

ASCE/EWRI Salt Lake City, Utah June 27-July 1 2004

6th ANNUAL SYMPOSIUM ON WATER DISTRIBUTION SYSTEM ANALYSIS—Day 1
(Final Program)

Session 1 Monday June 28, 2004 10:00 to 11:30
SYSTEM VULNERABILITY ASSESSMENT, James Uber, Moderator

Simulating Accidental Exposures to Deliberate Intrusions
Kenneth Nilsson *et al.*, University of Cincinnati
Threat Assessment of Water Supply Systems Using Markov Latent Effects Modeling
Vincent Tidwell *et al.*, Sandia National Laboratories
Delineation of Contamination Spread Potential over Extended Time Modeling
Francois Bouchart *et al.*, University of Calgary
Chemical/Biological Source Detection Using Full Space Algorithms For All Pipe Distribution Network Models
Bart van Bloemen Waanders *et al.*, Sandia National Laboratories

Session 2 Monday June 28, 2004 1:30 to 3:00
SYSTEM DESIGN AND ANALYSIS, Tom Walski, Moderator

Demand Modeling and Statistical Probability in a Regional Water Facilities Master Plan
Jennifer Nakayama and Richard Pyle, San Diego County Water Authority
A GIS Based Pipeline Route Selection Process
Thayne Clark and Jason Luettinger, Bowen, Collins & Associates
CALNET Project: Building and Updating Water Distribution Models from GIS+CIS+SCADA
Fernando Martinez *et al.*, Universidad Politécnic de Valencia
Simultaneous Optimization of Anytown Pipe Rehabilitation, Tank Sizing, Siting and Pump Operation Schedules
Raziyeh Farmani, University of Exeter

Session 3 Monday June 28, 2004 3:30 to 5:00
WDSA POSTER SESSION, Windsor Sung, Jakobus Van Zyl, and Robert Clark, Judges

Field Testing of Hydraulic Transients for Detecting Leaks in Transmission Pipelines
Ivan Stoianov, London, United Kingdom
Understanding the Hydraulics of Water Distribution System Leaks
Tom Walski *et al.*, Haestad Methods
Identifying Dependencies in Input Data in Hydraulic Modeling Problems
James Davidson and Francois Bouchart, University of Calgary
Implications of Over and Under Determined Networks in State Estimation
Francois Bouchart and James Davidson, University of Calgary
Multiobjective Optimization in the Design of Water Distribution Systems
Klebbber Formiga and Fazal Chaudhry, University of Sao Paulo
Optimal Simultaneous Design and Operation of Multi-Quality Water Dist Systems with Unsteady Hydraulics
Avi Ostfeld, Technion
Head Driven Analysis For Multi-Objective Optimization in Rehabilitation of a Water Distribution Network
Peter B. Cheung and Luisa F. R. Reis, University of Sao Paulo
Comparison of Surrogate Reliability Measures for Water Distribution Network Design
Devi Prasad Tumula *et al.*, University of Exeter
Economic Viability of Gravity Sustained Pipe Flow Systems
Prabhata K. Swamee, Indian Institute of Technology Roorkee
Development of a Conservative Scheme for Inverse Transient Analysis in Water and Gas Pipelines
Young-il Kim *et al.*, University of Adelaide
Greedy Heuristic Methods for Locating Water Quality Sensors in Distribution Systems
James Uber, University of Cincinnati
Experimental Measurements of Dispersion in Unsteady Laminar Pipe Flow
Matthew Cutter *et al.*, University of Cincinnati
Growth of Heterotrophic Biofilms in a Distribution System Simulator
Mark C. Meckes *et al.*, US Environmental Protection Agency
Evaluating the Vulnerabilities of Drinking Water Distribution Systems to Acts of Terrorism or Sabotage
Regan Murray *et al.*, US Environmental Protection Agency

6th ANNUAL SYMPOSIUM ON WATER DISTRIBUTION SYSTEM ANALYSIS—Day 2
(Final Program)

Session 4 Tuesday June 29, 2004 8:00 to 9:30
EVOLUTIONARY COMPUTING, Sean McKenna, Moderator

Application of LP Combined With Inverse ANN for Optimal Control of Complex WDS
Fernando Martinez *et al.*, Universidad Politécnic de Valencia
Genetic Algorithm Self Adaptive Boundary Search for Optimal Design of Water Distribution Systems
Zheng Wu, Haestad Methods
Optimization of Water Distribution Systems using Multi-objective GA and Extraction Rules using Data Mining
Ivaltemir Barros Carrijo, Goias State Sanitation Company and University of Sao Paulo

Session 5 Tuesday June 29, 2004 10:00 to 11:30
STOCHASTIC WATER DEMAND MODELS, Dominic Boccelli, Moderator

Effect of Time Scale on PRP Random Flows in Pipe Network
Zhiwei Li and Steven Buchberger, University of Cincinnati
Stochastic Residential Water Demand Characterization
Victor Hugo Yamanaka *et al.*, Mexican Institute of Water Technology
Stochastic Analysis of Water Distribution Systems
Hayley Kretzmann and Jakobus Van Zyl, Rand Afrikaans University
Modeling Solute Transport in Distribution Networks with Variable Demand and Time Step Sizes
Sean McKenna *et al.*, Sandia National Laboratories

Session 6 Tuesday June 29, 2004 1:30 to 3:00
NETWORK MODEL CALIBRATION, Steven Buchberger, Moderator

