**Memorandum**

To: Prof. Sills

From: Ushma Manandhar

Date: September 20th, 2013

Re: Sorption

**Objective:** Chlordane is a highly toxic chemical that contaminates water and makes it unsuitable to drink. The influent water that goes in the water treatment plant of Iowa consists of chlordane. The firm is considering designing a treatment process called granulated activated carbon (GAC) that sorbs chlordane from water. The objective of this experiment is to design a process to remove chlordane from the water and whether treating the water with GAC will remove the contaminant level of 2ppb. Your supervisor has asked you and the other new engineer in the m to conduct a set of experiments to determine the parameters for the sorption isotherm of chlordane on GAC.

**Method:** The data was collected for the laboratory study. The data was plotted in a Kaliedograph to figure out which one of two sorption isotherms: Linear and Freundlich, described in Eq. 1 and Eq. 2,fit respectively.

There are two equations in which there is chlordane

……………………........(1)

……………………...(2)

Where, q = mass of adsorbate adsorbed per mass of adsorbent at equilibrium (),

C = concentration of adsorbate in the aqueous phase at equilibrium (),

K = Freundlich isotherm soil-water partition coefficient (()()), and

1/n = Freundlich isotherm intensity parameter (unitless).

The data was plotted and different equations were tried to fit the curve produced from the collected data.

**Results and Discussion:**

KaleidaGraph was used to fit the data models to the two isotherm model and the Freundlich fitted the best as shown in in Figure 1. The Freundlich isotherm solid-water partition coefficient (K) is 245 (()()), and the Freundlich isotherm intensity parameter () is 0.4. Among the data sets analyzed, the linear model only fits two points as shown in Figure 2. Therefore, it is not a good model for showing and analyzing the relationship between mass of adsorbate adsorbed per mass of adsorbent and concentration of adsorbate

**APPENDIX**



Figure 1: Freundlich sorption isotherm Model perfectly fits the data sets with Freundlich isotherm soil-water partition coefficient of K = 245 ((mg/g)(L/mg)) and .



Figure 2: Linear sorption isotherm model fitted to data, K= 2097((mg/g)(L/mg)).

**REFERENCES**

**Sills, D. L. (2013) Week 3 Laboratory Handout. – Nonlinear Curve Fitting. Bucknell University. CENG 340 Course Notes, Fall, 2013.**