

## **Determination of an Occupational Exposure Guideline for Manganese Using the Benchmark Method**

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### **ABSTRACT**

An occupational risk assessment for manganese (Mn) was performed based on benchmark dose analysis of data from three epidemiological studies providing dose-response information regarding the potential neurological effects of exposure to airborne Mn below the current OSHA Permissible Exposure Level of 5 mg Mn/m<sup>3</sup>. Based on a review of the scientific evidence regarding the toxicity of Mn, it was determined that the most appropriate measure of exposure to airborne Mn for the subclinical effects measured in these studies is recent (rather than historical or cumulative) concentration of Mn in respirable (rather than total) particulate. For each of the three studies analyzed, the individual exposure and response data from the original study were obtained from the investigators. From these three studies benchmark concentrations calculated from 19 endpoints ranged from 0.09 to 0.69 mg Mn/m<sup>3</sup>. From our evaluation of these results, and considering the fact that the subtle, subclinical effects represented by the neurological endpoints tested in these studies do not represent material impairment, we believe an occupational exposure guideline for manganese in the range of 0.1 to 0.3 mg Mn/m<sup>3</sup>, based on the respirable particulate fraction only, and expressed as an 8-hour time-weighted average, would provide a scientifically defensible and reasonably conservative basis for the protection of workers exposed to airborne manganese.