Tracer Tests for Network Model Calibration
Dominic Boccelli, University of Cincinnati
Calibration of Tracer Test in Water Distribution System Using Optimization and Uncertainty Algorithms
Bart van Bloemen Waanders and Roger Bilisoly, Sandia National Laboratories
A New Versatile Technique for Hydraulic Models of Water Distribution Networks
James Davidson and Francois Bouchart, University of Calgary

Session 7 Tuesday June 29, 2004 3:30 to 5:00
OPTIMAL DESIGN AND CONTROL, Francois Bouchart, Moderator

Optimal Scheduling of Pumping and Chlorine Injections Under Unsteady Hydraulics
Avi Ostfeld and Elad Salomons, Technion
Comparison of Two Approaches for Least Cost Design of Water Distribution Systems Under Uncertain Demands
Artem Babayan and Zoran Kapelan, University of Exeter
Incorporating Water Quality and Reliability into Water Distribution System Optimization
Darren Broad *et al.*, University of Adelaide
Pipeline Size Optimization
Steven Ainsworth, MHM Engineers

6th ANNUAL SYMPOSIUM ON WATER DISTRIBUTION SYSTEM ANALYSIS—Day 3
(Final Program)

GENERAL CONFERENCE

Plenary Session Wednesday June 30, 2004 8:00 to 9:30

Session 8 Wednesday June 30, 2004 10:00 to 11:30
SENSOR OPTIMIZATION FOR WATER QUALITY MODELING, [Robert Clark](#), Moderator

A General Integer Programming Based Framework for Sensor Placement in Municipal Water Networks
[Cynthia Phillips et al.](#), Sandia National Laboratories
A Stochastic Early Warning Detection System Model for Drinking Water Distribution System Security
[Avi Ostfeld](#) and [Elad Salomons](#), Technion
A Multiple Objective Analysis of Sensor Placement Optimization in Water Networks
[Jean Paul Watson et al.](#), Sandia National Laboratories
Addressing Modeling Uncertainties in Sensor Placement for Community Water Systems
[William Hart et al.](#), Sandia National Laboratories

Session 9 Wednesday June 30, 2004 1:30 to 3:00
TRANSIENT ANALYSIS AND LEAK DETECTION, [Avi Ostfeld](#), Moderator

Field Tests for Air Pockets and Leak Detection Using Inverse Transient Analysis in Water Distribution Pipes
[Mark Stephens et al.](#), University of Adelaide
Transient Behaviour of Pipeline Blockages and Blockage Detection and Location Using Fluid Transients
[Angus Simpson et al.](#), University of Adelaide
Effect of Skeletonization on Transient Analysis Results
[Thomas Walski](#) and [Jean-Luc Daviau](#), Haestad Methods
Trends on Integrated Algorithm for Hydraulic Network Simulation in Steady, Transient and Oscillatory Flow
[Edmundo Koelle](#), University of Sao Paulo & Koelle Engineering

Session 10 Wednesday June 30, 2004 3:30 to 5:00
HYDRAULIC & WATER QUALITY MANAGEMENT, [Martin Lambert](#), Moderator

Water Quality Implications of Using SCADA Data Directly within the Unified Hydraulic Model
[Francois Bouchart](#) and [Kevin He](#), University of Calgary
General Regression Neural Networks for Forecasting Disinfection Residuals in Water Distribution Systems
[Robert May](#), University of Adelaide
Optimal Selection of Rechlorination Station in Water Distribution System by Optimization Techniques
[Hyoungmin Woo](#) and [Wu-gu Kim](#), Korea Water Resources Research Institute
Pilot Study of Greater Boston New Water Treatment Plant and Distribution System
[Xin Huang et al.](#), Northeastern University

6th ANNUAL SYMPOSIUM ON WATER DISTRIBUTION SYSTEM ANALYSIS—Day 4
(Final Program)

Session 11 Thursday July 1, 2004 8:00 to 9:30
WATER QUALITY MODELS AND IMPACTS, [Walter Grayman](#), Moderator

Incorporating General Chemical Reaction Dynamics in WDS Water Quality Models: Extensions to EPANET
[James Uber](#), University of Cincinnati
Characterizing the Pipe Wall Demand for Free Chlorine in Metallic Pipes
[Robert Clark](#) and [Roy Haught](#), Cincinnati, Ohio
Simulation of Chlorine Decay in Drinking Water Distribution Systems
[Alper Ucak](#) and [Osman N. Ozdemir](#), Herndon, Virginia
Corrosion Control and Chloramination, Discolored Water and Nitrification
[Windsor Sung](#), Massachusetts Water Resources Authority

Session 12 Thursday July 1, 2004 10:00 to 11:30
SYSTEM FAILURES AND LEAKAGE, [Angus Simpson](#), Moderator

Physical/Probabilistic Failure Models for PVC Pipe Networks
[Paul Davis](#), CSIRO
Isolating Subsystems in a Water Distribution Network
[G.V. Loganathan et al.](#), Virginia Tech
Interpretation of Unavoidable Annual Real Losses (UARL)
[Farhad Sabour](#) and [Fereshteh Molahosseini](#), Sadra Negar
Performance of Water Distribution Networks Based on Quality Parameters Using Head Driven Simulation Method
[Ahmad Dolatkahy](#) and [Masood Tabesh](#), ARSA Int. Construction Co.

Summary of Salt Lake City WDSA Symposium: 12 sessions with 56 topics (42 presentations and 14 posters)

[Look for Call for Abstracts for 7th Annual WDSA Symposium to be held in Anchorage, Alaska May 2005](#)

LAST UPDATE: April 27, 2004