Total Air Pollution Control Pty. Ltd.
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22nd February 2018

Mr. Jesse Brown,
Manager Technical and Environmental Services - Sydney
ToxFree
40 Christie St, St Marys NSW 2760

Dear Mr. Jesse Brown,

As per our meeting at ToxFree – St Marys Facility, Total Air Pollution Control Pty Ltd (aka TAPC) have reviewed the data which was forwarded during those discussion, and consecutive discussions upon the conclusion of the meeting. From the information and Australian Standards as the bases of our design, it can be confirmed that the nominated target emission specified of 99%, can be achieved through the use of TAPC Technology.

TAPC proposed system design is for a ventilation rate sufficient to dilute the maximum specified emission rates of chlorine (Cl_2) and sulphur dioxide (SO_2) gases to a level that will be suitable for treatment via a packed tower scrubber (PTS). The PTS consists of a vertical column containing randomly positioned structured plastic packing material for which a bed is created for which the gas will be passing through to be treated. With the assistance of the induced draft fan, the gas flow is to be in an upward direction. Scrubbing liquid is sprayed over the entire top surface of this packed bed and trickles down over the packing in a counter-current arrangement to the gas flow. The scrubbing liquid consists of water and sodium hydroxide (NaOH), also known as caustic soda.

The water component of the scrubbing liquid acts to transfer the Cl_2 or SO_2 contaminants from the gas phase into the liquid phase by absorption; the high surface area and turbulent mixing effect of the packing pieces facilitates this mass transfer process. The NaOH component of the scrubbing liquid acts as a reagent in a chemical reaction with the absorbed Cl_2 or SO_2 that transforms these contaminants into stable and highly soluble sodium salts, thus preventing their re-release into the gas phase.

By selecting a packed bed of high-efficiency packing pieces at a sufficient calculated depth height that is irrigated by a large enough flow of scrubbing liquid containing enough NaOH reagent (all as determined by standard engineering design principles and calculations), a removal efficiency of over 99 % for both Cl_2 and SO_2 can be guaranteed through the use of TAPC technology, for which the Clean Air Regulation emission limits of 200 mg/m^3 for Cl2 and 1,000 mg/m^3 for SO_2 will be comfortably met in the gas discharged from the PTS.

The scrubbing liquid that drains out of the bottom of the packed bed falls into the integrated scrubber sump tank, from which a recirculation pump system returns the scrubbing liquid to the top of the packed bed to complete the cycle. As a final stage of the process, the cleaned gas passes through a mist eliminator at the top of the PTS to remove any fine scrubbing liquid droplets that have been entrained in the gas as it exits the packed bed section. The cleaned and demisted gas is then directed out of the top of the PTS and into the induced draft (ID) fan that provides the necessary motivation for the ventilation gas to flow under constant negative pressure from the plant work area to the PTS and then out to atmosphere via the discharge stack downstream of the ID Fan.

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In conclusion, from the original data provided and emission levels nominated during our discussion, TAPC through the use of our in-house design and technology selected for the nominated application, will guarantee the overall emission level by achieving 99% cleaning efficiency and the targeted Cl_2 and SO_2 levels.

In return if you have any further questions or clarifications for which you would like to discuss, please do not hesitate to contact me.

Thank you,

Best Regards

Marco Tomassi
Business Development Manager