Abstract #1

Water Quality Monitoring in Water Supply Systems: An Integrated Approach

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Biographical Sketches of Authors

Professor Ioannis (or Yiannis) Papadimitrakis is a faculty member of the School of Civil Engineering of the National Technical University of Athens (NTUA), in Athens Greece.

He has done research work on a variety of issues in the broader areas of Environmental Fluid Mechanics-Hydraulics and of Marine Hydrodynamics.

He, along with other colleagues from Chemical and Electrical Engineering of NTUA and from abroad, is promoting the ideas of proper design and operation of advanced remotely operating systems for monitoring the quality of (drinking) water in distribution networks (inside cities), in fresh water Reservoirs, and in aqueducts supplying water to treatment facilities.

He received a Diploma in Civil Engineering from the National Technical University of Athens in Greece, two MSc Degrees from Stanford University (one in Water Resource Engineering from Civil Engineering and one in Fluid Mechanics from Mechanical Engineering), and a joint Ph.D form Civil and Mechanical Engineering Departments of Stanford University.

He is the author of numerous Journal and Conference Papers and serves as a reviewer in various Journals.

Dr. Angelos Findikakis is a Senior Principal Engineer with Bechtel National in San Francisco. He is also a Bechtel Fellow, which is the highest Bechtel honor in recognition of technical excellence. As a Bechtel Fellow he acts as Bechtel's technical ambassador and as a special technical advisor to upper management.

He has worked on a variety of environmental and water resources studies, including both surface and ground water problems. Examples of his recent assignments in Bechtel are the study of the National Water Plan for Morocco, the integral study for the environmental remediation of Lake Maracaibo in Venezuela, and the thermal analysis of the Russian Fissile Material Storage Facility. He is currently working on the Yucca Mountain project.

He received his Diploma in Civil Engineering from the National Technical University of Athens, Greece, and his MSc in Water Resources Planning and PhD in Civil Engineering from Stanford University. His doctoral dissertation was on environmental fluid mechanics.

He is also a Consulting Professor in the Department of Civil and Environmental Engineering at Stanford University.

He is the author of several journal and conference papers. He has received different awards including the Straub Award, the ASCE Hering Medal, and the ASCE Horner Award. He is a member of many national and international organizations, societies and committees, including ASCE, AGU, IAHR and Sigma Xi and has served in several professional organization committees.

Abstract

The use of state-of-the-art technology allows the continuous, automated and telemetric monitoring of different physical and chemical parameters that characterize water quality in water supply systems (reservoirs and aqueducts), with simultaneous monitoring of water flows driven by the external forces affecting reservoir circulation, including wind, heat transfer due to solar and atmospheric radiation, incoming river discharges, water withdrawal, etc. This can be achieved by combining in situ automated sensors installed in the reservoirs, the incoming river and at selected locations along the aqueducts from the reservoir to the respective treatment

facility, with software that simulates, in real time, the reservoir hydrodynamics, aqueduct hydraulics and water quality of the entire reservoir and aqueduct system, utilizing actual time series of the monitored parameters through a data assimilation scheme. This paper describes the possibilities offered by currently available technology for integrated water quality monitoring in reservoirs and open aqueducts and discusses the system envisioned for the major reservoirs and aqueducts of the water supply system of the Athens metropolitan area.

Abstract #2

Design Concepts – Water-Quality Aspects of Water-Distribution Model Applications in Panama

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Mr. Amaya has served 22 years as a Project Engineer; currently is part of the potable water and sanitation office at the Ente Regulador de los Servios Publicos (ERSP) which is in charge of the water quality program in urban areas. Previously, he worked 16 years at the Instituto de Acueductos y Alcantarillados Nacionales (IDAAN), the main water provider in Panama. He served as technical coordinator for the SVCAPU (Sistema de Vibilancia de la Calidad del Agua Potable Urbano) project, funded by The World Bank and results from which were used herein.

Mr. Barrios has worked 5 years as an international consultant for water-quality management and contamination control. He has been involved with water quality management projects in Cambodia, Thailand, Laos and Vietnam, and Mexico and Central America. Previously, he served as Project Manager of the national water-quality monitoring network of the National Water Commission in Mexico, and was affiliated with the water research group at the Institute of Engineering, from the National University of Mexico (UNAM).

