Flue Gas Scrubbing
Spotlight #18
January 8th, 2019.

Q: Does it matter how long the residence times are in the reactor section? Is that something we should consider?
Yes. When kinetics are part of the simulation, then retention time is critical. Also, depending on the container type, Completely Stirred Tank Reactor (CSTR) or Plug Flow Reactor (PFR) the number of reactor stages is also a critical input parameter.
Flue
Q: When you do the filtration is a filter enough? Or do you need to treat the water in other ways?
There is much more to the water treatment part that we did not discuss at this presentation. There is a downstream water treatment plant that will remove salts and other undesirables before the water is sent back to the process or discharged. Water treatment unit operations include lime softening, reverse osmosis, and ion exchange. We have several water treatment application cases created in Flowsheet, for the user to look at if they are interested. If you are interested, please contact us at success@olisystems.com

Q: There may be other impurities besides mercury in the stack, do they change the simulation?
Not the overall mass balance and acid base chemistry because they are small. However, their fate is important. Arsenic, selenium, silica, reduced sulfur, ash, unburnt carbon are some examples. These are components we want to explore in future spotlights, in particular, Hg adsorption onto particulates. More information about upcoming and future spotlights will be published on OLI's website: www.olisystems.com

Q: Is that 80% Murphree efficiency for every scrubber or just this one? Do I have to calculate the efficiency for my own scrubber or can I use 80%?
Murphree efficiencies are set to 1.0 in the default column. I manually adjusted all three stages to be 80%. I could also adjust the sprayer stages to be different from the upper process water sprayers if needed. My actions here were strictly to match the simulation output to the measured/BOD value.

Q: What form is the lost 50% Hg in? Hg2S?
Not in this case study, because the sulfur was not reduced in the flue gas or the limestone (FeS2 is sometimes present). So, in this case study Hg+2 was dissolved in the water, and left with the water, not as a solid. In real cases, Hg could precipitate as HgS or it could adsorb onto any metal-oxide particles like Al(OH)3 or perhaps Fe(OH)3 if the Fe+2 from the limestone oxidizes to Fe+3. Again, this is something we'll want to explore in future spotlights. More information about upcoming and future spotlights will be published on OLI's website: www.olisystems.com.

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