Using Remote Sensing Techniques and GIS to Study Hydrocarbon Leakage from Oilfields in Urban Areas

(A Case Study of Masjed-Soleiman City)

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Abstract

To examine gas and hydrocarbon leakage from oilfields of Masjed-Soleiman city, information layers such as surface and subsurface structures, locations of gas leakage, stratigraphy, status of population density, and topographic altitude of the region were prepared. Information from field investigations and remotely sensed data have been analyzed and were entered into geographic information systems (GIS) software for mapping. By using analytical functions in GIS, the layers were overlaid, and the zoning of gas leakage risk was accomplished through Boolean logic. The results indicated high fracture density at the intersection of major faults corresponding to the location of a deep anticline hinge in Masjed-Soleiman. It is a factor of decreasing the impermeability of the Asmari Reservoir cap rock. Gas leakage occurs through these fractures; as a result, the highest risk of leakage in Masjed-Soleiman was detected in its urban areas, including Siberenj and Naftun districts. In addition to the high density of fractures, the gas cap depth is low. These areas also have the highest amount of gas leakage and the highest population density. In other areas, the leakage risk was lower than average due to lower population density, increased depth of gas cap, and lower fracture density.

Keywords: Masjed-Soleiman, Gas leakage, Remote sensing, GIS

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