USE OF WSP CONCEPTS IN RISK MITIGATION OF DISTRIBUTION SYSTEMS AT UNDER CAPACITY OPERATION - A CASE STUDY ON KANDY SOUTH WATER DISTRIBUTION SYSTEM

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DECLARATION OF THE CANDIDATE AND SUPERVISOR

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....

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Date

Use of Water Safety Plan concepts in risk mitigation of distribution systems at under capacity operation – A case study on Kandy South Water Distribution System

ABSTRACT

A Water Safety Plan is one of the most effective ways of ensuring that a water supply is safe and reliable for human consumption and that it meets the health and demand based standards and other regulatory requirements. WSP is based on a comprehensive risk assessment and risk management approach to all the steps in a water supply chain from source to consumer. Recently introduced WSP for distribution systems is a new concept to NWSDB. However, the NWSDB, being the authority directly responsible for treatment and delivery of drinking water to the consumer, has commenced implementation of the WSP approach to the distribution system as a first step.

Numerous studies were found in literature for assessing the formation and behavior of disinfection by products, residual chlorine and other hydraulic parameters in water distribution systems. Yet the studies related to WSP for distribution system approach were not frequently found.

The risk assessment of an under capacity operating system is carried out throughout this study and the recommendations were made to mitigate those in future. Maligathenna scheme, which is a sub-scheme coming under Kandy South Region was analyzed in detail. The main parameters concerned were Trihalomethane, Residual Chlorine, Pressure, Water Age, Total Organic Carbon, Turbidity and Conductivity.

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Water quality parameters were tested at site or in the laboratory. A hydraulic model was built using Water GEMs software to determine the hydraulic parameters such as pressure, water age. A special water quality model was developed to assess the performance of the distribution network and predict the parameter values for the future.

General conclusions along with the specific recommendations were made based on the results and observations met throughout the study. WSP hazard identification and assessment approach is followed throughout the study. Some alarming findings were listed with respect to TTHM and RCl. However clear and significant relationships among the parameters could not be found. Most of the recommendations which were made at the end of the study are expected to be implemented either in design stage or during operation and maintenance period.

Key words: Water safety plan, Water quality parameters, Hydraulic parameters, Pipe distribution system, Risk assessment

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LIST OF ABBREVIATIONS

Abbreviation		Description
TTHM	-	Total Trihalomethane
RCl	-	Residual Chlorine
TOC	-	Total Organic Carbon
DBP	-	Disinfection by Products
OIC	-	Officer in Charge
NWSDB	-	National Water Supply and Drainage Board
DI	-	Ductile Iron
GI	-	Galvanized Iron
CT	-	Contact Time
SLS	-	Sri Lanka Standards
WHO	-	World Health Organization
WSP	-	Water Safety Plan
UV	-	Ultraviolet
WTP	-	Water Treatment Plant
DEM	-	Digital Elevation Model
SACDA	-	Supervisory Control And Data Acquisition
NRW	-	Non Revenue Water
WTP	-	Water Treatment Plant
O&M	-	Operation and Maintenance
USEPA	-	United States Environmental Protection Agency
NOM	-	Natural Organic Matter
DOC	-	Dissolved Organic Carbon
GIS	-	Geographical Information System

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