



Operations Maintenance Update



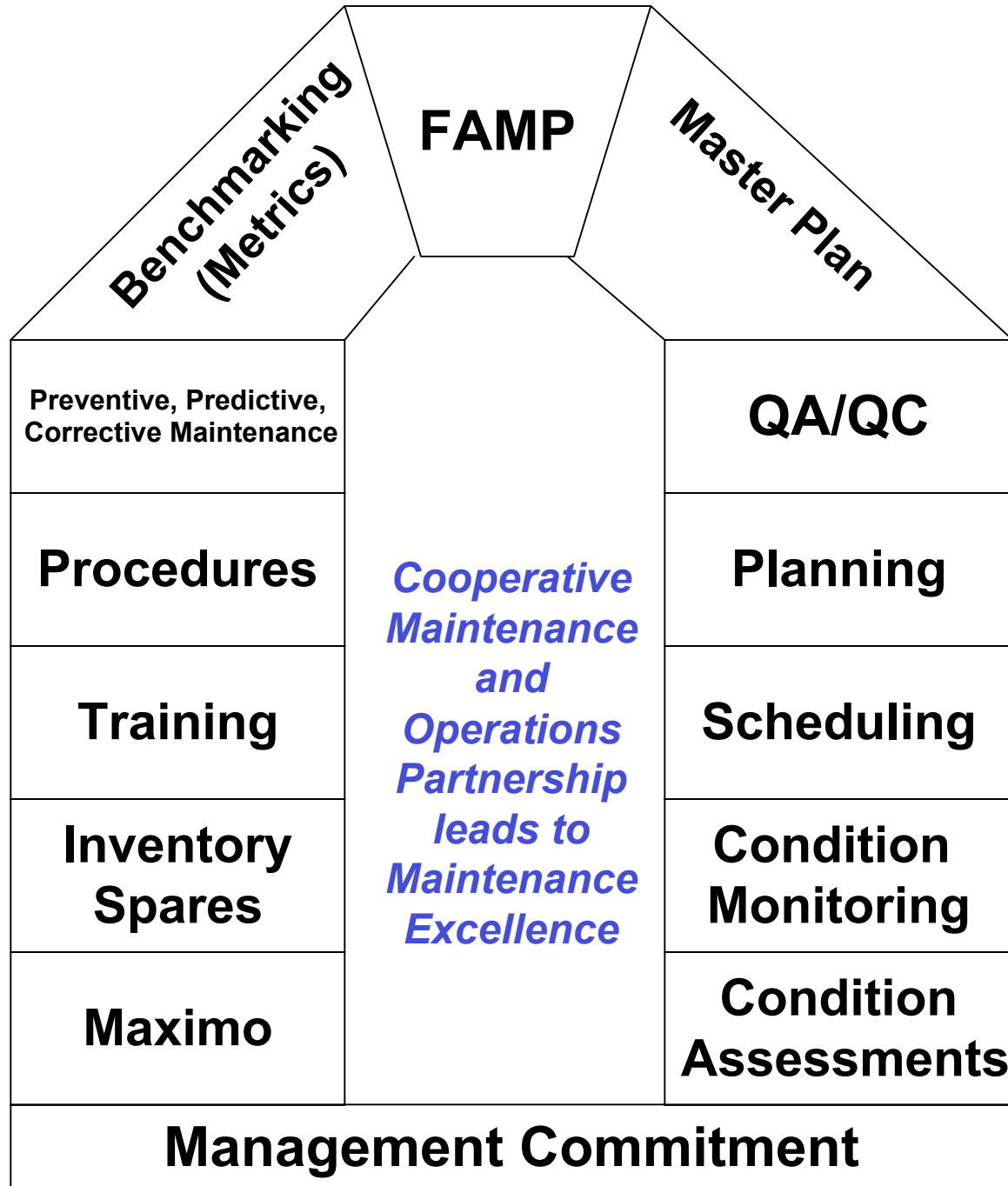
**Wastewater and Water
Supply Advisory
Committees
February 2011**



Today's Agenda

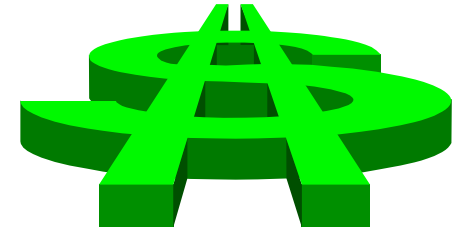
- Asset Management Goals
- Operations Assets
- CIP and CEB Spending
- Operations Asset Management Program
 - Planning
 - Metrics
 - Condition Monitoring
 - Software Use
 - Training







Asset Management Goals



- **Cost effectively replace components at the appropriate time to**
 - ensure reliable plant operation
 - preserve value of ratepayer investment
- **Prolong equipment life**
- **Control large spending spikes**
 - avoid historical deferred maintenance approach
 - incorporate planned budget approach



