Presentation to

MWRA Board of Directors

Thermal and Hydro Power Plant Maintenance
Deer Island Treatment Plant

March 12, 2014
On-Site Thermal/Power Plant

- Built in 1998
- Provides Electrical Generation, Process and Facility Heat at Deer Island WWTP
- Two (2) High Pressure Steam Boilers fired on Digester Gas, No. 2 Fuel Oil or Combo
- Main Steam 590psig at 750deg F
- Two (2) Steam Turbine Generators:
  - 18-megawatt Main STG
  - 1.2-megawatt Back Pressure STG
Hydroelectric Power Plant

- Built in 2001
- Provides Electrical Generation from Treated Wastewater prior to discharge into 9.5 Mile Effluent Outfall Tunnel
- Two (2) 1.1-Megawatt Kaplan Hydroelectric Turbine Generators
- Electrical Output varies based on Plant Flow and Tunnel Shaft Level (Ocean Tides and Tunnel Headloss)
• O’Connor Corporation - $3,273,607

• Contract Duration: 730 days

• Scope:
  – 1) Perform Scheduled Maintenance and Inspection Services at each Facility;
  – 2) Provide Emergency and Non-Emergency Repair Services at each Facility;
  – 3) Install Steam Bypass Line at Thermal/Power Plant;
  – 4) Demo Abandoned Cooling Water Lines at Thermal/Power Plant;
  – 5) Replace Various Pumps at Thermal/Power Plant
Two High Pressure Steam Boilers
18-Megawatt Steam Turbine Generator
1.2-Megawatt Back Pressure Steam Turbine Generator
Hydroelectric Turbine Generator
Presentation to

MWRA Board of Directors

Rehabilitation of Anaerobic Digesters, Primary Clarifiers and New Influent Gates at Clinton AWWTP

March 12, 2014
Clinton AWWTP Overview

- Built in 1995
- Advanced wastewater treatment services to the Town of Clinton and Lancaster
- Design capacity:
  - Average: 2.5 MGD
  - Peak: 12 MGD
- Rehabbed in 1992
Facility Map

- Historical Pump Station, original
- Sludge Holding Tank
- Anaerobic Digesters recently rehabbed
- Gravity Thickeners (2)
- Sludge Dewatering Building
- Primary Clarifiers recently rehabbed
- Aeration Tanks
- 60’ Diameter Trickling Filters (2) with new distribution arms
- 80’ Diameter Trickling Filters (2)
- Final Clarifiers (3)
Contract Summary

- Contract #7277A

- Lowest Bidder: R. H. White Construction Co. - $4,347,571

- Contract Duration - 730 days

- Scope:
  - 1) Replace existing Primary Clarifier scum/Sludge collection Equipment and concrete remediation;
  - 2) Rehabilitation of two digester tank covers;
  - 3) Replacement of various digested sludge pumps piping and valves;
  - 4) Replacement of Digester mixing system;
  - 5) Add isolation gates to protect the plant in the event of catastrophic flooding
Primary Clarifier Concrete Restoration
Primary Clarifier Walkway Concrete Restoration
Digester Sludge Transfer Pump
Digester Floating Cover (Steel)
Digester Fixed Concrete Cover
Primary Clarifiers
Presentation to

Board of Directors

Remote Headworks Upgrade
Amendment 3

March 12, 2014
Remote Headworks Facilities – Location Plan
Relocation of Odor Control Equipment
- Original layout on north side of facility
- New layout on south side of facility

Additional Design Items
- Conversion to natural gas to reduce heating costs
- Individual electric actuators for sluice gates
- Connection to City of Chelsea water system

Flood Protection
- Protect facility from 100-year storm plus 2.5 feet
- Integrated building solutions for exterior protection from floods
- Interior improvements to isolate facility from influent

MA Contingency Plan Reporting Requirements
- Phase II Report and Risk Assessment
- Revised Activity and Use Limitation (AUL)
Odor Control Equipment Alignments
Views of Odor Control Equipment

