EVE 402
Air Pollution Generation and Control
Chapter #6 Homework -- Adsorption

1. The data given below are for the adsorption of methane (CH_4) on charcoal at 273 K. Determine the isotherm that fits the data and give the constants of the equation using the given units.

P [bar]	25	50	75	100	200	300	400
Ads.[mg/g]	84.7	105.6	226.9	233.4	246.1	252.2	253.5

2. An activated carbon bed that is 4.5 m wide, 1.7 m long, and 0.75 m deep is used in a methane recovery system. The system is on-line for 1.5 hours and is then regenerated for one hour. The influent gas stream contains 7500 ppm methane (by volume) at 1.0 atm and 25 °C. The operating capacity of the bed is 100 g methane per 1 kg carbon. The physical properties of the carbon are as follows: bulk density = 450 g/L, and void fraction = 0.45 and particle size = 3350 μm. Estimate the pressure drop across the bed using both methods discussed in class.