**Memorandum**

To: Deborah sills, Ph.D.

From: Ben Seketa

Date: September 24, 2013

Re: Nonlinear Curve Fitting and Sorption

**OBJECTIVE**

As part of a team that is tasked with assessing whether treating drinking water in Ames, Iowa with GAC reduces the chlordane concentrations it was necessary to determine the parameters for the sorption isotherm of chlordane on GAC. In order to appropriately present the results in a graphical manner, it must be determined with sorption isotherm is the most appropriate model. Either Linear or Freundlich isotherms were to be used, based upon which model fit the data best.

**METHODS**

Due to the nature of the equations for Linear and Freundlich isotherms, shown below, it was necessary to use the graphing program Kaleidagraph.

(Linear)

(Freundlich)

The original data collected from experimentation was imputed into the program, and then using the above equation for Linear isotherms was also imputed and placed on the graph of the data. This process was again repeated using the equation for Freundlich isotherms. The graphs were then compared and it was determined which was a better fit for the data set.

**RESULTS AND DISCUSSION**

Using the graphical data obtained from the application of two equations of isotherms, it was possible to compare the fits. By visual analysis, it was determined that the Freundlich isotherm was the most appropriate model to fit the data. The Data does not appear to be linear and the bend in the graph suggests the fit is not linear. The plot, with the fit can be seen in Figure 1 below. A trendline was added to the graph to show this relationship more clearly.

Figure 1. Plot relating the absorbed chlordane concentration and dissolved chlordane concentration using the Freundlich isotherm.