Micellar partitioning of volatile chlorinated hydrocarbons in surfactant solutions and its effects on vapor–liquid equilibrium is fundamental to the overall design and implementation of surfactant-enhanced aquifer remediation. Surfactant micelles greatly enhance contaminant recovery from the subsurface; however, the reduced volatility of organic compounds compromises the aboveground treatment of surfactant-laden wastewaters using air-stripping process. Batch equilibrium tests were performed to acquire micellar partition coefficients (K_m) and apparent Henry's law constants (H^*) of three prominent groundwater contaminants (tetrachloroethylene, trichloroethylene, *cis*-dichlorethylene) in the presence of two anionic surfactants (sodium dodecyl sulfate, SDS; sodium dodecylbenzene sulfonate, SDBS) and two nonionic surfactants (Triton X-100 and Tween 80). The H^* values were significantly reduced in the presence of all four surfactants over their critical micelle concentrations (cmc's). On a cmc basis, the anionic surfactant SDS had the greatest effect on H^*, followed by SDBS, Triton X-100, and Tween 80. Anionic surfactants decreased H^* to an order of magnitude lower than nonionic surfactants, although nonionic surfactants decreased the H^* at concentrations significantly lower than the anionic surfactants due to their lower cmc's. Nonionic surfactants present higher K_m and molar solubilization ratio than anionic surfactants. Tetrachloroethylene has the highest K_m values among three chlorinated solvents, which agrees well with the hydrophobicity (K_{ow}) of these chemicals. An empirical correlation between log K_m and log K_{ow} is developed on the basis of data from this study and the K_m values reported for a number of chlorinated and nonchlorinated hydrocarbons. Equilibrium data were also tested against three sets of models that describe the partitioning of volatile compounds in vapor–water–micelle phases. Applications of these models in experimentally determining K_m from batch vapor-water equilibrium data are discussed.