Deer Island Wastewater Treatment Plant

- Result of \$3.8 Billion Dollar Construction Project
- 2nd Largest Wastewater Treatment Plant in the United States
- Built on 120 Acres
- Treatment Capacity:
 - Maximum
 - 1.27 Billion Gal/Day
 - Average Daily Flow:
 - 365 Million Gal/Day





John J. Carroll Water Treatment Plant



- \$350 Million Construction Cost
- Placed in service in July 2005
- Treatment Processes
 - Ozonation for primary disinfection
 - Corrosion control (soda ash and CO₂)
 - Chloramination for secondary disinfection
 - Fluoridation
- Plant capacity 405 MGD max; designed for 270 MGD average, operating at <200 MGD average



Metro Operations

Water System (\$ 6.0B)

- 100 miles of tunnels and aqueducts
- 284 miles of water distribution piping
- 11 pump stations
- 11 storage facilities
- 4904 valves

Transport System (\$ 2.2B)

- 228 miles of interceptor sewers
- 12 pump stations
- 4 combined sewer overflows facilities
- 4 headworks
- 1 screen house





Capital Project Spending

FY 08 through FY12 Spending - \$ 1,010M

- FY 08 Actual Spending \$196.8M
- FY 09 Actual Spending \$183.9M
- FY 10 Actual Spending \$211.4M
- FY 11 Projection \$183.0M
- FY 12 Projection \$235.0M



Operations Major Capital Projects

Water System

- Spot Pond Storage Facility (\$63M)
- Metrowest Tunnel and Hultman Aqueduct (\$704M)
- Long Term Redundancy Projects (\$ 529M)
- Valve Replacements (\$ 20M)
- CWTP UV Addition (\$ 38M))
- Ware UV Disinfection Project (\$ 5M)

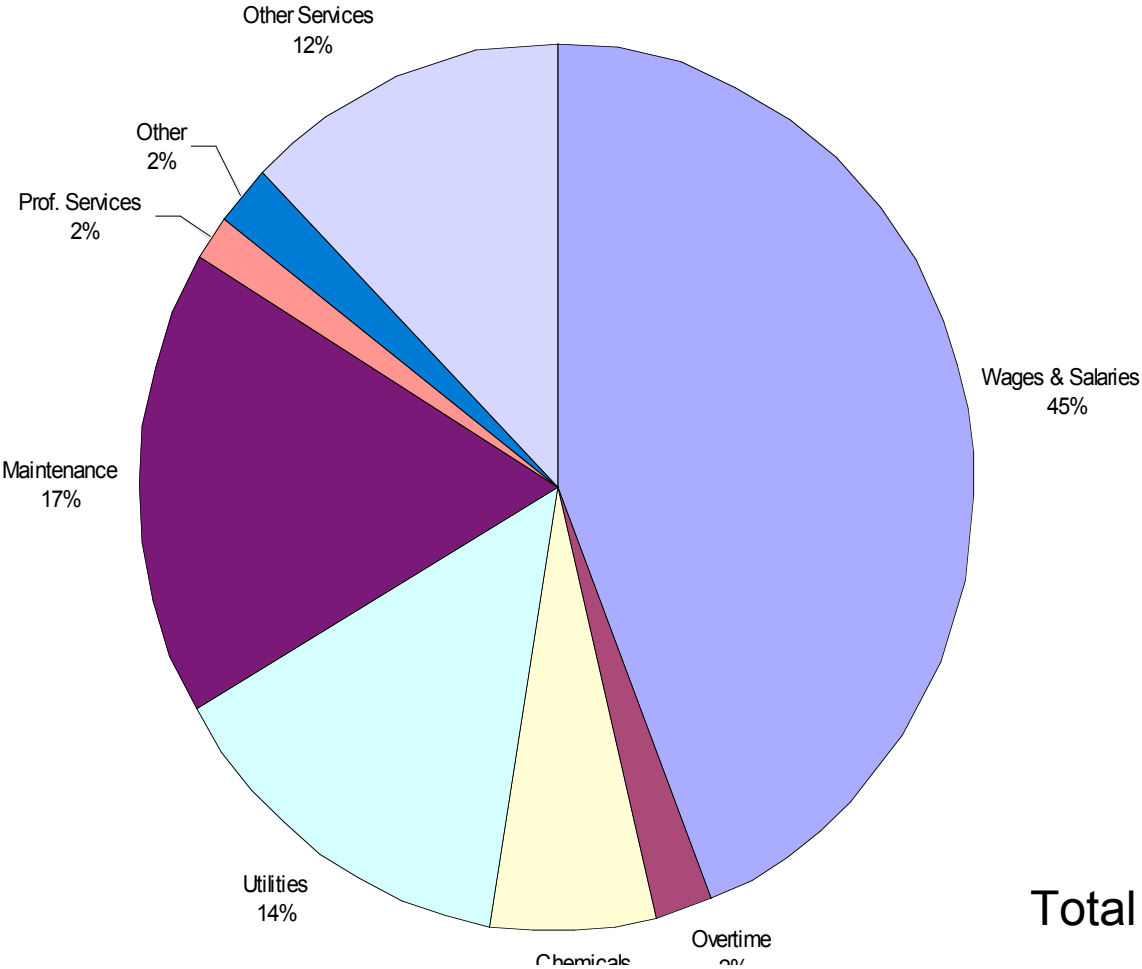
Transport System

- North Dorchester Bay Tunnel Pump Station and Odor Control (\$223M)
- West Roxbury Tunnel (\$89M)
- Interceptor and Pumping Facility Asset Protection (\$160M)
 - Remote Headworks Rehabilitation
 - Somerville CSO Gate/Stop Log Replacements
 - Alewife Brook Pump Station Rehabilitation
 - Prison Point HVAC Replacement
 - Nut Island Mechanical and Electrical Replacements

