MWRA Water Supply and Treatment

2012
MWRA Service Area

- MWRA provides wholesale water and wastewater services to approx. 2.3 million customers in 61 communities including the City of Boston

- On average, MWRA delivers 200 million gallons per day to its water customers, with a maximum day demand of 280 million gallons

- MWRA collects and treats an average of 350 million gallons of wastewater per day, with a peak capacity of 1.2 billion gallons
The Watersheds
Source Reservoirs

**Quabbin Reservoir**

- **Storage:** 412 billion gallons
- **Depth:** 150 feet
- **Length:** 17.9 miles
- **Width:** 3 miles

**Wachusett Reservoir**

- **Storage:** 65 billion gallons
- **Depth:** 129 feet
- **Length:** 8.5 miles
- **Width:** 1 mile
The MetroWest Water Supply Tunnel was brought on-line in November 2003.

By March 2004, the Tunnel was fully utilized allowing the shutdown of the Hultman Aqueduct.
Covered Storage Projects

- MWRA is building seven new covered storage tanks to replace all open reservoirs
- Six are completed and on-line
- A new tank at Spot Pond in Stoneham will complete this work
Integrated Water Supply Improvement Program: 
John J. Carroll Water Treatment Plant

• Placed in service in July 2005

• Treatment Processes
  – Ozonation for primary disinfection
  – Corrosion control
  – Chloramination for secondary disinfection
  – Fluoridation

• Plant capacity 405 MGD max, 270 MGD average
Ozone System
> 3 log *giardia* inactivation
2 log *cryptosporidium* inactivation*
Up to 3.3 mg/l dose

*Using MWRA/AWWARF site specific study results*
Ozone Generators

- 4 Generators total
- 3,380 pound capacity each
- 10% ozone by weight
- 529 dielectric tubes
- 13.8 kv electric supply
- 560 gpm cooling water flow
Ozone System

- Three 24,000 gallon liquid oxygen storage tanks
- Nitrogen boost system for added efficiency
- Four 1.3 million gallon primary contactors
  - with 5 bubble diffuser-stone grids, each
- Two 3.4 million gallon extended contactors
- Four dissolved ozone analyzers per contactor
Process Flow Diagram
John J. Carroll Water Treatment Plant

- Ozone addition
- "Post treatment"
- Extended ozone contact – Future UV treatment
- 22.5 MG baffled storage tank
- Storage
• Plant staff utilize plant monitoring and control system to optimize chemical and electrical usage
Benefits of the Carroll Water Treatment Plant

• Immediately noticeable taste & odor improvements
• Dramatic reduction in disinfection by-products
• Increased pathogen inactivation achievement
• Elimination of multiple satellite treatment facilities
  (including 9 community re-treatment facilities)
Chlorine By-products Have Been Reduced, Disinfection Improved With Ozone Treatment

MWRA TTHM Compliance Program
MetroWest/Metropolitan Boston

EPA Maximum Standard

Ozone plant goes on-line

Giardia CT Percent Achievement
Carroll Water Treatment Plant

EPA Minimum Standard

Ozone plant goes on-line
Ultraviolet Disinfection will meet new regulations

- UV disinfection chosen to meet new EPA regulations*

- Calgon Carbon UV equipment was selected through a life-cycle oriented competitive bid process

- Contract award in April 2011.

- UV system must be in operations by April 1, 2014

* Long term 2 Enhanced Surface Water Treatment Rule
Ultraviolet Disinfection construction underway

• A-side demolition nearly complete

• B-side demolition proceeding

• UV equipment to arrive in summer 2012
Western Operations Energy Production

FY12 Power Production
Q1 & Q2

MWHr


Oakdale Cosgrove Solar CWTP consumption