

Removal of PFOA with Granular Activated Carbon 3M Wastewater Treatment System Monitoring

There are many factors that can influence the adsorption of a chemical constituent onto activated carbon. These will include the carbon type, the concentration of the target constituent, loading rates, pH, and the concentrations of other organic/inorganic substances that will compete for the available adsorption sites. Each treatment scenario will be unique and the actual removal efficiencies can only be determined by careful analysis of the specific wastewater stream.

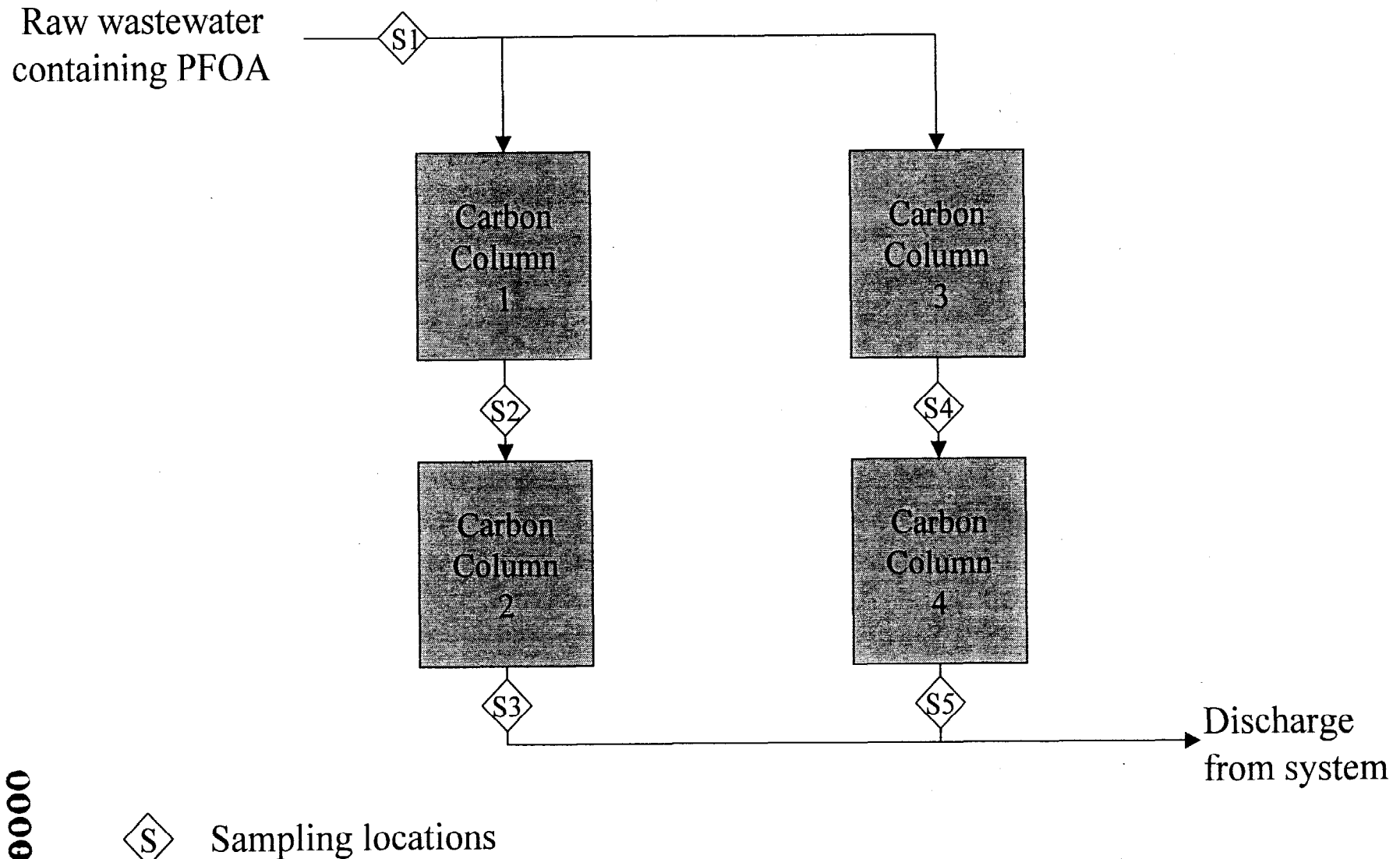
This report provides a brief summary of results for PFOA monitor that contained PFOA. This system utilized two sets of two pairs of GAC column absorbers that were operated in a lead-lag format. Each of the four vessels contained 7000 kilograms of GAC. Testing was conducted on each of the two systems and data was collected on the both the column influents and effluents. A schematic of the system is provided in Figure 1. Table 1 summarizes the testing results and Figures 2 and 3 provide graphical summaries and operating information on the column adsorbers. This testing program demonstrated that:

1. Activated carbon was effective in reducing PFOA to less than detected values for extended periods of time (Method detection limit = 6.6 ug/l).
2. Even with variable influent concentrations, GAC was able to produce low effluent concentrations on a consistent basis.
3. The calculated PFOA adsorption capacities for the lead columns were approximately 6.0 mg PFOA per gram of activated carbon. (Note: Accurate flowrates were obtained from a period of 11/23/2000 through February 5, 2001 and flowrates for the remaining period were extrapolated based on that data.) The adsorption capacity of the first columns were not fully utilized at the time this testing was terminated. For this reason, the actual capacity of activated carbon for PFOA would be somewhat higher.

