

The Occurrence Time Estimation of Oil Contaminated Source Considering Hydro-geological Features

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ABSTRACT

Fig 1 shows that the location map of site occurred oil leakage accident. In this area, the any section of subway No. 4 go through the Anyang city in one part out of the Trans Korea Pipeline(TKP) layed sections has been happened civil appeal and stenchy at September 2001. And then, the several accidents presumed the explosion happened when a welding works of storage tank in factory vicinity. The groundwater sample gathered at GL(-) 90m has been contaminated to oil components of about overall 2/3, and so the laying structures and boring of surrounding area was investigated for 3 times. The oil leakage could be verified in a part of TKP at 8 May, 2002. The surface of pipeline which had got digged or scratched by any construction equipments as well as the digged points has been eroded to area of about diameter 20.3cm and it was investigated for the oil leakage to occurred from several holes smaller than needle holes.

In order to confirm on damage parts of layed pipeline, In this study the characteristics of soil and groundwater investigated, which are referred to soil investigation results of periods for 9 months from Sep. 2001 to May 2002 and added to soil boring results accomplished which Anyang city, KARICO(Korea agriculture & Rural Infrastructure Corporation) and DOPCO etc., And so, through these results, a diffusion range of contaminated area and concentration of groundwater contaminated by oil leakage were assessed. However, since the contaminated area was long distanced form the first civil appeal point, the transport feature of LNAPL shall be much affected by the characteristics of soil, geology and hydrology of groundwater. Moreover, these area

were adjoined to Anyang stream, and so in order to more sensitive analysis, the fundamental investigation on the samples of groundwater and soil of contaminated soil carried was performed. The groundwater flow and its contaminated range shows as figure 2 which due to the analysis of flow net and groundwater flow.

In order to trace of base contamination source, the contamination diffusion model considering soil features was used and also Buschek and Alcantar' formula used that natural attenuation of BTEX components for the states of stable plume and shrinking plume, respectively on contaminated sources.

To confirming of oil leakage time and transported distance of contaminated groundwater the starting time of analysis based on 27 Dec. 2001. When average velocity of flow is 0.523m/day, the requirement time was about 430 days and average transported distance was about 225m(refer to figure 3).

The estimation of diffusion range and soil contamination ratio considering the contamination sources and soil characteristics may be needs to establish that more rational plan, design and restoration etc.

Key words: Oil leakage, Contamination source, Hydro-geological feature, trace of occurred time

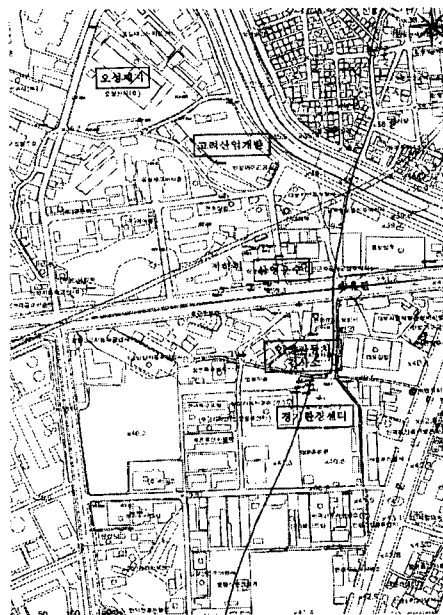


Figure 1. The map of layed location and leakage accident point of oil pipeline

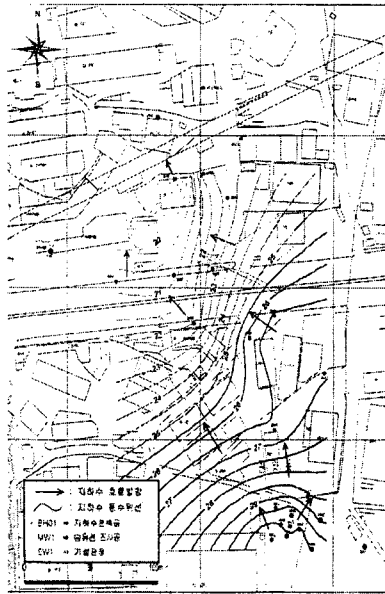


Figure 2. Assessment map of groundwater and soil which contaminated by oil leakage

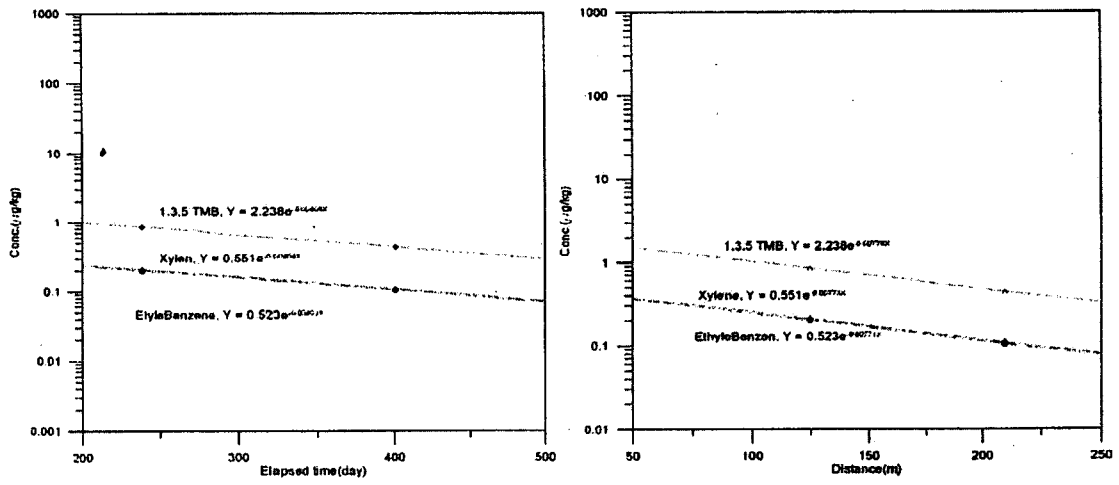


Figure 3. Estimation of oil contaminated range