HEALTH RISK ASSESSMENT IN UNEXPECTED CONTAMINATION WITH A COMBINATION OF CARCINOGENIC AGENTS

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The focus of the case study reported herein is a brownfield site (formerly a filling station) located in a residential area of Pesaro (central Italy). Field surveys were conducted and contamination by oil compounds (benzene, toluene, ethylbenzene, and xylene - BTEX) and hydrocarbons, both at the ground surface and in the groundwater, was found. The concentration of benzene (maximum allowable limit (MAL) 1 g/L) was found to be 60 g/l. Surprisingly, very high concentrations (2792 g/l vs. an MAL of 1 g/L) of the chlorinated solvent tetrachloroethylene (TCE), unrelated to the filling station, were also detected over an extensive area. Several wells have been drilled in this area to irrigate flower and kitchen gardens. Groundwater withdrawal for domestic purposes was forbidden as soon as the TCE contamination was detected. Decontamination (with a minimum benzene target set at 13 g/l) and urban requalification (to allow for the construction of a residential building) proceeded simultaneously. A health risk assessment (HRA) was carried out in accordance with Legislative decree 152/06 integrating BTEX, hydrocarbon TCE and chlorinated solvents HRAs. Since HRA of some carcinogenic agents includes only the long term incremental risk and does not account for short term health risk, no criteria are available to estimate the overall health risk for local residents while work is in progress. Meanwhile, owing to poor coordination between environmental and public health professionals, workers have not been undergoing biological monitoring (measurement of TCE in urine). The decontamination activities have also enabled the temporary protection of the aquifer from further contamination by chlorinated solvents. The clearing of both BTEX hydrocarbons and chlorinated solvents is proceeding on schedule (benzene is down to 36 g/l and TCE in well samples to 204 g/L). To conclude, as a result of this experience the project was expanded to include another public area where, unlike in the former, the polluter can't be clearly identified. This extension has been realized thanks to the collaboration between several public entities that obtained the necessary resources. Finally, this methodology has already been applied to several other sites with work already under way. However, the assessment and management of the health implications of environmental contamination still need to be improved.

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