

Occupational Exposure to Benzene, Toluene and Xylene (Btx) by Petrol Service Station Pump Attendants in the Ledzokuku Krowor Municipal Assembly (Lekma) of the Greater Accra Region

JOHANNA ADWOA ABBIW ENTSIE

ABSTRACT

Urban air pollution mainly comprises of emissions from buses, trucks, motorcycles and other forms of motorized transport. As Ghana's cities continue to expand, the number of vehicles has risen resulting in increased emission of air pollutants into the atmosphere. Fugitive emissions from retail distribution centers in urban areas also constitute a major source of air pollution. Petrol vapours escape during refuelling and offloading of petrol adding pollutants like Benzene, Toluene and Xylene (BTX) to ambient air. During these times people may easily be exposed to extremely high levels of petrol vapour for a short time, although such exposure takes on more importance in the case of fuel service station pump attendants and those who live or work close to petrol service stations. In this study, air samples were taken within the breathing zone of occupationally exposed petrol service station pump attendants and analysed. These workers were spread among ten different petrol service stations within the Ledzokuku Krowor Municipal Assembly (LEKMA). The study was carried out in two phases. Firstly, air samples were collected during vehicle refuelling operations. Secondly, air samples were collected during the off-loading of petrol into underground storage tanks. The study showed that the levels of exposure to Benzene, Toluene and Xylene per eight hour shift of petrol service station pump attendants (PSSPA) were below detection limits during vehicle refuelling operations. This suggests that these attendants are not at risk with respect to vehicle refuelling operations. The concentrations of Benzene and Toluene during the off-loading of 18000L of petrol into underground storage tanks (UST) were highest (i.e. 48.50 ppm of Benzene, 64.70 ppm of Toluene) and lowest for 9000L of petrol (i.e. 20.80 ppm of Benzene and 40.10 ppm of Toluene). Concentration of Xylene however was below detection limit during the off-loading of petrol into UST. It was also observed that the temperature and rate of off-loading the petrol into UST affect the concentration of Benzene and Toluene released into the atmosphere; the higher the temperature, the higher the concentration of these compounds. Similarly, it appeared from the results that the higher the rate of off-loading, the higher the concentration of these compounds. In addition, the results indicated that the volume of petrol off-loaded into UST and the ambient temperature increase the concentrations of Benzene and Toluene

vapour and consequently increases the occupational exposure of service station attendants to these VOCs. Concentrations of Benzene and Toluene were estimated using the occupational Safety and Health Administration (OSHA) method.

Supervisors

Prof. V.K. Nartey

Dr. F. Nyame

Mr. E. Dartey