Wastewater Treatment – Deer Island

- Deer Island Asset Protection (\$ 512M)
 - Clarifier Rehabilitation (\$ 60M)
 - North Main Pump Station VFDs (\$ 50M)
 - Heat Loop Piping Replacement (\$ 14M)
 - Digester Sludge Pump Replacement (\$ 3M)
 - Digester Modules 1 and 2 Piping Replacement (\$ 13M)

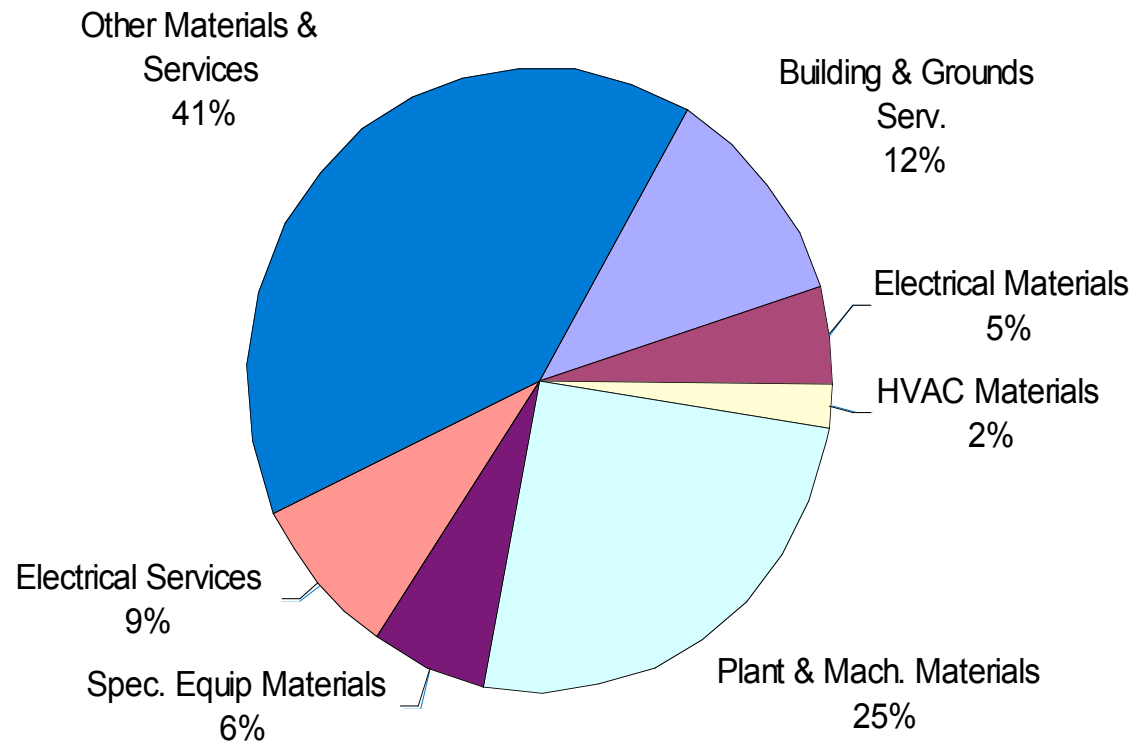
Components of FY12 CEB Request



Total = \$155.5M

Operations Division FY12 CEB Maintenance Request

Total = \$26.2 M



Total Services = 62% or \$16.2M



Service contracts

- **Maintenance contracts**
 - Cryogenics
 - Centrifuge
 - Combustion Turbine Gen
 - Steam Turbine Generator
 - Boiler
 - M/V Electrical Testing
 - Variable Frequency Drives
 - Pest Control
 - Janitorial
 - Landscape
 - Paving
 - Hydraulics
 - Elevator
 - Crane
 - Air Compressor
 - Security



Maintenance Planning

- Maintenance Priority List
 - Meet weekly with operations/Maintenance/Engineering
 - Discuss highest priority work
 - Maintenance uses meeting to create area Daily Dispatch
- Daily Dispatch record
 - Plan for tomorrow and schedule for the day
 - Schedule eight hours of work for all technicians
 - Includes WO#, Description, Location, # of hours
 - Priority work/PM/Projects
 - Management tracks productivity



Maintenance Highlights

- 72,970 Pieces of equipment in Maximo
- 98.7% Equipment availability
- 41,166 Work Orders per year
- 2074 Preventive Maintenance/month
- 100% Preventive Maintenance completed
- 17% Predictive Maintenance
- < 1% Emergency Maintenance





Maintenance Metrics

<u>Benchmark</u>	<u>Industry Goals</u>
Maint. Spending/RAV	1.0-1.5%
Availability	97%
Emergency Maintenance	< 5%
Overtime	< 5 %
Operations Light Maint.	10-15%
Backlog	3-6 weeks

Benchmark data was taken from industry data including Society of Maintenance & Reliability Professionals, International Benchmarking Clearinghouse, Maintenance Technology Magazine, Maintenance Handbooks, and various technical papers from Fortune 500 companies and Maintenance Consultants.



