In the early years of the oil and gas industry, fire in storage tanks was the common root of most of the incidents. One technique to protect the integrity of neighboring tanks is the water spray curtain, which can provide thermal shielding against fire. This study presents a numerical simulation of radiative heat transfer by the Mont Carlo method through a semitransparent medium (water spray curtain) containing water droplets and gas for the design of an effective thermal shielding system to protect LNG (or combustibles) storage tank from fire. This model will allow us to calculate exactly the attenuation factor of the water curtain as a function of its thickness, density and the size of water droplets. The medium is considered as a non grey, absorbing and anisotropically scattering. The spectral behavior of the medium is taken into account by the Mie theory and the SNB model applied respectively to water droplets and gas (H_2O, CO and CO_2). The calculated results are satisfactorily in agreement with the experimental data