PACK, DELAUNA

From: DUTCHESS Mark [Mark.Dutchess@hamonusa.com]
Sent: Saturday, May 12, 2007 11:42 AM
To: ALLEN, CHRISTOPHER P
Cc: PACK, DELAUNA; MOREY, STEVEN R; WIDICO Michael; PETERS James; MENEZES Vivek
Subject: RE: Typical Maintenance for the Hamon FGD System

Dear Chris

Based on HRC's extensive installed base of wet and dry Flue Gas Desulfurization systems, HRC typically takes its core operation and maintenance experiences and recommendations and customizes those requirements for each new project's O&M Manual. This approach allows HRC to adjust future project instructions for lessons learned from prior good and bad experiences and allows the operator to optimize the performance and service life of the equipment. Underlining this philosophy is the basic concept that all mechanical systems require routine inspection and maintenance services in order to achieve the maximum reliability for each facility's operating conditions.

As we have discussed on numerous occasions over the past four (4) years, the process and operating conditions encountered by the emissions control system installed on a heat recovery coke facility are very a-typical of those experienced at other applications such as on conventional coal fired boilers. Coke oven facilities of this type exhibit very unique and challenging operating conditions which require extra O&M considerations which typically are not present on other industry applications. In particular, the FGD system faces significant variances in cyclic load conditions on a 24/7 basis with swings in gas temperatures and flow rates and acid gas concentration levels. The presence of abnormally high levels of SO3 and HCl acid gases in addition to SO2 requires special attention towards monitoring of equipment for corrosion and unexpected by-product build-up and deposits.

In particular, HRC's experience at the Indiana Harbor HRCF and similar albeit not quite as severe applications on municipal solid waste incinerators, indicate that the presence of high levels of HCl in the gas stream produce a tendency for enhanced internal corrosion problems and also by-product dropout and deposits. Dropout material which takes place during the swing load operation is especially problematic because of the hygroscopic nature of the Calcium Chloride – CaCl2 – reaction by-product which is formed. Unlike conventional coal fired DFGD installations where coal fly ash dropout is light and easily re-entrained at design gas flow velocity, this CaCl2 material readily creates hardened deposits which are not re-entrained in the gas stream as gas flow rates increase. Overtime these deposits can alter the gas flow distribution exacerbating the dropout problem and eventually restricting the internal ductwork gas flow which will lead to other operating problems, including reductions in SO2 removal efficiency.

DFGD systems are designed for routine maintenance of critical operating components while the flue gas production process remains on-line; i.e. rotary atomizers can be exchanged on line; filter bags and cages can be inspected and replaced when necessary, and external components such as hopper heaters, level detectors, filter bag cleaning systems, can all be inspected and replaced during normal operation. However, critical internal system components such as dampers, flow distribution devices, corrosion effects and by-product dropout and deposits can only be determined by performing a complete internal inspection when the FGD system is removed from service.

For a coal fired power plant DFGD installation, this internal inspection is typically conducted on a yearly basis during annual plant outages. However, in between these annual outages, quick inspections are often performed during unexpected plant forced outages, particularly if known problems exist within an operating system. And, in the extreme where a major malfunction occurs, the complete power generation system can be temporarily shut down to facilitate emergency inspections and repairs. Over the past 25 plus years of DFGD system operation, these procedures have worked well for the much less challenging coal fired applications.

Recognizing the extremely challenging service encountered by the DFGD system on coke oven emissions treatment, HRC endorses a very aggressive preventative maintenance program for this type of equipment. This preventative maintenance program should be geared to producing optimum performance for the remainder of the operating year, and maximum the effective service life of all components. HRC's recommendations include semi-annual and annual complete internal inspections. The semi-annual outage should encompass a minimum of one (1) or two (2) days to confirm proper operation, resolve small operating issues, and develop service plans for the annual outage time. The annual outage would likely encompass two (2) to five (5) days to perform a thorough internal inspection and complete maintenance work identified earlier or at the time of the outage.

Again, HRC views these planned outage events as realistic preventative maintenance procedures specific to this unique application which will maximum the overall operation and emissions performance of the DFGD system throughout its long service life.

Please give me a ring to discuss these recommendations at your earliest convenience.

Best regards,

Mark

Mark S. Dutchess

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From: ALLEN, CHRISTOPHER P [mailto:CPALLEN@sunocoinc.com]
Sent: Friday, May 11, 2007 9:42 AM
To: DUTCHESS Mark
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Subject: Typical Maintenance for the Hamon FGD System

Mark,