Wastewater Pipeline TV Inspection/Maintenance

	<u>Total</u>	<u>FY10</u>
Sewer line CCTV Inspections/Cleaning (Miles)	228	32
Siphon Inspections/Cleaning (Number of Barrels)	108	48 (24 cleaned)
Structure Inspections (Includes Manholes, Head houses, Diversion and Junction Chambers)	~4300	650
Manhole Frame and Cover Replacements	~4200	108
Community Assistance	43	As needed Avg. 1 - 3 miles



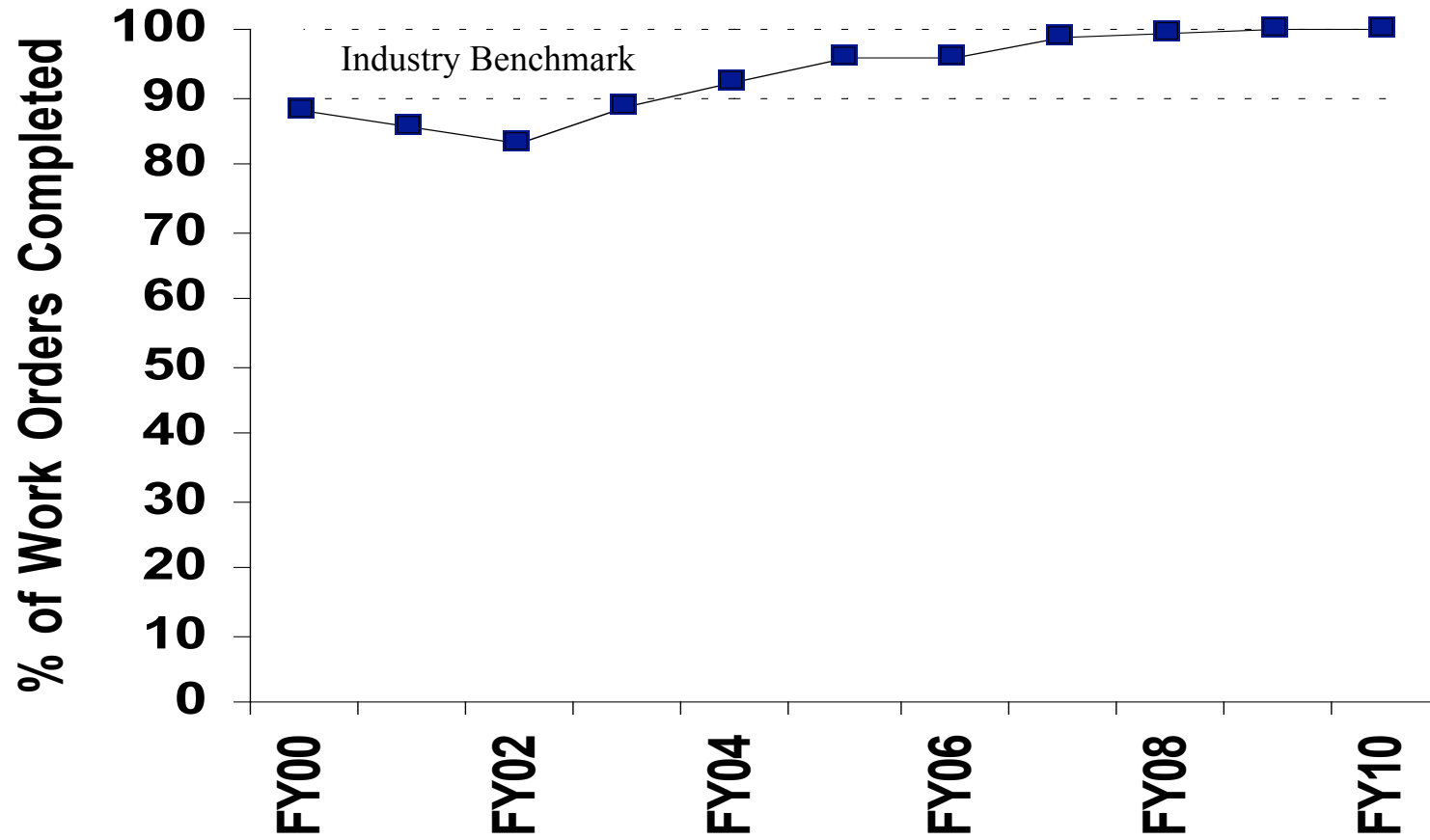
Water Pipeline Maintenance

	<u>Total</u>	<u>FY10</u>
Leak Detection Inspections	284 miles	284 miles
Valve Exercising		
– Main Line Valves	2092	1100
– Blow Off Valves	1197	375
Valve Replacement/Retrofits	4904	78



