The dynamics of biofilm formation in non-chlorinated groundwater-based drinking water was studied in a model distribution system. The formation of biofilm was closely monitored for a period of 522 days by total bacterial counts (AODC), heterotrophic plate counts (R2A media), and ATP content determinations. The biofilm grew at a rate of 0.030±0.002 day⁻¹ reaching quasi-stationary state at 2.6×10⁶ cells/cm² after approximately 200 days. The low substrate level in the bulk phase (AOC at approximately 6 g ac-C/l) most likely caused the relatively slow biofilm formation rate observed. During the maturation of the biofilm, the bacterial community changed properties in terms of cell-specific ATP content and culturability of the bacteria.