EFFECT OF WATER CHEMISTRY ON IN -SITU DEPOSITION OF KANDY SOUTH WATER TREATMENT PLANT

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ABSTRACT

The Kandy Sauth Water Treatment Plant (KSWTP) was commissioned on 29th January 2010. The main responsibility of this plant is to treat raw water abstracted from the Mahaweli Ganga (River) and supply the treated water to 15 reservoirs located in the service area, i.e. south to the Kandy Metropolitan area. This plant is designed to produce 35,000 m^3/day of drinking water compiling to the SLS standards.

The possible effect of water chemistry on in-situ deposition of Kandy South Water Treatment Plant has been analyzed in this study. Brownish black color depositions are found on the inside of the casing, impellers and also on the surface of the moving parts of the Non Return Valves (NRV"s) at KSWTP. Water in the channel at the service outlet of instrument is black color. It is also noticed that black–brown color deposition on walls of clear water reservoir.

Deposit samples were analyzed using EDX (Energy Dispersive X-ray fluorescence) method. Wet samples were analyzed to determine the bacteriological effect of manganese deposition. Chemical water quality parameters were analyzed using various analytical methods. Major and minor ions were measured using titrimetric and spectroscopic methods using Varian SpectrAA 240 AAS available at the Uva Wellassa University and as atomic Hatch DR 5000 as UV/Vis spectrophotometer. Other physical properties were measured with standard methods.

Deposition results when dissolved ions in the water such as iron, manganese and copper exceed the solubility of a given mineral. Several principal factors determine deposits forming such as temperature, pH value, amount of deposit-forming material present, and influence of other dissolved materials. Manganese oxidizing bacteria analyzed data shows that there is not any biological manganese oxidation process in this water treatment process. Source of Iron and manganese of the water is raw water. There is no copper in raw water. Ferrihydrite, Ferrihydrite (aged), Gibbsite (C), Goethite, Hematite, Lepidocrocite, Strengite, $Fe(OH)_2.7Cl_3(s)$, Maghemite Magnetite are the main possible mineral phases which are formed iron oxide. $MnHPO_4(s)$ is the only mineral phase which forms the manganese oxide and cuprispinl is the only mineral phase which forms the Copper. Deposit samples show high content of Manganese, Iron, and Copper.