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Figure 1: Granular Activated Carbon Wastewater Treatment System



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Table 1: Activated Carbon Data for Wastewater Treatment System
(all values listed in ug/l)

DATE	Influent to system (S1)	Columns 1 and 2		Columns 3 and 4	
		Col. 1 Eff. (S2)	Col. 2 Eff. (S3)	Col. 3 Eff. (S4)	Col. 4 Eff. (S5)
23-Nov-00	1970.0	<6.6	<6.6	<6.6	<6.6
30-Nov-00	994.0	<6.6	<6.6	<6.6	<6.6
07-Dec-00	968.0	<6.6	<6.6	<6.6	<6.6
14-Dec-00	1760.0	<6.6	<6.6	<6.6	<6.6
21-Dec-00	586.0	<6.6	<6.6	<6.6	<6.6
08-Jan-01	1350.0	32.2	<6.6	91.4	<6.6
15-Jan-01	2590.0	<6.6	<6.6	982.0	<6.6
22-Jan-01	925.0	13.2	<6.6	70.9	<6.6
29-Jan-01	1780.0	66.3	<6.6	84.8	<6.6
05-Feb-01	214.0	90.6	<6.6	169.0	<6.6
07-Mar-01	2170.0	695.0	<6.6	959.0	<6.6
05-Apr-01	1180.0	<6.6	<6.6	959.0	<6.6
08-May-01	499.0	455.0	<6.6	959.0	<6.6

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**Figure 2: Activated Carbon Treatment System
PFOA Removal in Columns 1/2**

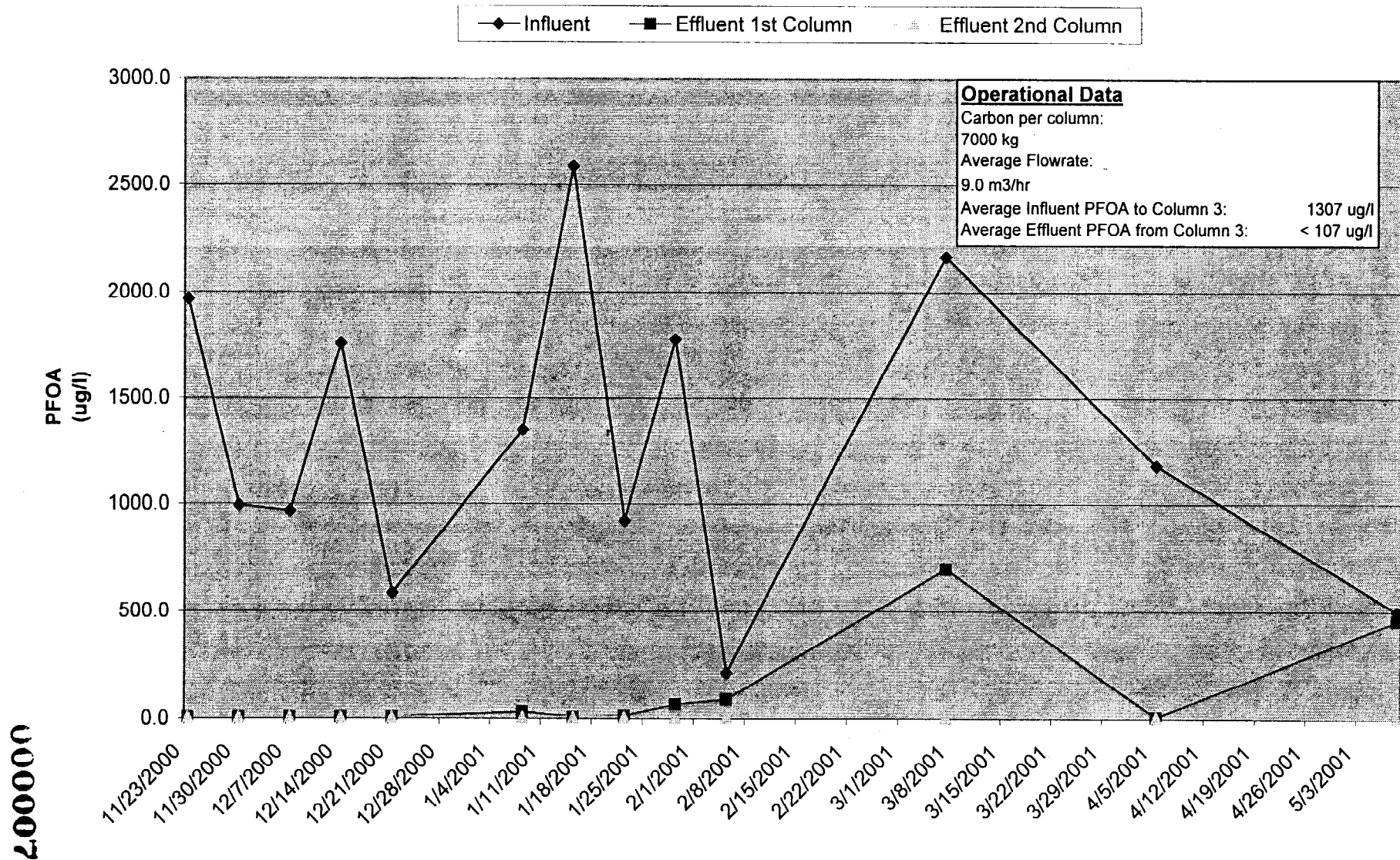


Figure 3: Activated Carbon Treatment System
PFOA Removal in Columns 3 and 4