South Side - Existing View

North Side - Existing View

View at 60% Design – Odor control units over conduits between Headworks and Screen House

View with relocation of odor control equipment to Congress Avenue Extension
Flood Protection – Existing Exterior

Elevation 119

Elevation 116.5
Flood Protection Barriers

Compression bolts

6063T5 Aluminum

Compression gasket runs entire length of log

Sill flush with floor
2014 Update on Local Pipeline Financial Assistance Program

March 12, 2014
Old unlined cast iron pipe needs to be replaced or cleaned and lined to prevent tuberculation (rust build up), loss of disinfectant residual and potential bacteria growth
Water Financial Assistance Program - Summary

- $30M Pilot Program in FY98-FY99
- $222M Phase 1 Program FY01-FY13
- $210M Phase 2 Program FY11-FY20 ($61M distributed)
- 100 percent interest-free loan repaid over 10 years
- All Loans Repaid to MWRA
- 38 Communities Have Participated – 328 Projects Funded during Phases 1 and 2
Regional Water System Lined and Unlined Pipe
About 6400 Miles of Community Water Mains
Updated February 2014

- 60% lined (3850 miles) pre-1998
- 32% unlined (2082 miles) Projected future cost of $1.0-$1.5 billion
- 7% lined (423 miles) 1998-February 2014 $313 million MWRA Funded
- 1% lined (50 miles) 1998-February 2014 Community Funded
Water Financial Assistance Program - Results

- $313 million invested in community water projects
- 270 miles water main replaced with new cement lined pipe
- 153 miles existing water main cleaned and lined
- 4,600 lead service connection replacements
- Additional system improvements include valves, hydrants, storage tanks, booster pump stations, and meter projects
Examples of Tuberculated Pipe
New Cement Lined Ductile Iron Pipe
Typical Replacement Project – West Roxbury
Typical Cleaning and Lining Project - Norwood
• Board Authorized Early Distribution to Reading January 2013

• $4,012,000 Distributed August 2013

• Replacement of 15,500 LF and Cleaning and Lining of 16,200 LF

• Design Complete, Construction bidding for Spring 2014
Local Projects Coordinated with MWRA Projects

• Cost Savings Achieved through Economy of Scale
  – Saugus - $450,000 for Design to Replace 6,000 LF Project Bid under MWRA Lynnfield Pipeline Contract
  – Milton - $750,000 for Construction to Replace 9,200 LF Project Bid under MWRA Southern Spine Contract
Milton Pipe Bursting Project

- Pipe Bursting Construction Method Utilized to Avoid Wetland Impacts
Lead Service Replacement Projects

- Arlington – 210
- Everett – 300
- Malden – 1200
- Medford – 150
- Melrose – 200
- Norwood – 110
- Somerville - 450
Canton Water Quality Issues at Local Water Storage Tanks

- $1.1 million demolition/replacement of 0.7 MG Tolman Street Standpipe
- $0.5 Million cleaning and rehabilitation of 0.6 MG Ponkapoag Standpipe
- $410,000 replacement of faulty hydrants and gate valves
Canton Ponkapoag Standpipe Rehabilitation
Update on Co-Digestion

March 12, 2014
Bench Scale Set-up
Project Site Before Demolition
After Demolition With New Equipment Pads
Thickened Sludge Pump
Food Waste Truck
Presentation to

MWRA Board of Directors

Spot Pond Covered Storage Project Update

March 12, 2014
Covered Storage Tank Overflow Pipe
Section 99 Isolation
Mobile Pumping Units Deployed
Overflow Pipe Jacking Pit
Overflow Pipe in Jacking Pit
Overflow Pipe in Jacking Pit
Muck Removal
Tracking of Pipe Jacking

Pipe Jacking - 48" RCP

Distance to Date - 2/18/2014

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Work Days Remaining to Section 99 (Center-Line)

15.2
Pump Station and Tank Wall
Pump Station and Tank Wall
Tank Wall
Rendering of Pump Station