

Madukismo sugar/alcohol factory is well-known for hot-spot location of phenol groundwater contamination. It is because the treatment plant has not functioned for many years, and the waste water containing high concentration of phenol releasing from the sugar/alcohol processing has discharged directly to the lagoon. As a result, phenol has somehow leaked to groundwater and polluted many supply wells inside the village at the downgradient of Madukismo factory.

Since the repeated intake of phenol could cause various acute and chronic effects to human health, it is crucial to undertake the study of phenol groundwater contaminant transport modeling to acquire a better understanding of phenol movement as well as to characterize its plume dimension and its associated concentration in the aquifer. Due to the fact that phenol is subject to biodegradation process, the reactive transport modeling is applied for this transport modeling.

Based on the result of transport simulation, phenol has already moved to a distance about 600 meters from the source and its concentration has somewhat reached 1mg/L. The output of this modeling is further evaluated to make the prediction model of phenol migration in the 10 years and suggest a remediation method to help solve this contaminated groundwater problem in order to ensure the harmonious living environment of the local people and groundwater sustainability in term of water quality.

**Keywords:** groundwater contamination, phenol, contaminant transport modeling, contaminant plume