A Monitored Natural Attenuation (MNA) sampling program that included benzene carbon isotope analyses was used to evaluate the natural attenuation of petroleum hydrocarbons (including benzene) in shallow groundwater at a petroleum storage facility. Natural benzene biodegradation based on isotopically heavier carbon of benzene, is in general associated with decreased benzene concentrations, increased electron acceptor concentrations, and decreased concentrations of biodegradation end-products including dissolved methane and ferrous iron. This is typically observed outside of areas containing light non-aqueous phase liquids (LNAPL). Within the LNAPL areas, decreased electron acceptor concentrations (including sulfate) appears to reduce natural benzene biodegradation and attenuation. To this end, Parsons has developed a process to promote the natural anaerobic biodegradation of LNAPL.