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Screening Ecological Risk Assessment at an Old Abandoned Mine in Northern Taiwan

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Abstract : Former Taiwan Metal Mining Corporation and its associated 3 wasted flue gas tunnels, hereinafter referred to as 'TMMC', was contaminated with heavy metals, Polychlorinated biphenyls (PCBs) and Total Petroleum Hydrocarbons (TPHs) in soil. Since the contamination had been exposed and unmanaged in the environment for more than 40 years, the extent of the contamination area is estimated to be more than 25 acres. Additionally, TMMC is located in a remote, mountainous area where almost no residents are residing in the 1-km radius area. Thus, it was deemed necessary to conduct an ecological risk assessment in order to evaluate the details of future contaminated site management plan. According to the winter and summer, ecological investigation results, one type of endangered, multiple vulnerable and near threaten plant was discovered, as well as numerous other protected species, such as Crested Serpent Eagle, Crested Goshawk, Black Kite, Brown Shrike, Taiwan Blue Magpie were observed. Ecological soil screening level (Eco-SSLs) developed by USEPA was adopted as a reference to conduct screening assessment. Since all the protected species observed surrounding TMMC site were birds, screening ecological risk assessment was conducted on birds only. The assessment was assessed mainly based on the chemical evaluation, which the contamination in different environmental media was compared directly with the ecological impact levels (EIL) of each evaluation endpoints and the respective hazard quotient (HQ) and hazard index (HI) could be obtained. The preliminary ecological risk assessment results indicated HI is greater than 1. In other words, the biological stressors (birds) were exposed to the contamination, which was already exceeded the dosage that could cause unacceptable impacts to the ecological system. This result was mainly due to the high concentration of arsenic, metal and lead; thus it was suggested the above mention contaminants should be remediated as soon as possible or proper risk management measures should be taken.

Keywords : screening, ecological risk assessment, ecological impact levels, risk management
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