Plant Smith - Summary of PM Emissions Associated with MATS Controls

Plant Smith Units 1 and 2 are equipped with both hot-side and cold-side electrostatic precipitators (ESPs). As part of the MATS compliance projects that are under consideration, each of the hot-side ESPs will be converted to cold-side ESPs. The ESP conversions are being performed to improve the PM removal efficiency of the ESPs. The hot-side ESPs on Units 1 and 2 currently have design filterable PM removal efficiencies of 99.1% and 99.2%, respectively. These ESPs are also followed by additional cold-side ESPs on each unit designed to remove an additional 98% of the remaining filterable PM. As such, the injected dry sorbent and activated carbon contemplated for MATS compliance in each unit will be removed by two precipitators in series.

Below is a conservative analysis of the PM emissions that will result from the injected materials. The analysis assumes that each unit operates 100% of the time at full load (i.e., 100% capacity factor) and that the ESP performance remains unchanged even after conversion from hot-side to cold-side. The analysis shows the maximum amount of filterable PM mass that would be emitted as a result of the injected materials.

<u>Smith Unit 1</u>

<u>Dry Sorbent</u>

Injection rate = 5000 lb/hr

Injected mass = 5000 lb/hr x 8760 hr/yr x 1 ton/2000 lb = 21,900 tpy
Emitted mass after ESPs = 21,900 tpy x (1-0.991) x (1-0.98) = 3.94 tpy

<u>Activated Carbon</u>

Injection rate = 5 lb per million ft^3 of exhaust flow
Exhaust flow = 885,645 acfm

Injected mass = 5 lb/million ft^3 x 885,645 acfm x 525,600 min/yr/ 1,000,000/2000 lb/ton = 1,163.74 tpy
Emitted Mass after ESPs = 1,163.74 tpy x (1-0.991) x (1-0.98) = 0.21 tpy

Total PM from Dry Sorbent and Carbon = **4.15 tpy**

<u>Smith Unit 2</u>

<u>Dry Sorbent</u>

Injection rate = 6000 lb/hr

Injected mass = 6000 lb/hr x 8760 hr/yr x 1 ton/2000 lb = 26,280 tpy
Emitted mass after ESPs = 26,280 tpy x (1-0.991) x (1-0.98) = 4.20 tpy

<u>Activated Carbon</u>

Injection rate = 5 lb per million ft^3 of exhaust flow
Exhaust flow = 1,066,600 acfm

Injected mass = 5 lb/million ft^3 x 1,066,600 acfm x 525,600 min/yr / 1,000,000 /2000 lb/ton = 1,401.51 tpy
Emitted Mass after ESPs = 1,401.51 tpy x (1-0.991) x (1-0.98) = 0.22 tpy

Total PM from dry sorbent and carbon = **4.42 tpy**

PSD significance levels:
    PM   25 tpy
    PM10   15 tpy
    PM2.5   10 tpy

As can be seen the maximum PM emitted as a result of the injected material even with conservative assumptions is well below PSD significance levels. