

The Problem of Groundwater for Consumption is Contaminated with Volatile Organic Compounds in Chachoengsao Province, Thailand

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The areas affected by groundwater contamination are Tha Than and Ban Song Subdistricts, Phanom Sarakham District, Chachoengsao Province, east of Thailand. As the shallow aquifer is rotten. People cannot use water for consumption. The aquifer has been contaminated with volatile organic compounds (VOCs) and heavy metals since 2020. Pollutants detected include Dichloromethane, benzene, trichloroethylene, vinyl chloride, lead, and nickel. The concentration of pollutants was higher than standards in groundwater monitoring wells and domestic wells located nearby the electronic waste crushing plant and an oil and solvent recycling plant. The purpose of this study is to find sources of pollution and study changes in groundwater quality as well as find a solution to the problem of water shortage for consumption.

To achieve a better understanding of the aquifer system in the study area, data from site investigations were collected such as well construction, groundwater level, groundwater sampling, and chemical analysis. The data were a database for evaluating the direction of groundwater flow and comparing chemical analysis data (30 wells between 2020-2021). Results of the investigation suggested that the total content of heavy metals and VOCs in groundwater, surface water, and leachate in 2021 was included in the standards and decreased in 2020. Except for shallow wells in an oil and solvent recycling plant and the Ban Rai area, Village No. 8, which is about 500 meters away on the northwest side. Still, the number of heavy metals and VOCs exceeded the standard. The organic matter and volatile organic compounds are found in shallow wells both inside and outside the plant above. There has a correlation with the chemical properties of the leachate within the plant. While surface water and deep wells did not detect organic matter and volatile organic compounds. This may be a result of hydrogeological conditions, environmental conditions, and distance from the source. and the direction of groundwater flow including the decomposition properties of pollution with a half-life of at least 45-90 days. In addition, the volatile organic compounds detected in shallow groundwater are caused by the solvents used in the plant. It can be carcinogenic. Therefore, people should be warned to avoid using shallow groundwater for consumption. If necessary, it must be improved according to the groundwater quality standard first.

Keyword: Contaminated groundwater, Chachoengsao, VOCs