Written by John W. Fortin, John P. Colbert, and Ted Regan, Massachusetts Water Resources Authority, Deer Island Treatment Plant
Sunday, 01 September 2002 19:41

Consultants, onsite visits, benchmarking, and conference attendance add fuel to the development of an asset management program.

The Massachusetts Water Resources Authority (MWRA) is responsible for providing wholesale water and sewerage services, in whole or in part, to 61 communities and 2.6 million people. In addition to its operating responsibilities, MWRA is responsible for rehabilitating, repairing, and maintaining the regional water and sewerage systems.

Since its assumption of the ownership and operations of the systems in 1985, MWRA has undertaken an ambitious program of water and wastewater system capital improvements with estimated expenditures for fiscal years 1986 through 2009 of more than $7 billion. Under one massive construction effort, the Boston Harbor Project, the MWRA assumed maintenance responsibility for the $3.8 billion Deer Island Treatment Plant designed to treat 1.2 billion gpd. It is the second largest wastewater treatment facility in the nation. The new treatment plant's operations and discharge water quality are closely monitored by state and federal agencies and environmental organizations through an extremely stringent permit.

Initiative created

Given the significant value and critical nature of the MWRA assets, maintenance is of paramount importance. In 1996, the Facilities Asset Management Program (FAMP) initiative was created as a comprehensive, agency-wide effort to most efficiently and effectively manage the region's water and sewer infrastructure. The purpose of the FAMP initiative is to optimize the efficiency and effectiveness of MWRA equipment maintenance practices (i.e., minimize critical equipment failures, minimize unnecessary maintenance practices, improve equipment reliability, and heighten system knowledge).

In summary, the program focused on areas such as standardization of maintenance practices, adoption of best practices, and optimization of labor and material resources. The program is a phased approach (see above).

In 1999, the Capital Programs Group, under the direction of Dan O'Brien, selected New Dimensions Solution consultants, New York, NY, to help facilitate changes in MWRA maintenance practices. The changes included implementing a Reliability Centered Maintenance (RCM) strategy instead of the current time-based maintenance strategy, advancing the use and quality of the computerized maintenance management system, MAXIMO (MRO Software, Bedford, MA), and developing a design for the installation of permanent vibration and temperature monitoring for critical process equipment.

Site visits

As the Phase I program was implemented, there was uncertainty between the operating units of the benefits of a comprehensive asset management program. A critical turning point in the program's success followed site visits to several industries. The Authority sent seven representatives, led by Deputy Director of Maintenance Gerry Gallinaro, to Dofasco Inc., Hamilton, ON, and Broward County, FL (a water/wastewater utility), to learn about the implementation of RCM and CMMS at their sites.

The Authority team was made up of a cross-section of staff including maintenance management, work coordination, process control, plant engineering, capital programs, and warehouse personnel. The host sites provided invaluable insight and lessons learned from their asset management projects including corporate commitment, culture change agents, best practices, resource requirements, and sustainment structures to support the new business approaches.

The results were presented to the various operating units and senior staff and a detailed trip report with recommendations to be implemented was prepared. The trip resulted in a giant step forward by empowering in-house staff and solidifying the FAMP program's goals and objectives. After these trips, senior staff support increased and the program gained significant momentum.

One additional key element that was identified was the need to institute a communications plan to facilitate change. The plan was needed to institute cultural changes to a diversified staff in multiple locations and to institute standardized practices Authority-wide.