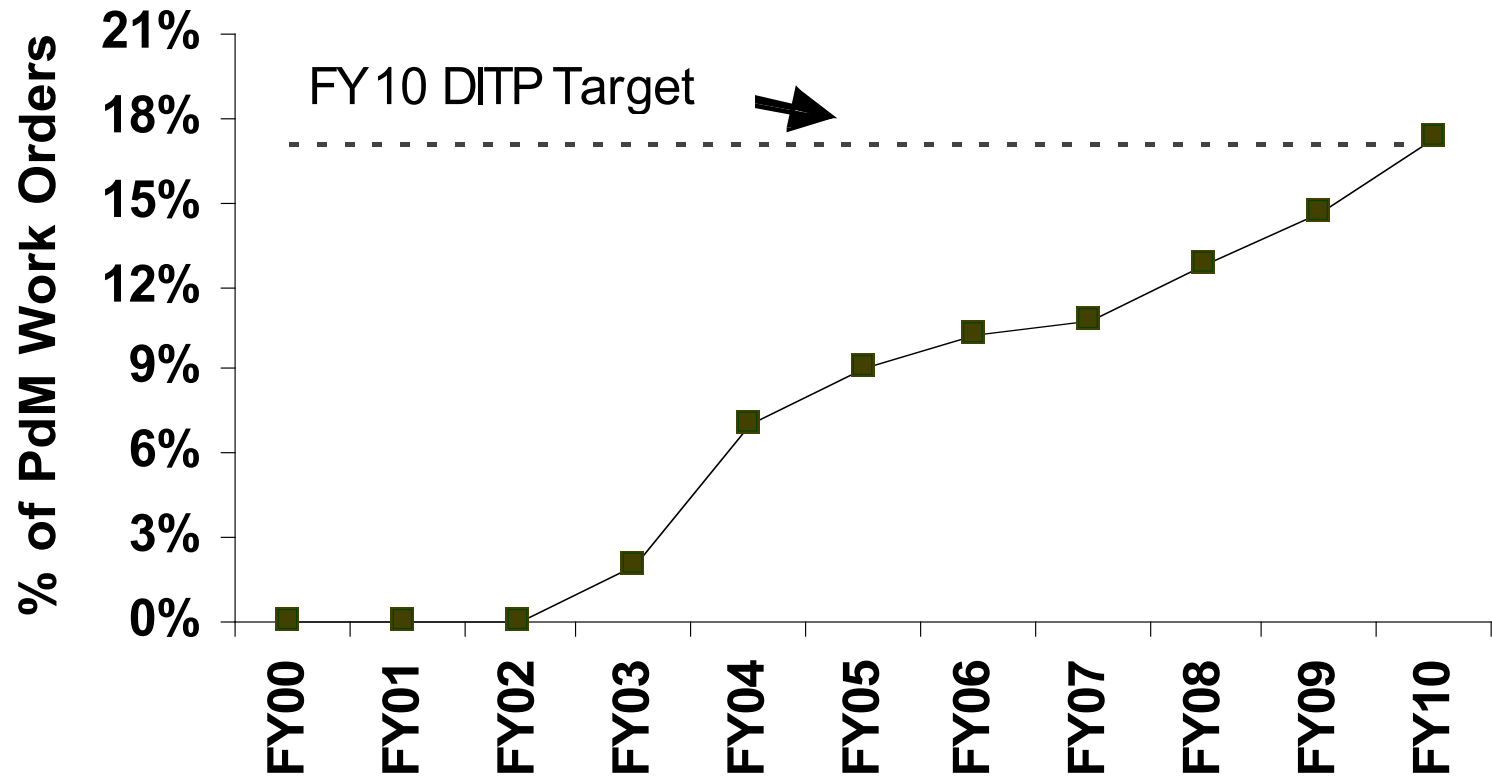


Preventive Maintenance



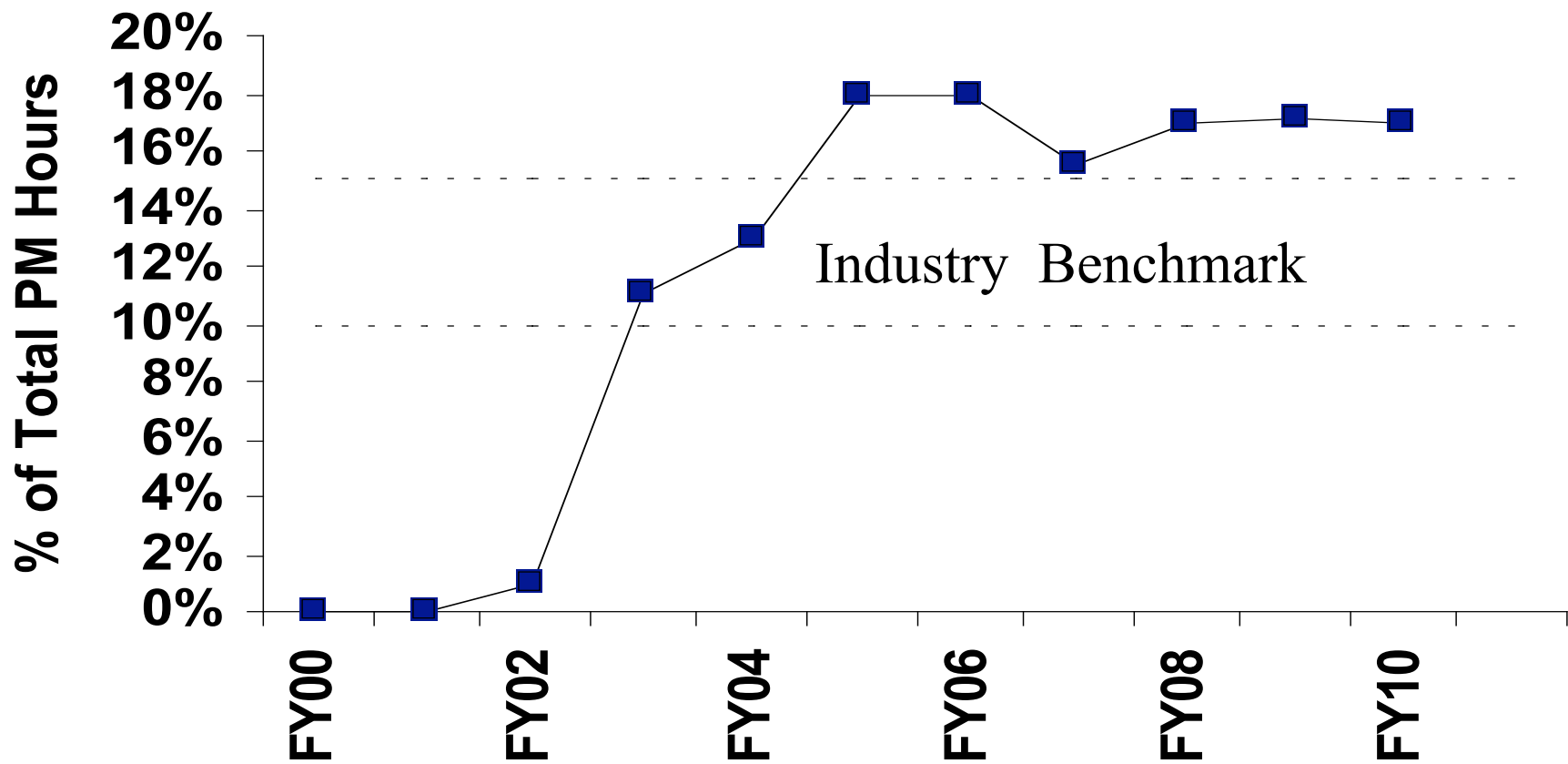


Predictive Maintenance





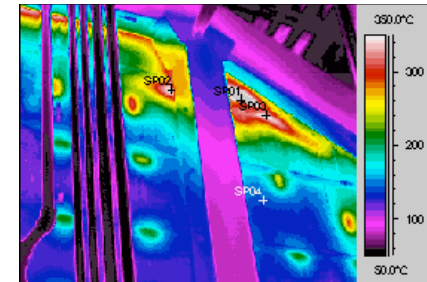
Operations Light Maintenance PMs





Condition Monitoring

- Lubrication / Oil Analysis
- Vibration
- Temperature
- Thermography
- Ultrasonic

