

TREATABILITY TESTING TO SUPPORT FIELD APPLICATION OF OZONE

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Laboratory treatability testing to evaluate ozone prior to field application is a cost-effective method to determine whether ozone is appropriate for a given site. Ozone gas is a strong oxidant that can destroy a wide range of organic compounds in soil, groundwater, surface water, waste water, and in the gas phase. Treatability testing can be used to determine whether a specific contaminant(s) can be destroyed under site conditions, estimate the amount of ozone needed to achieve contaminant destruction, assess the potential for adverse side effects, and in cases of in situ treatment of soil and groundwater, evaluate whether adverse effects are likely to be short term or long term. Although ozone can destroy a wide range of compounds including petroleum hydrocarbons, chlorinated solvents, and PCBs, not all compounds are readily destroyed in all matrices. For example, in laboratory tests, ozone destroyed DDT in groundwater but had no effect on most BHC isomers; 1,4-dioxane was completely removed from groundwater, but not from deionized water. Although the amount of ozone required to achieve contaminant destruction can be calculated for discrete compounds such as benzene (but not for mixtures such as gasoline or toxaphene), excess ozone is often needed because ozone is non-selective and may react with natural organic matter and other non-target compounds present in soil and water. Finally, treatment of soil and/or water with ozone can potentially generate unwanted side effects. The most common are oxidation and precipitation of dissolved iron, oxidation and dissolution of manganese oxides, oxidation of naturally-occurring bromide to bromate, and oxidation of soil chromium to hexavalent chromium, Cr(VI). The magnitude and duration of these effects is site specific.

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