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## **OCCURRENCE AND MITIGATION OF PETROLEUM SEEPS IN LOS ANGELES**

Oil and thermogenic methane generation continues from thick, rich Neogene source rocks. Seep hazards persist, particularly near oil fields and leaky traps along the northern LA Basin margin. Petroleum can migrate large distances from their source via faults and fracture zones; by updip migration where deformed Puente formation strata are near the surface; from improperly abandoned wells; along ancient stream channels incised in bedrock; and by diffusion. Biogenic gas sources include decomposition from landfills, marshland deposits and peat beds, from oil spills and former sumps, former MGP sites, and sewers.

Petroleum seepage rates are influenced by rainfall/groundwater levels, temperature, barometric pressure and earthquakes. Gas incursions are typically ephemeral and unpredictable due to mixing and alteration of gas from multiple sources, varying chemistry and aging effects, making large-scale relief venting infeasible.

Oil seeps are collected in sumps for proper disposal. For methane, current City of Los Angeles mitigation standards, passed as a result of a 1985 Fairfax District explosion over the Salt Lake Oil Field, vary by building type within defined Methane Districts. Requirements include subslab membrane barriers, vent piping, methane detectors, alarms, interior ventilation, paved area vents and utility protection. Recent development within marshland deposits and oil fields, coupled with concern for associated hydrogen sulfide and VOCs, led to formation of a new Methane Task Force whose purpose is to: expand areas subject to gas investigations, require further testing and additional mitigation measures depending upon site methane concentration and pressure.