

Integrated Investigations to Identify the Source of the Oil Leakage, Karnataka, India

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Petroleum contamination of the groundwater is widespread problem in many parts of the world by Petroleum storage tanks etc. Groundwater in the study area is contaminating by oil leakage from Oil Refinery. Intensive geophysical, hydrogeological studies were carried out to find out the oil leakage source. Groundwater monitoring has been carried out in existing bore wells/dug wells and springs within the watershed. The groundwater level contours indicate predominant groundwater flow direction from Hidro Cracker Unit & Sulfur Recovery Unit areas towards Nitrogen plant and Athrukudi in the down stream. Interpretation of Electrical Resistivity Tomography (ERT) images indicate that any leakage from Hidro Cracker Unit (HCU) would migrate through Sulfur Recovery Unit (SRU) towards the nitrogen plant in the lateritic aquifer. Fracture zone inferred from visual interpretation of CARTOSAT LISS–III Satellite imagery has confirmed by geophysical investigations. The highest TDS has been reported from HGIL well and the spring adjacent to Nitrogen plant. The Volatile Organic Components (VOC) concentrations indicated that the spring flow adjacent to the compound wall of Nitrogen plant has TDS 850 mg/l. A numerical groundwater flow and mass transport model has been developed to find out the path of oil leakage in MRPL and Athrukudi village. In addition to this, the model has run with Modpath. Predictive mass transport and Modpath indicating that oil leakage from HCU emerging oil springs in the down stream area along Nitrozen plant. Modpath indicating that any leakage from HCU unit, it will reach down stream area <1 year because of fracture is passing along the HCU, SRU, Nitrozen plant to Athrukudi village. Oil leakage source has been identified and suggested that continuous pumping from three bore wells for arresting the oil contamination.

Key words: VOC's, MT3DMS, Modpath, Oil leakage, Mangalore, ERT Surveys

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