



300 Center Drive Ste. G-129  
Superior, CO 80027  
Main: (720) 295-1696  
Fax: (866) 989-8936

## **Power Plant in Central KS – Field Services – Feed Rate Capacity and Compliance Issues**

**Situation:** Motus Group was contacted by representatives of a power plant in Kansas regarding multiple issues they were experiencing with their Activated Carbon Injection (ACI) system. The major issue communicated was the inability to achieve maximum screw feeder capacity (per the manufacturer's O&M), which they needed in order to maintain Mercury Air Toxic Standards (MATS) compliance during the summer months. A Motus representative travelled to site to inspect the customer's equipment and try to determine the cause of the issues.

**Analysis:** It became evident, upon surveying the systems, that the customer's preventative maintenance program was not being followed. In the case of the screw feeders, this meant that the feeder hoppers had not been emptied since their installation, and internal components, including screws, had not been inspected or replaced.

Based on this information, the first step taken by the Motus representative was to feed all the Powdered Activated Carbon (PAC) out of the hoppers. While emptying the hoppers it was determined that the maximum achievable feed rate was approximately 250-300 lbs/hr, while the feeder's maximum feed rate was listed at 600 lbs/hr. While the hoppers were empty, the feeder scales (used to calculate the feed rate via loss in weight) were calibrated in order to rule them out as a potential source of inaccuracy. After the scales were calibrated and ruled out as the cause of the feed rate discrepancy, it was discovered that the screw flights were worn, and there was a substantial amount of PAC buildup in the flights.

**Resolution:** The screws were removed, cleaned, and put back in service so that the hoppers could be filled again. Feed rate testing after the hoppers were refilled resulted in feed rates in the range of 450 lbs/hr for one unit, and 550 lbs/hr on the other. The screw feeders' throughput (availability) increase is represented graphically below, and was based on PI data provided by the customer before and after the site visit activities were performed.

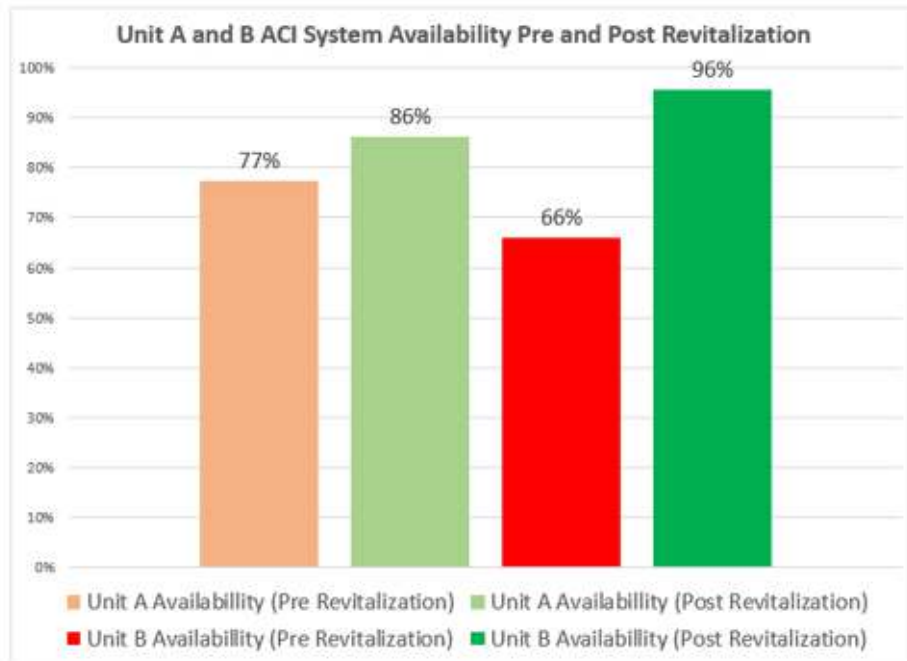
While it wasn't possible to achieve the maximum design feed rate, due to screw deterioration and reduced throughput capacity, the increase in feed rate was substantial, and helped the customer meet their compliance limit. Motus Group provided new screws and feeder seals to the plant, and recommended that the screw feeder hoppers be emptied out completely when downtime was expected to be two (2) weeks or more (to extend the life of the feeding equipment). This recommendation was provided as part of a comprehensive preventative maintenance plan created by Motus Group to help the customer avoid similar issues in the future.

Table 1, below, details estimated cost of non-compliance and the ROI of this project.

COST SAVINGS:		
MATS Compliance Excursion Penalty	\$25,000	\$ (min)
Project Cost, [\$]	\$5,000	\$
<b>ROI ESTIMATE:</b>	<b>&lt; 1</b>	YEAR

Table 1: Estimated Cost of Non-Compliance and Project ROI

## REVITALIZATION RESULTS



The graph above represents the feed rate increase (availability) after preventative maintenance activities were performed by Motus Group during the site visit. PI data, provided by the customer from before and after the site visit, comparing feed rates at 100% VFD output (60 Hz) was used to create a direct comparison in top end performance capabilities.