



Power Plant in Central NE – Data Analysis and Feed Rate Reduction

Situation: The customer in question had been supplied with a sorbent injection system that was originally designed for use with a product known as Amended Silicates. Amended Silicates was designed to be used for controlling Hg emissions in lieu of Powered Activated Carbon (PAC). Due to the higher density of Amended Silicates, compared to PAC, and higher feed rates needed to meet the Mercury Air Toxic Standards (MATS) requirements, the system was designed to feed between 150 – 600 lbs/hr.

Initial testing with Amended Silicates proved ineffective, and the decision was made to move to PAC instead. The result of this change was that the feed rate ranges needed to achieve compliance decreased drastically, and their equipment was not sized appropriately to achieve the needed turndown.

Analysis: Motus Group conducted a brief analysis of plant PI data, and it was recommended that a 10x reduction in feed rate was needed for the existing feed system to best optimize PAC usage. The original screw feeder capacity in low range was 20 – 150 lbs/hr (when using PAC) but, due to the effectiveness of PAC in controlling Hg emissions, the feed rate range needed to maintain compliance was determined to be much lower, at 4 – 10 lbs/hr.

Resolution: In order to achieve this reduction, Motus Group supplied the customer with custom extra fine pitched screws and an additional gear reducer which, when used together, reduced the feed rate capacity of the screw feeder to 2 – 15 lbs/hr. Adding just the additional gear reduction would have provided the needed turndown, however, reducing the screw flight capacity with the custom screws allowed for more accurate control of the system at the lower feed rates. If plant conditions or fuel blend were to change, and more PAC was required to meet compliance, the high-speed setting of the feeder would give the customer additional throughput capabilities.

Table 1, below, details the annual sorbent savings and project ROI realized via modifying the system’s turndown capabilities.

ACI COST SAVINGS:		
PAC Cost, [\$/LB]	\$0.55	\$/LBS
Original Feed Rate, [LB/HR]	20	LBS/HR
New Feed Rate, [LB/HR]	5	LBS/HR
Delta, [LB/HR]	15	LBS/HR
Unit Availability, [%]	80%	%
Sorbent Savings per YEAR	\$57,816	\$
Project Cost, [\$]	\$9,500	\$
ROI ESTIMATE:	2.0	MONTHS

Table 1: Annual Sorbent Savings Realized and Project ROI