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SUBJECT: Task 8 – Water Supply Management Options
Subtask 8.2 – Wellhead Treatment Costs

INTRODUCTION

The objective of this subtask is to assess the cost of constructing Granular Activated Carbon (GAC) adsorption facilities at Suffolk County Water Authority (SCWA) public supply well fields in Suffolk County for the most common Volatile Organic Contaminants (VOCs).

CONSTRUCTION COSTS

The SCWA has been utilizing Granular Activated Carbon (GAC) Adsorption system to treat wells contaminated with VOCs since the late 1980's. Currently there are 118 GAC units throughout SCWA treating 126 wells. The majority of these GAC units were housed in large pre-engineered buildings in order to maintain year round operation of the affected wells. Wells with GAC units that were not housed in this manner were usually drained and taken out of service for the winter, and the affected wells are not used during those months. In more recent years, the SCWA has undertaken the practice of constructing permanent buildings around virtually every GAC unit. The reasons for this are numerous. First, the labor involved with annual draining and winterizing of seasonal GAC units, and then starting them back up again in the spring, made this practice very cumbersome and costly. It was also discovered that after restart of a GAC system in the spring, the adsorptive capacity of the carbon was quickly exhausted, and had a shorter-than-normal run time before requiring a change-out. Logistically, it is much easier to maintain year round operation of all GAC units. Once the building was constructed, the operation costs were reduced, and the wells were available all winter long if needed. If a GAC system needs to be winterized, all of the carbon media is removed.

As part of this effort to house all GAC vessels, the style of the building housing the GAC system is now taken into consideration when the building is visible from residential neighborhoods. These new buildings are constructed with split-faced masonry block and provide a more architecturally pleasing outward appearance than the pre-engineered structures. While this has added somewhat to the overall cost of these projects, the SCWA believes that the benefits are worth the additional costs.

Figure 1 shows photographs of GAC systems in use at the SCWA, and Figure 2 shows photographs of the different types of buildings that house them.

The GAC vessels used by the SCWA are typically either 10 ft. or 12 ft. in diameter, and are capable of treating from 1000 to 2000 gpm at the very low concentrations of contaminants typically encountered at SCWA (typically less than 10 parts per billion). In most of western Suffolk, these contaminants usually include either MTBE or chlorinated solvents such as 1,1,1 trichloroethane. For system located in eastern Suffolk, contaminants typically consist of agricultural chemicals such as Aldicarb or TCPA. Even though the flow rates of wells in eastern Suffolk are much lower than western Suffolk, the same 10- to 12-foot diameter vessels are typically used, so that construction cost comparisons are valid. The use of these large vessels on low flow wells allows for longer run times between carbon changes, thereby saving operational costs.

Table 1 shows the construction costs of several recently built GAC systems at various SCWA well fields located throughout Suffolk County. The data show that the average large diameter (10- to 12-foot) system with an appropriate building costs about \$490,000. For the 2 systems with no buildings, this cost is reduced to \$ 380,000. Systems of this size are capable of treating up to 2,000 gpm.

OPERATIONAL COSTS vs. SCWA POLICY

A separate study was conducted by SCWA in 2007 to evaluate the operational costs of GAC treatment for the entire SCWA system. The methodology was simple: sum the total the costs associated with purchasing carbon and servicing all of SCWA's systems, and divide that cost by the total volume of water pumped through all GAC systems at SCWA for a given year. The end result was that the use of GAC, as employed by SCWA, adds \$0.24 per thousand gallons to the cost of pumping water.

In an effort to minimize any potential for contamination, SCWA has historically followed a very aggressive treatment schedule for its VOC-contaminated wells. Typically, the SCWA treats VOC contaminated water to achieve a finished concentration of zero ppb of VOC. Carbon is typically changed in a vessel as soon as 50% of the NY State drinking water standard is reached. Additionally there are approximately 9 compounds for which the maximum contaminant level goal has been set at zero. As soon as any breakthrough is detected, the carbon is changed. There are also three compounds with a MCLG of 1 ug/L, wherein carbon is change out in a vessel as soon as 1 ug/L is detected. Since the New York State drinking water standard for a number of VOCs is 5 ug/L, it is possible to extend the life of the carbon in a vessel by allowing the presence of low levels of VOCs in the finished water, thereby reducing the overall operational costs. However, in the interest of public health and confidence, the SCWA has opted for fits current, more expensive option.

Figure 1: Photos of Granular Activated Carbon Adsorption Units



Figure 2: Buildings housing GAC vessels at the Suffolk County Water Authority



Figure 2: Buildings housing GAC vessels at the Suffolk County Water Authority



Gun Club Rd. well field double width GAC building featuring gabled roof and artistic painted doors



Mill Lane GAC building with block facing and glass block windows

Well field	Well #	contam.	vessel dia.	Total cost	comments
Eastwood Blvd.	3	solvents	12 ft.	\$ 375,235.07	no bldg.
Old North Rd.	2 & 3	Aldicarb	12 ft.	\$ 385,492.58	no bldg.

Average system without building **\$ 380,363.83**

Cty. Rte. 111	3		12 ft.	\$ 473,189.10	
Jayne Blvd.	1	MTBE	12 ft.	\$ 503,381.70	
Mt. Sinai-Coram Rd. S	1	solvents	12 ft.	\$ 522,829.41	
Wayne Ct.	1	solvents	12 ft.	\$ 562,352.06	
Wicks Rd.	3	solvents	12 ft.	\$ 453,622.29	
Oval Dr.	2	MTBE	10 ft.	\$ 424,896.37	

Avg. system with Building **\$ 490,045.16**