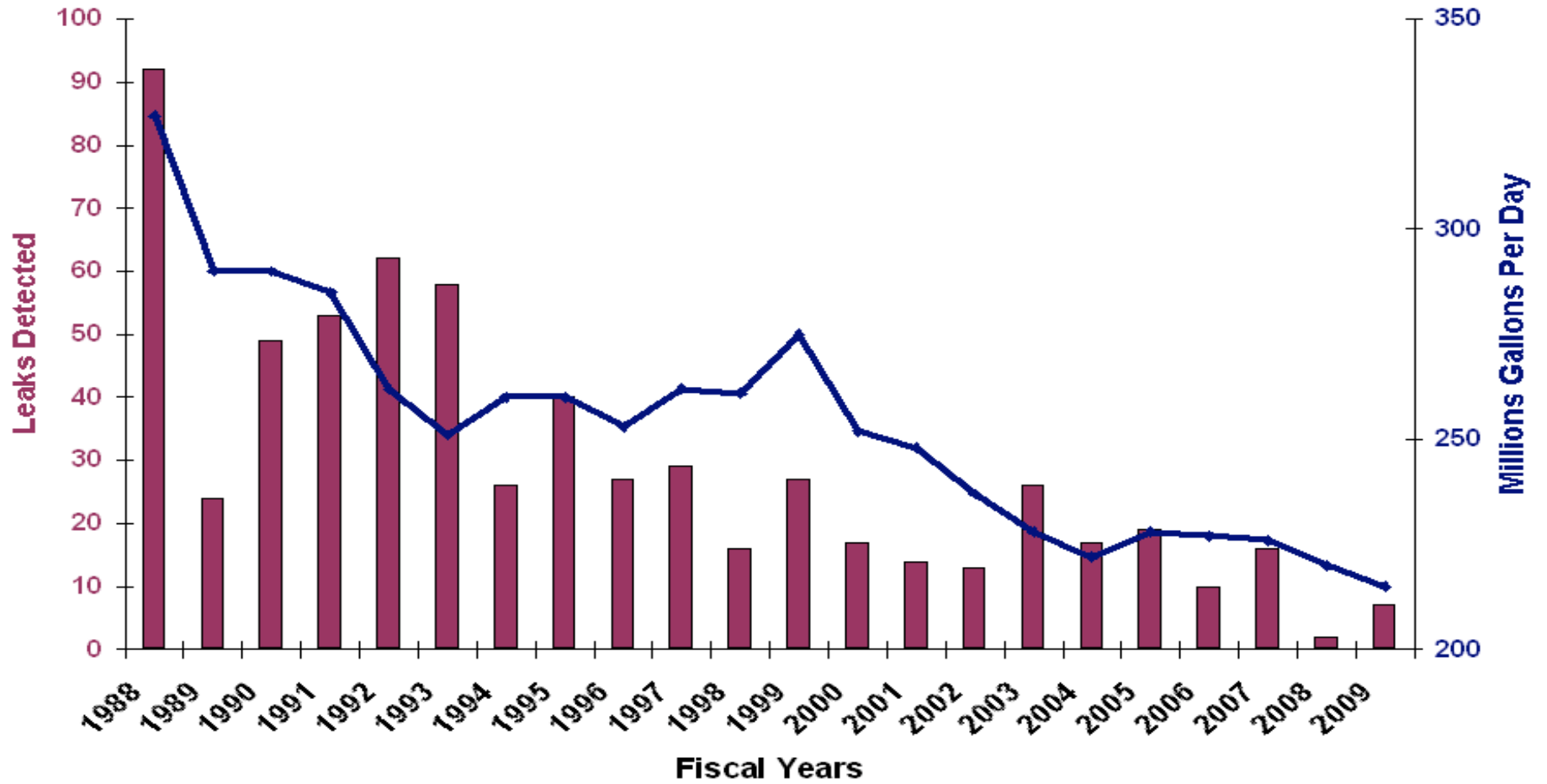




Condition Monitoring Water Leak Detection Program



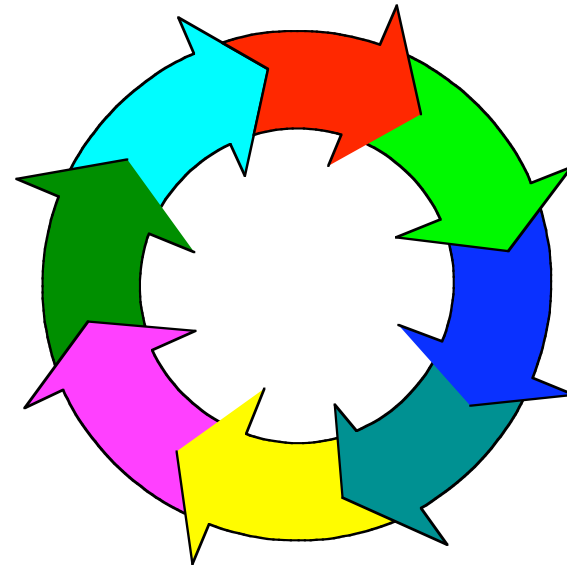
Water Leaks and Usage 1988 to 2009





Software Utilization

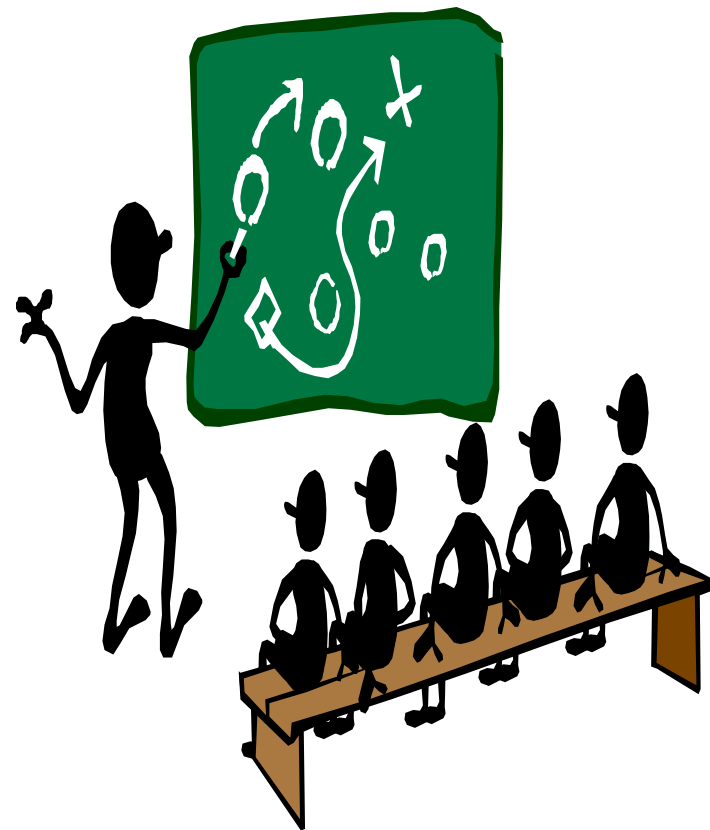
- Maximo 5.2 (upgrade to 7.0 on 12/1/11)
- Lawson/Maximo interface
- Increase Functionality
 - Attached documents
 - Data-base roll-up
 - Performance reporting
 - Required fields
 - PICS Maximo Interface
 - Enhanced Queries

