additional testing is completed to determine the supplier recommended brominated PAC injection rate, PM emissions should also be closely monitored to confirm no longer term impacts are caused by the increased ACI rate. In order to mitigate potential increases or deviations for the current PM emissions, it would be reasonable to anticipate some ESP upgrades (operational changes and/or equipment optimizations) to be required to ensure the ESP maintains its current performance.

### 3.2.3. Increased Contact

Increasing the degree of flue gas and PAC mixing can optimize the sorbent utilization to ensure adequate mixing of the oxidized Hg and PAC is achieved, which potentially could result in the use of less PAC to achieve the same Hg emission rate. Similarly, additional testing and evaluation would be required to determine the beneficial incremental Hg removal improvement that could be achieved. Additional mixing could be implemented by either adding static mixers into the flue gas path and/or using a more advanced injection lance design to increase sorbent dispersion relative to a straight lance design to optimize sorbent usage.

Increased contact time could also be achieved by relocating the injection lances upstream of the APH.[5] Hg reduction effectiveness with PAC has been shown to be temperature limited, as the absorption capacity of the carbon is reduced at temperatures above approximately 350°F. Although flue gas temperatures downstream of the APH are more ideal for capture, temperatures upstream of the APH are within an ideal zone for mercuric halogens to be formed, taking advantage of the additional halogen introduced with the PAC. Furthermore, for applications with $SO_3$ concentrations above 5 ppm in the flue gas (as is on the MRY units), carbon active sites may be preferentially occupied by $SO_3$. Although adsorption rates slow down above 350°F, injection upstream of the APH is sometimes considered to lower the impact of $SO_3$ competition. Furthermore, tubular APH designs will not offer as much mixing compared to Ljungstrom type APHs; therefore, relocating the injection lances upstream of the APH will likely only achieve added residence time for adsorption to occur in lieu of additional mixing. Therefore, the high temperature environment and resulting residence time for injection at the APH inlet would need to be evaluated further.

### 3.2.4. WFGD Re-Emission Control

Oxidized Hg is highly water soluble and exists in vapor phase at back-end equipment flue gas temperatures. WFGDs readily capture approximately 90% of oxidized Hg because it is highly soluble, but will not remove elemental Hg. However, re-emission of Hg is possible in some circumstances when Hg precipitates out in scrubber solids (mercuric sulfide or equivalent) and the scrubber slurry converts some of the oxidized Hg back into elemental form. Re-emission of elemental Hg can be mitigated through the use of a sulfide-donating liquid reagent additive that enhances the Hg capture within the WFGD by decreasing soluble Hg in the WFGD slurry. Testing would be required to determine the amount of re-emission currently occurring based on recent operating conditions.

## 3.3. MERCURY EMISSIONS SUMMARY

Presently, there is not any publicly available information to determine if improvements to any of the above categories (individually or in combination) can achieve a Hg emission of 1.2 lb/TBtu or below on a lignite unit.

[5] It should be noted that this approach is patented by Alstom, and use of this approach would need to consider intellectual property implications.