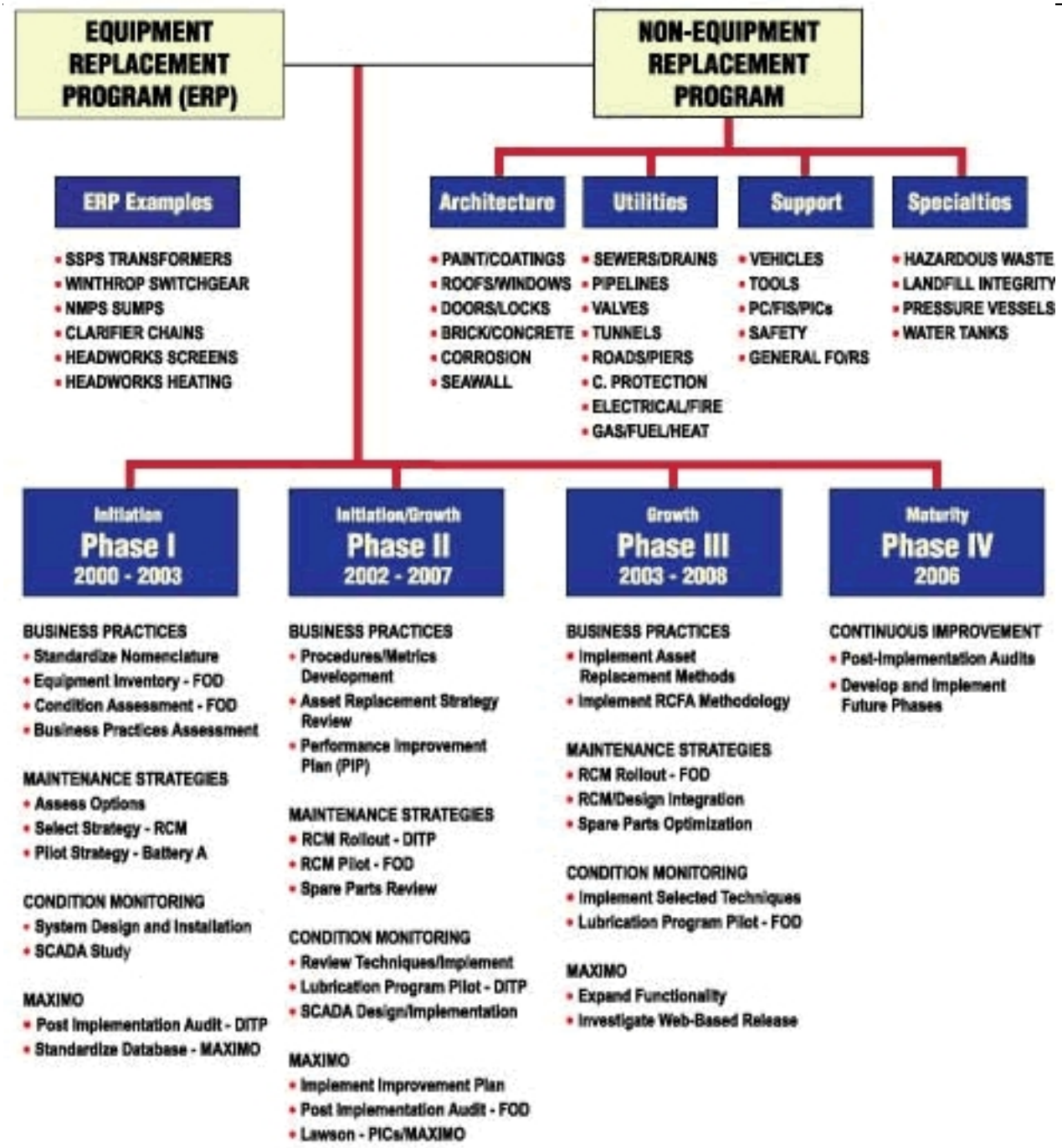
The communication plan included activities such as regular program briefings, team meetings, newsletter articles on progress, forum events, and an Intranet site. The director of Deer Island, John Vetere, held informational meetings with all staff to discuss the program elements and their importance. It proved to be an essential component to our successful maintenance management optimization campaign allowing connectivity between workforce members and business goals. In addition, the communication plan is used to highlight and track program success.

SMRP conference

As the FAMP program moved ahead, it was clear to MWRA that staff needed to look outside the

box from traditional maintenance thinking. Historically, water quality professionals relied on civil engineering type conferences to gain operations and maintenance knowledge. Our consultant team recommended involvement in the Society for Maintenance & Reliability Professionals (SMRP).

Four members of the Authority attended SMRP's 2001 conference to gain insight into high level company approaches to asset management. The results of this trip were overwhelmingly positive. Staff gained tremendous insight into "for profit" best maintenance practices approaches allowing MWRA to gain beneficial knowledge to map out future program phases and best practices implementation.


EQUIPMENT REPLACEMENT PROGRAM (ERP)
NON-EQUIPMENT REPLACEMENT PROGRAM
ERP Examples
• SSPS TRANSFORMERS
• WINTHROP SWITCHGEAR
• NMPS SUMPS
• CLARIFIER CHAINS
• HEADWORKS SCREENS
• HEADWORKS HEATING
Architecture
• PAINT/COATINGS
• ROOFS/WINDOWS
• DOORS/LOCKS
• BRICK/CONCRETE
• CORROSION
• SEAWALL
Utilities
• SEWERS/DRAINS
• PIPELINES
• VALVES
• TUNNELS
• ROADS/PIERS
• C. PROTECTION
• ELECTRICAL/FIRE
• GAS/FUEL/HEAT
Support
• VEHICLES
• TOOLS
• PC/FIS/PICs
• SAFETY
• GENERAL FO/RS
Specialties
• HAZARDOUS WASTE
• LANDFILL INTEGRITY
• PRESSURE VESSELS
• WATER TANKS
Initiation
Phase I
2000 - 2003
BUSINESS PRACTICES
• Standardize Nomenclature
• Equipment Inventory - FOD
• Condition Assessment - FOD
• Business Practices Assessment
MAINTENANCE STRATEGIES
• Assess Options
• Select Strategy - RCM
• Pilot Strategy - Battery A
CONDITION MONITORING
• System Design and Installation
• SCADA Study
MAXIMO
• Post Implementation Audit - DITP
• Standardize Database - MAXIMO
Initiation/Growth
Phase II
2002 - 2007
BUSINESS PRACTICES
• Procedures/Metrics Development
• Asset Replacement Strategy Review
• Performance Improvement Plan (PIP)
MAINTENANCE STRATEGIES
• RCM Rollout - DITP
• RCM Pilot - FOD
• Spare Parts Review
CONDITION MONITORING
• Review Techniques/Implement
• Lubrication Program Pilot - DITP
• SCADA Design/Implementation
MAXIMO
• Implement Improvement Plan
• Post Implementation Audit - FOD
• Lawson - PICs/MAXIMO
Growth
Phase III
2003 - 2006
BUSINESS PRACTICES
• Implement Asset Replacement Methods
• Implement RCFA Methodology
MAINTENANCE STRATEGIES
• RCM Rollout - FOD
• RCM/Design Integration
• Spare Parts Optimization
CONDITION MONITORING
• Implement Selected Techniques
• Lubrication Program Pilot - FOD
MAXIMO
• Expand Functionality
• Investigate Web-Based Release
Maturity
Phase IV
2006
CONTINUOUS IMPROVEMENT
• Post-Implementation Audits
• Develop and Implement Future Phases