Over 24 of the past 38 years of his professional career, Dr. Steele has consulted on projects dealing with design/evaluation of hydrologic monitoring networks, statistical analysis of hydrologic data, stream/subsurface modeling, use-attainability analyses, stream standards, total maximum daily loads assessments, regional ground-water planning, and international water-resources planning and management. His career includes overseas experience in eleven foreign countries and recently includes teaching short courses at two German universities.

Mr. Gomez is a Project Engineer with the Ente Regulador de los Servios Públicos (ERSP) and assisted Engineer Amaya and the TDS project staff in several aspects of the SVCAPU project.

Mr. Tapia is an independent Engineering Consultant in Mexico and provided the water-distribution model (EPANET and WaterCAD) expertise required for the SVCPU project.

Abstract

A conceptual design of elements of a water-quality monitoring program applicable to potable-water systems in Panama has been developed through a contract with the Republic of Panama's Ministry of Economics and Finance (MEF) and funded by The World Bank. Monitoring aspects (site selection, scheduling, and constituents of concern) are delineated for each of the five component subsystems: source areas (generally watersheds, but also springs and groundwater); intake and initial system conveyance; water-treatment plants; storage facilities (tanks/reservoirs) and distribution pipelines; and end-users (water taps). The primary regulatory agency in the Republic of Panama is the ERSP; however, participation by and collaboration with other governmental agencies (Ministry of Health and Ministry of Environment) as well as the Panama Canal Authority (ACP) is necessary. Critical aspects of program implementation include capacity building (human resources and technical support), training, configuration of each potable-water system, development and maintenance of a water-quality database, and a range of program information products. Eventual application is intended for the more than 130 municipal systems operated by the Instituto de Acueductos y Alcantarillados Nacionales (IDAAN) or private-sector water providers in Panama. However, over the near term, a strategy for human-health ranking or risk is advocated to aid in prioritization of water-system monitoring and modeling.

Abstract #3

Monitoring and Assessment of Non-Point Source Pollution in Norway

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Biographical sketches of authors

Johannes Deelstra is an agro-hydrologist. Before working in Norway he obtained extensive experience with agriculture and water related issues in Kenya and Egypt. At present his main activities are related to agriculture and environment. He has been working with the Agricultural Environmental Monitoring Programme in Norway (JOVA) since 1992 and is since 1993 also involved with agriculture and environmental issues in the Baltic countries.

Stine Marie Vandsemb is an environmental scientist with experience in water and soil pollution. Since 2000 she has been working with the Agricultural Environmental Monitoring Programme in Norway (JOVA). In addition the last three years she has been working as a project manager in an EU project (MANTRA-East) dealing with management issues of transboundary waters and the implementation of the EU Water Framework directive.

Marianne Bechmann is an environmental scientist. Since 1989 her main field of work has been nutrient dynamics and monitoring nutrient losses at catchment scale, e.g. as co-ordinator of the nutrient part of the Agricultural Environmental Monitoring Program in Norway. Now she is a Ph. D student working on risk assessment of phosphorus losses. Bechmann have several international publications in this field

Hans Olav Eggestad is an environmental scientist. His main tasks are related to the Agricultural Environmental Monitoring Programme in Norway (JOVA) in which he is responsible for the development of software and database management. In addition, he is working with statistical modeling in relation to data reporting both at national and international level.

Nils Vagstad has long experience within agro-hydrology, agronomy, environmental issues in agriculture, land resources and watershed management. He has an extended network within agriculture/environment including monitoring in the Baltic Sea Region and in Northern Europe and is participating in various working groups and task forces under e.g. HELCOM, Baltic 21, OSPAR.

