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## **OCCURRENCE AND MITIGATION OF LNAPL AND DISSOLVED HYDROCARBONS IN GROUNDWATER BENEATH THE COASTAL PLAIN OF LOS ANGELES COUNTY, CALIFORNIA – A DECADE LATER**

The Los Angeles coastal plain was a prime location for the construction of numerous petroleum-handling facilities during the 1920s. Numerous light non-aqueous phase liquid (LNAPL) hydrocarbon pools and associated dissolved hydrocarbon plumes occur beneath these facilities, notably in the Carson-Long Beach area, albeit not limited to this area, as isolated perched zones of limited lateral extent, and relatively large pools encompassing tens to hundreds of acres in lateral extent. The cumulative estimated volume is on the order of millions of barrels.

LNAPL recovery efforts were initiated in the late 1970s, and by the mid-1980s all major petroleum handling facilities implemented LNAPL recovery and groundwater quality and behavior monitoring programs. The Carson Regional Groundwater Group (CRGG), a consortium of facility owners in the Carson-Long Beach area, was established in 1990 to coordinate delineation and LNAPL recovery efforts in the area underlying or influenced by their past and present activities. Each facility that makes up the CRGG operates under separate Water Board Cleanup and Abatement Orders, but reports as a group in regards to such issues as pool and plume delineation, and LNAPL recovery progress. Over the past decade, the lateral on- and off-site extent of LNAPL pools have been delineated, individual LNAPL pools further characterized via forensic fingerprinting, dissolved plumes further delineated, groundwater quality within the primary water-bearing zones assessed, and models developed to evaluate regional groundwater behavior. In addition, over a million barrels of LNAPL has cumulatively been recovered. A decade later, however, questions relating to larger regional issues remain uncertain. These issues include hydraulic communication between aquifers, potential adverse impact on the intervening Lynwood (guardian) aquifer, hydraulic impacts associated with groundwater withdrawal from the lower Silverado aquifer and barrier projects, the potential impact of those constituents of relatively higher solubility within underlying water-bearing zones, and source(s) identification.