst
- Spill Emergency Response Plan
- Research into water treatment effects on chemicals
• Desktop drill on December 16, 2014

• Field drill on October 15, 2015
  – 1 train
  – 20 bags of peat moss
  – 230 participants
- Train derails on the Quinapoxet Causeway in the Thomas Basin
- One rail car ruptures and spills 30,000 gallons
- Two rails cars develop slow leaks
- Red placards read “1267”
Peat moss was used to simulate floating crude oil.
The Drill Begins
Incident Command System and Unified Command

Unified Command
WB FD, MWRA, DCR, DEP

- Safety Officer
- Public Info Officer
- Liaison Officer

Operations Section  Planning Section  Logistics Section  Finance & Admin.
Subsequent Boom Deployments – Route 12
Boom in Front of Cosgrove Intake
Water Quality Sampling
Sampling Data Base

[Map showing locations with sample data points.

Table of sample data:

<table>
<thead>
<tr>
<th>Sample Time</th>
<th>Date/Time</th>
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<tbody>
<tr>
<td>TEMP</td>
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<tr>
<td>COND</td>
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<tr>
<td>DEPTH</td>
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<tr>
<td>PH</td>
<td>6.55</td>
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<tr>
<td>DO</td>
<td>9.12</td>
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UV254
SAMPLE APPEARANCE
OBVIOUS ODOR
PID
CGI
SAMPLE_ID
SAMPLE_TYPE
PROFILE

Move mouse to get coordinates.

East Woods
Mount Pleasant County Club
Mount Pisgah

Lessons Learned

- More frequent status updates
- Second common radio channel
- Possible Wiki use for event log
- Better ICS resource tracking
- CWTP EOC reconfiguration
- Better Cosgrove boom moorings
- Surface transport model needed
- More robust Mobile Lab GC/MS
Remediation of Direct Discharges at Wachusett Reservoir

November 18, 2015
Wachusett Reservoir is Surrounded by Major Roads
Stormwater Runoff and Risk of Spills = WQ threats
Water Quality Threat – Hazardous Spills
Direct Discharge: Location Where Runoff Is Directed To The Reservoir, Through A Pipe Or Other Structure
• Conducted in 2008

• Identified priority areas for treatment or removal

• Made initial recommendations:
  – Phase I
  – Phase II
All local roof, pavement drainage and misc. building flows collected and directed to 2-25K Gal. storage tanks.

Storage tanks discharge to constructed underground drainage system and out-of-basin at surface drain.
Phase I Project – Completed

- Design awarded 2009
- MassDOT funded construction, completed in 2012
- Eliminated 6 direct discharges; two local BMPs
- Total cost - $1.9 Million
Phase I BMP – Bioretention Basin at River Road

- All BMPs inspected by DCR 2x/year; and after any storm > 3 inches.
- DCR agreement w/ MA DOT for each project stating DCR will maintain BMPs.
Phase II Project - 3 Areas
Road runoff down hill and directly to reservoir from road
Area 1 - Route 12/140 Causeway – Proposed Design

[Diagram showing proposed design features such as ponds, drainage areas, and treatment areas along Route 12/140 Causeway.]

[Text details related to stormwater management and treatment areas for Route 12/140 Causeway, including proposed ponds and drainage structures.]
Area 2 - Beaman Street Bridge – Existing Conditions

Road runoff down hill to reservoir
Area 2 - Beaman St. Bridge – Proposed Design
Road runoff to reservoir via direct discharges
Area 3 - South Bay – Proposed Design

State of Massachusetts
Department of Conservation and Recreation

FIG 4 - Waterview Reservoir

COMPREHENSIVE ENVIRONMENTAL INCORPORATED
Phase II Project Status

Area 1 - Route 12 Causeway
  Design awarded.
  MassDOT bid Sept. 2015
  Construction 2016
  $3.0 M (excluding water main - at Town cost)

Area 2 - Beaman St. Bridge
  75% Design completed
  Public Hearing Fall 2015
  Anticipated accelerated Bid in 2016/Construction 2017
  $1.0 M (excluding water main - at Town cost)

Area 3 - South Bay
  75% Design completed
  Public Hearing Fall 2015
  $1.4 M
Wachusett Reservoir Direct Discharge Summary

- Program Underway to Eliminate/Mitigate Roadway Spills/Stormwater Discharges
- Prioritized Based Upon Location/Potential Water Quality Impacts.
- DCR Watershed/MWRA/MassDOT and Town of West Boylston Coordinating
- MWRA Funding Design: $698,000
- MA DOT Funding Construction: $8,091,400
## Project Summary Table

