Water and Wastewater
Europe 2005

Reduction of NRW Losses by Using an integrated WLM and WPM System
Content

- General
- Water Leakage Management (WLM)
- Water Pressure Management (WPM)
- Contradiction between WLM + WPM
- Using an integrated WLM + WPM system
- Summary
Globally the demand for potable water is increasing

New water sources
- might by scare
- require high investments

Alternatives to new sources
- Wastewater reuse
- Reduction of water losses
  - Too much water is treated
  - Too many plants have to be constructed

Reduction of leakages increase the availability of potable water
Water Leakage Management (WLM)

**Analyzed components**

- Water losses
  - Real (physical) losses
  - Apparent losses
- Authorized consumption
  - Billed authorized consumption
  - Unbilled authorized consumption

**Activities**

- Active Leakage control
- Pressure management
- Speed and quality of repair
- Pipe material management
Evaluation Methodology

- Bursts and Background Estimates (BABEL) methodology
- Utility is subdivided into districts and district metering areas
- Loss calculations are performed by using data from flow and pressure meters
- Analysis of loss components
- International Water Association (IWA) standard terminology
- Top-down analysis by Water Balance
- Bottom-up approach by Night Flow analysis
Elements

Determined losses
- Background losses
- Reported losses
- Unreported Losses

Trend Analysis
- Flow-pressure trends
- Demand profile
- Baseline trends
- Night flow trends
- Water balance trends

Online repair monitoring
- Job progress tracking
- Job costing
- Active Leakage Control tracking
- Repair statistics
- Physical loss components
- Repair quality monitoring
Indicators

Economic level of leakage
- Calculation
- Scenario analysis
- Monitoring by DMA

Performance indicators
- Unavoidable Annual Real Losses
- Continuous Average Real Losses
- Infrastructure Leakage Index
- Non-Revenue Water volume
- Average Zone Pressure
- Real Losses by components
Layer

Geographical Information System

User Interface & Maps navigation

3rd Party SCADA Integration

Burst & Background Calculation

User Interface & Security

Native Language Support

Communication Network Design and Web access

Flow and pressure data acquisition

Data Aggregation

Customised Reports

DMA & Zone structure

Pressure Management

Financial Analysis of Repair

Repair Monitoring

CORE Technology

Optional

Functional Modules

Add-ons
Water Pressure Management (WPM)

- Varying water demand
  - Excess pressure for more than 90% of the time in many systems
- High pressure
  - Contribute to leakage
  - Increase maintenance cost
- Pressure reduction program
  - Balance leakage savings against customer service
High, fluctuating, or sudden change…

…in water pressure in the supply network…

- reduces the average life of pipes
- causes more breaks in water main pipes
- boosts leakage rates
- places a strain on customers’ plumbing fittings
- increases citywide water consumption
Benefits of applying WPM

- Less expenditure for network maintenance
- Fewer breaks in water main pipes
- Reduced water losses through leakage
- Fewer customer complaints
- Slower deterioration of the network
- Fewer unplanned shutdowns of water supply
- Reduced maintenance on domestic plumbing fittings
- The flow rate from taps and fittings is reduced when pressure is turned down – this means customers have been using less water,
- Energy savings
Look and Feel

Pressure Management in DMA

Fixed Inlet Pressure Control

Operator Controls Choice

Water Savings Calculated

Date and Time of Day: 06/04/2001 00:00 PM
Current Potential Savings: 12.34 m³/hr
Previous Potential Savings: 12.34 m³/hr
Contradiction between WLM + WPM

- Natural conflict
  - Operator
  - Field engineer

- Solution → integrated WLM + WPM system
Schematic of System Architecture

Water Leakage Management + Pressure Management

AIP

OPC

SCADA Functionality

RT DB

Historian

Protocol Translator

Receiver/Transmitter

Datalogger/Transmitter/Modem

Flowmeters

PRV (incl. Controller)

Valve positioner

Communication

Pumping station, water quality monitoring, water gate,...
Summary (I)

- NRW + PM project can...
  - ...avoid investments in new treatment plants
  - ...increase revenues
  - ...cut OPEX due to reduction of losses
- BABE and IWA are proven methodologies to reduce NRW
- An integrated WLM and WPM System...
  - ...supports utilities and consultants in NRW + PR projects
  - ...provides progress monitoring using performance indicators
  - ...provides data available in the right time at the right place based on integrated data management
  - ...supports more efficient and effective water distribution network management
Benefits of an integrated WLM and WPM System

- Early detection of new bursts
- Daily analysis of loss components
- Recommendation of a maintenance strategy
- Effective deployment of leakage location team resources
- Accurate reporting of the daily NRW
- Ability to access all zone criteria
- Tracking of repair and maintenance status
- Balance leakage savings against customer services
- Cut operating cost and support fast response to users
Summary (III)

- Active Leakage Control & Pressure Management …
  - …to reduce Non-Revenue Water and to increase revenues
  - …to reduce water leakages to an economic level instead of investing in more treatment plants
  - …to control water pressure to the most economic level
  - …to act fast in repairing the bursts

- Never stop the Active Leakage Control & Pressure Management