Air Sparging is a remediation procedure of injecting air into polluted ground water. The primary intention of air sparging is to promote biodegradation of volatile organic compounds (VOCs) in the groundwater passing through the treatment sector. Sparging treatment efficiency depends on air-phase distribution. Likewise, air-phase distribution is also dependent on a number of factors, one of which is interfacial tension (IFT). This experiment was conducted to determine how significantly a decreased air-water interfacial tension affects air-flow distribution and air saturation during sparging. Surfactants used to decrease IFT were fluorocarbons and sodium dodecylbenzene sulfonate (SDBS). First, the drop weight method was used to select the SDBS concentration (0.08 g/L) and the fluorocarbon (perfluorohexand [FCH]) that had similar interfacial tensions of approximately 60 dyn/cm. This represents an IFT percent reduction relative to air-water of 18%, where the interfacial tension for water was measured at approximately 73 dyn/cm. An aquifer model with the dimensions 15.2 cm X 14.7 cm X 1.4 cm was constructed and packed with 20/30 sand. Sparging experiments were conducted using a range of air flow rates (0.01 to 0.13 SLPM) in three systems: air-water, air-water-FCH (FCH sparged with air), and air-water-SDBS (SDBS being dissolved in water). Light transmission visualization was used to measure and compare the air-phase distribution between these systems. Relative to the air-water system, the sparging experiments with FCH and SDBS resulted in larger bulk air saturation in the model. Also, differences were noted between the SDBS and FCH systems despite their similarity in IFT. Our results showed air saturation increased most with SDBS, with the miximum air saturation increasing from ~60% for the air-water system, to ~80% for FCH, and ~90% for the SDBS system.