A nonthermal, atmospheric pressure plasma, made-up of a BaTiO3 packed-bed reactor, has been used to study the formation of NOx and N2O during the plasma destruction of a range of volatile organic compounds (VOCs) and hazardous air pollutants, including chlorinated, brominated, fluorinated, and iodinated methane species, in a carrier gas of air. Using the plasma destruction of pure air as a baseline, it is found that the amount of NOx formed is unaffected by the addition of a few hundred parts per million of a simple hydrocarbon (e.g. methane). In the case of the fluorinated, chlorinated, and brominated methanes, we find enhanced production of NOx and a marked increase in the ratio of NO2 to NO formed, from approximately 1.1 in air and methane to approximately 2.3 in halogenated species. However, iodinated additives (specifically methyl iodide and diiodomethane) have remarkably different results compared to the other halogenated additives; they show enhanced increases in the NO2 to NO ratio (approximately 6-13) and reduced NOx production. The enhanced conversion of NO to NO2 is attributed to reactions involving halogen oxides, e.g. ClO and IO.