To: A. Co Worker

From: Alexander Bradbury

Date: September 24, 2013

Re: Sorption Data and Model

**OBJECTIVE**

A drinking plant in Ames, Iowa asked us to design a process to remove chlordane from the water that is used at the plant. Our objective was to assess whether or not using GAC will reduce the chlordane concentrations to below 2 ppb. We were to determine the parameters for the sorption isotherm of chlordane on GAC. Using these parameters, a bench-scale treatment unit will be designed and put in place to be tested. Using the data that you collected from your laboratory study I was able to model the data using a linear and Freundlich model. Then my job was to determine which model best fit the data.

**METHODS**

By inputting your laboratory data in KaleidaGraph, I was able to generate a linear and Freundlich model relating the mass of adsorbate absorbed per mass of adsorbent at equilibrium, q, and the concentration of adsorbate in the aqueous phase at equilibrium, C. By generating these models I was able to define the Freundlich isotherm solid-water partition coefficient, K, and the Freundlich isotherm intensity parameter, 1/n. By analyzing both of the plots, I was able to assess which model best fit the laboratory data.

**RESULTS AND DISCUSSION**

After analyzing the two plots, it was determined the best fit for the data was the Freundlich isotherm. The Freundlich plot can be seen on the next page in Figure 1.



n= 0.4

**Figure 1. Dissolved chlordane concentration (C) vs. adsorbed chlordane concentration (q)**

As seen in the figure, the Freundlich isotherm fits the data almost perfectly. Using the plot, I was able to determine that the Freundlich isotherm solid-water partition coefficient was 245 L/mg, and the Freundlich isotherm intensity parameter was 0.4. These parameters best fit the laboratory data and should be used when designing the treatment unit that will be tested.