**Memorandum**

To: Coworker John Doe

From: CENG Student: Rafael Enriquez-Hesles

Date: September 23, 2013

Re: Freundlich Isotherm Model

**Objective**

The purpose of the experiment was to help find a process to remove chlordane from the drinking water in Ames, Iowa. Chlordane is a highly toxic chemical that was used as an insecticide until it was banned in the late 1980s but is still present in some rural parts of the U.S. groundwater. Our team is assessing whether treating the water with granulated activated carbon will reduce concentrations below 2ppb. The model parameters of the sorption isotherm of chlordane on GAC will be used to design bench-scale treatment until that will be further tested.

**Methods**

A coworker conducted the laboratory study and collected the data for the sorption isotherm of chlordane on GAC. This data will be fitted into one of two sorption isotherms- Linear and Freundlich, described in Eq. 1 and Eq. 2. This model fitting will be done using data of dissolved chlordane concentration and absorbed chlordane concentration. KaleidaGraph will be used to fit the two isotherm models and the best fit will be determined to calculate the model parameters.

Results and Discussion

The data points were modeled using the following two equations:

Eq. (1)

Eq. (2)

where q = mass of absorbate absorbed per mass of absorbent at equilibrium

C= concentration of absorbate in the aqueous phase at equilibrium

K = Freundlich isotherm soil-water partition coefficient

= Freundlich isotherm intensity parameter (unitless)

Equation 2 was the more appropriate model based on the visual inspection on KaleidaGraph. This equation was then analyzed and graphed during this program in figure 1. Given the parameters found, we will be able to compute the mass of absorbate absorbed per mass of absorbent at equilibrium if we now the concentration of absorbate in the aqueous phase at equilibrium and vice-versa. John Doe, my co-worker will write up a complete memo and send it to the supervisor as the final revision



K=245

1/n= 0.4

Figure 1. Plot of best-fitting Ferundlich isotherm and its model parameters.