<table>
<thead>
<tr>
<th>Project</th>
<th>DCR Fiscal Year Budgets*</th>
<th>Total Design Cost included in DCR Budget</th>
<th>Construction Year</th>
<th>MassDOT Funding</th>
<th>Potential additional DCR costs</th>
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<tbody>
<tr>
<td><strong>Phase I</strong></td>
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<tr>
<td>Phase I – Cosgrove Intake roadway area</td>
<td>FY9 – 12</td>
<td>$173,000</td>
<td>2012</td>
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<tr>
<td>improvements</td>
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<td><strong>Phase II</strong></td>
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<td>Conceptual Study</td>
<td>FY12</td>
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<td>Area 1 - Rt 12 Causeway Improvements</td>
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<td>2020**</td>
<td>$1,001,800***</td>
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<td>Area 3 - South Bay Improvements</td>
<td>FY15-16</td>
<td>$173,000</td>
<td>2020</td>
<td>$2,189,600</td>
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<td><strong>Total</strong></td>
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<td>$698,000</td>
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<td>$8,091,400</td>
<td>$120,000</td>
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*Water Supply Protection Trust- approved
**Anticipated acceleration to 2016/17
*** Excluding town-funded water main
Massachusetts Water Resources Authority

Northern Intermediate High
Section 110 Reading and Woburn
Construction Contract Award

November 18, 2015
Northern Intermediate High Redundancy Loop
Northern Intermediate High Contract 7471

MAP OF CONTRACT AREA

- New Line Valve/Vault
- New Line Valve/Vault
- New Reading Meter
- New Reading Meter

Legend:
- Yellow: Contract 7066 (Completed May 2015)
- Blue: MWRA Mains
- White: New Meter Locations
- White: New Line Valve/Vault

Scale: 0 - 600 Feet

Directions:
- North
- South
- East
- West

Areas:
- Reading
- Woburn
- Stoneham
- Newton
General bids were opened on October 22, 2015 as follows:

- Albanese D&S: $9,888,000
- P. Gioioso and Sons: $9,945,400
- Fed Corp: $10,054,809
- Baltazar Contractors Inc.: $10,417,000
- Albanese Brothers Inc.: $10,897,000
- Revoli Construction: $11,032,450
- RJV Construction: $11,888,000
- P. Caliacco Corp.: $12,178,000
- The Dow Company: $12,713,000
- McCourt Construction Company: $15,811,000
- Engineers Estimate: $10,100,000
Low bidder is Albanese D&S

Prior MWRA projects:

- Northern High Service Pipeline Improvements-Section 53
- Northern Intermediate High Stoneham-Reading Connection
- Cummingsville Branch Replacement Sewer
Recommendation

- Staff have determined that Albanese D&S is qualified to construct contract Northern Intermediate High Section 110 – Reading and Woburn and is the lowest responsible and eligible bidder.

- Staff recommends the award of Contract 7471 to Albanese D&S in the amount of $9,888,000 for a contract duration of 808 calendar days.
Construction Schedule

- Construction Notice to Proceed: November 2015
- Construction Substantial Completion: December 2017
Wachusett Aqueduct Pumping Station

Construction Contract Award

November 18, 2015
Carroll WTP Supply – Cosgrove Tunnel

Cosgrove Tunnel Supply

Wachusett Aqueduct Extension

Carroll WTP
Major Design Elements

- 240 mgd pumping station located near the end of the Wachusett Aqueduct
- Security Gate Improvements
WAPS and Carroll WTP Site

- Carroll WTP
- Forebay Channel
- Wachusett Aqueduct Pumping Station Site
- Wachusett Aqueduct Terminal Chamber
• 122’ x 68’ and 51’ high masonry building
• Surge tank
• Storage yard
- Seven 40 mgd pumps with 700 hp motors (six for 240 mgd and one stand-by)
- Control valves on pump discharge to prevent surges
- Overflow Channel
- Constant speed vertical turbine pumps
- Intake Channel
- Overflow Channel

To CWTP
Entrance Improvements

- K-12 Security Gates
- Guard House
- Canopy
General bids were opened on October 15, 2015 as follows:

- BHD/BEC JV 2015, A Joint Venture $47,011,000
- Walsh Construction Company $47,789,433
- PC/R.H. White, Joint Venture $47,855,000
- Carlin Contracting Co., Inc. $49,586,840
- Daniel O’Connell’s Sons $49,967,433
- J.F. White Contracting Co. $50,467,433
- *Engineer’s Estimate* $60,500,000
Low bidder is BHD/BEC JV 2015, A Joint Venture:

- Barletta Heavy Division
- Barletta Engineering Corporation
- Numerous Prior MWRA projects including John J. Carroll Ozone Treatment Plant
Recommendation

- Staff have determined that BHD/BEC JV 2015 is qualified to construct the Wachusett Aqueduct PS and is the lowest responsible and eligible bidder.

- Staff recommends the award of Contract 7157 to BHD/BEC JV 2015, A Joint Venture in the amount of $47,011,000 for a contract duration of 1,260 calendar days.
• Construction Notice to Proceed  December 2015

• Construction Substantial Completion  June 2019