The effects of agitation on naphthalene volatilization from solutions with surfactant concentration exceeding critical micelle concentration were studied. Micellar partition coefficient (K(m)) and liquid-vapor mass transfer coefficient (K(L)) in the presence of three surfactants, i.e., anionic sodium dodecyl sulfate (SDS), cationic cetyltrimethylammonium bromide (CTMAB), and nonionic Tween 20 were determined at different agitation speeds. Both K(m) and K(L) increased in the agitated solutions, indicating enhanced naphthalene micellization and water-vapor mass transfer due to agitation. The enhancement factor of K(L) in surfactant-laden solution was determined to be in the range of 1.3-6.3 (SDS), 0.7-7.9 (CTMAB), and 1.5-7.3 (Tween 20). However, agitation exhibited a greater enhancement on K(L), resulting in a net increased volatilization rate. A conceptual model was developed to describe the dependence of the bulk aqueous phase naphthalene concentration (C(L)) on Henry's constant (H), K(L), K(m), and surfactant concentration (S). This study is the first in reporting the combined effects of agitation and surfactant on the volatilization of semi-volatile naphthalene in air-water-micelle system. Results provided insight into the volatile emission as frequently encountered in certain waste streams.