Abstract

The Agricultural Environmental Monitoring Programme (JOVA) in Norway monitors and assesses nutrient losses and erosion from 10 small agricultural catchments under different agricultural systems and climatological, topographical and geo-hydrological conditions. The core of the monitoring activities consists of discharge measurement and water sampling, providing data for nutrient load calculation. Routines have been developed for automatic downloading of recorded data on a daily basis, control of runoff data and water analysis results in addition to load calculations. Relevant information regarding farming practices is collected yearly at the level of the individual farmer field and entered into a database while reporting routines concerning farming practices have been developed. The monitoring program is integrated into existing national networks and provides on a yearly basis relevant data to comply with both national and international obligations. The JOVA programme includes components dealing with modelling nutrient loads and erosion and when necessary additional measurements are carried out to support these activities. To enhance the sustainability of the monitoring programme, the design and implementation is such that it is suitable and attractive for research and educational purposes while the applied measuring methods and procedures are sufficiently advanced to comply with international scientific standards.

Abstract #4

Assessment of the National Water Quality Monitoring Program of Egypt

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Biographical Sketches of Authors

Dr. Rasha is a water quality specialist with a civil/environmental engineering background. She has 10 years experience working a researcher in the National Water Research Center, Egypt. She is the assistant manager of the National Water Quality Monitoring Program, a part of a bilateral national project with Canada. She was nominated by the Ministry of Water Resources and Irrigation MWRI as the ideal engineer of year 1997. She is experienced in water quality management including: data analysis and interpretation, modeling, information systems and networks development. She has a various range of published papers in Canada, Spain, Portugal, Australia and Egypt.

Eng. Bahaa is an assistant researcher in the National Water Research Center, Egypt. He has over 8 years of experience in the areas of water management, drainage systems for heavy clay soils, controlled drainage, water quality, monitoring network assessment and re-design and statistical analysis. Bahaa is participating in the Egyptian Civil Engineers Syndicate, Egyptian Society of Civil Engineers, Egyptian Society of Irrigation Engineers, American Society of Civil Engineer (Student), and Wafaa El-Nile Society (NGO).

Dr. Shaden is the Vice-Chairperson of the National Water Research Center, Ministry of Water Resources and Irrigation, Egypt. She is also the Manager of National Water Quality Monitoring Program. She has over 25 years experience in water quality management and environmental protection. She has supervised and managed several foreign funded projects as well as local programs in the field of water quality monitoring, modeling and assessment. She has organized and implemented several training programs in her fields of specialty. She has more than 100 technical papers published in scientific journals in addition to chapters in international books and many technical reports.

Abstract

The first step towards water quality management is the establishment of a monitoring network. Monitoring in the logical sense, implies watching the ongoing water characteristics and activities in order to ensure the laws and regulations are properly enforced besides detecting trends for modeling and prediction processes. The design of a network must clearly define the monitoring objectives, and accordingly the necessary simplifying assumptions have to be established. Based on the assumptions made, there are many levels of design that could be applied. The supreme aspiration of the national water quality monitoring program in Egypt is to bridge the gap between simple water quality monitoring and trustworthy decision making.

This research presents the process of redesigning the water quality monitoring network of Egypt to produce the national water quality-monitoring network using the statistical approach proposed by Sanders and Adrian (1978) of the expected confidence interval for the mean value. An evaluation of the network is implemented using the additional data produced after the design phase as well as a verification of the considered assumptions within the scope of work. Through the assessment, some reduction was perceived in the percentage of error associated with the design phase.

Abstract #5

Securing Our Water Supplies-The Challenges of Water Quality Monitoring in the Small Island Developing State of Barbados

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Biographical Sketch of Author

Carlyle Bourne is a water resources engineer who is actively involved in water quality for irrigation and potable water. He is currently a Member of the Steering Committees for examining water quality related to pollution in the Belle and Hampton aquifers, which are two of the main aquifers in Barbados. He was a former Member of the Barbados Water Authority Board. He is currently a Member of the International Association of Hydrological Sciences (IAHS).

Abstract

Barbados is a Small Island Developing State, which is classified as a water scarce country, with an area of 430 square kilometers (166 square miles) and an annual average rainfall of 1524 millimetres (60 inches). Ground water is the natural resource providing water for a resident population of over 250 000 along with agricultural and industrial needs. The challenges of water quality monitoring in securing the water supply against vulnerability are reviewed against institutional monitoring frameworks.