

Chapter 6

IMPLICATIONS FOR DRINKING WATER TREATMENT

6.1 Introduction

TiO₂-photocatalyzed As(III) oxidation has been demonstrated to work quickly and efficiently in bench studies. However, before pilot studies are undertaken, we must establish whether TiO₂ pre-oxidation of As(III) could be competitive with existing technologies. This chapter compares TiO₂ photooxidation to established methods for As(III) oxidation to determine under what conditions this would constitute a practical, cost-effective treatment technology.

6.1.1 Current treatment technologies

Many conventional water treatment methods are capable of removing significant fractions of As, particularly when it is present as As(V). If such a treatment technology is already operating in a given facility, it is far less expensive for the utility to optimize the As removal capacity of the existing treatment rather than to implement a new treatment method exclusively for As (McNeill and Edwards 1995; Chen et al. 1999). For example, coagulation/filtration, coagulation/microfiltration, activated alumina, and lime softening are not typically capable of removing As to levels below 10 µg L⁻¹, but they can be modified to enhance treatment (Chen et al. 2002). In Table 6.1, several treatment technologies capable of greater than 90% As(V) removal are evaluated for extent of As(III) removal, water quality conditions necessary for optimal performance, and production of residuals.