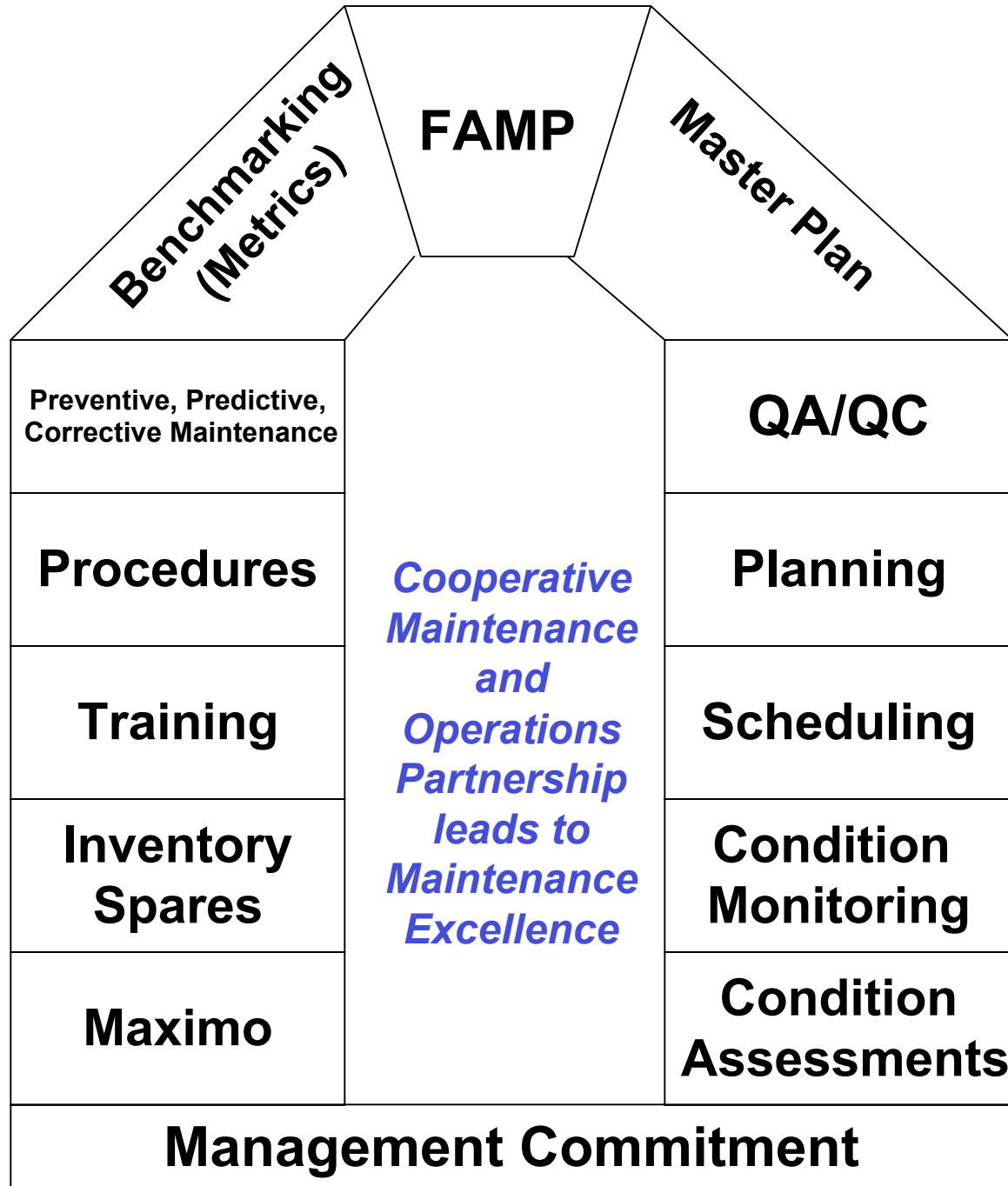




Operations/Maintenance Training

- Alignment Training
- Maximo Training
- Vibration Training
- RCM Training
- Arc flash Training
- B&G Pump Training
- New Procedures







Questions

