

Low Level Mercury Treatment Utilizing MAR Sorbster

Summary:

MAR Systems, under a Memorandum of Agreement with the Northeast Ohio Regional Sewer District (NEORS), developed a procedure for using MAR Sorbster media for mercury removal on low level water. NEORS utilized its clean room to perform lab-scale mercury testing on the low level mercury water which had been treated with MAR Systems Sorbster Hg: F and Sorbster Hg: A in fixed bed columns.

Objective:

Demonstrate the performance of MAR Sorbster Media on low level mercury water consistently reducing the concentration to 1.3 ppt or less.

Procedure:

MAR Sorbster was packed into two fixed-bed columns and the water was passed through the columns in series, the first Sorbster Hg: F and then Sorbster Hg: A. The water contacted the media for less than four minutes in an up-flow configuration. Four 20 liter carboys were processed containing the following mercury concentrations: 2.92 ppt, 2.99 ppt, 3.24 ppt and 2.36 ppt.

Results:

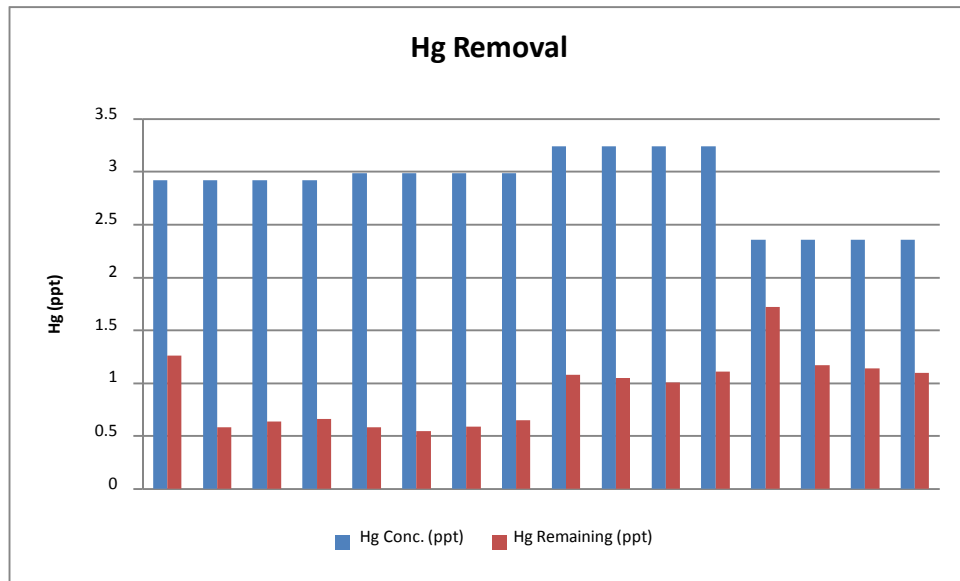
A total of 143.8 ng of mercury was successfully removed from the water. The average mercury concentration of the treated water was 0.93 ppt. Four samples from each carboy were analyzed at various volume throughputs.

The media removed an average of 66.5% of the mercury and met the Great Lakes discharge level of 1.3 ppt on all samples except for one spike of 1.72 ppt on the first sample from Carboy 4 at 60.3 liters processed.

A variety of factors may have contributed to the spike, including the following: the columns sat idle for four days prior to the collection of the spike sample, the re-start of the columns may have introduced air resulting in channeling, and the water that may have channeled through the column would not have had enough contact with the media to allow for mercury removal. In addition, contamination may also have been a factor when working at the part per trillion levels. The columns did rebound from the spike sample and continued to remove mercury to less than 1.3ppt. Raw data from the testing is shown below.

Sample	Hg Conc. (ppt)	Hg Remaining (ppt)	Total Vol (L)	% Removal
1	2.92	1.26	0.34	56.8%
2	2.92	0.58	5.30	80.0%
3	2.92	0.64	11.00	78.1%
4	2.92	0.67	17.00	77.2%
5	2.99	0.58	20.50	80.5%
6	2.99	0.55	26.00	81.8%
7	2.99	0.59	31.00	80.3%
8	2.99	0.65	37.00	78.2%
9	3.24	1.08	40.20	66.7%
10	3.24	1.05	45.00	67.6%
11	3.24	1.01	50.00	68.8%
12	3.24	1.11	55.00	65.7%
13	2.36	1.72	60.30	27.1%
14	2.36	1.17	65.60	50.4%
15	2.36	1.14	71.50	51.7%
16	2.36	<u>1.10</u>	75.00	53.4%
Avg.		0.93		66.5%

Col. Length=	18.4	cm
Col Vol=	14.451	cm ³
Media=	16.4	g
Flow Rate=	4	ml/min
Contact time=	3.61	minutes



Conclusion:

MAR Sorbster media has proven successful in the laboratory-scale reduction of low levels of mercury to 1.3 ppt or less. A field trial for use on a large scale would be beneficial to demonstrate the efficacy of MAR Sorbster.