

## Groundwater Treatment of Thailand's Mae Moh Lignite Mine

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**Abstract :** Mae Moh Lignite Mine is the largest open-pit mine in Thailand. The mine serves coal to the power plant about 16 million tons per year. This amount of coal can produce electricity accounting for about 10% of Nation's electric power generation. The mining area of Mae Moh Mine is about 28 km<sup>2</sup>. At present, the deepest area of the pit is about 280 m from ground level (+40 m. MSL) and in the future the depth of the pit can reach 520 m from ground level (-200 m.MSL). As the size of the pit is quite large, the stability of the pit is seriously important. Furthermore, the preliminary drilling and extended drilling in year 1989-1996 had found high pressure aquifer under the pit. As a result, the pressure of the underground water has to be released in order to control mine pit stability. The study by the consulting experts later found that 3-5 million m<sup>3</sup> per year of the underground water is needed to be de-watered for the safety of mining. However, the quality of this discharged water should meet the standard. Therefore, the ground water treatment facility has been implemented, aiming to reduce the amount of naturally contaminated Arsenic (As) in discharged water lower than the standard limit of 10 ppb. The treatment system consists of coagulation and filtration process. The main components include rapid mixing tanks, slow mixing tanks, sedimentation tank, thickener tank and sludge drying bed. The treatment process uses 40% FeCl<sub>3</sub> as a coagulant. The FeCl<sub>3</sub> will adsorb with As(V), forming floc particles and separating from the water as precipitate. After that, the sludge is dried in the sand bed and then be disposed in the secured land fill. Since 2011, the treatment plant of 12,000 m<sup>3</sup>/day has been efficiently operated. The average removal efficiency of the process is about 95%.

**Keywords :** arsenic, coagulant, ferric chloride, groundwater, lignite, coal mine

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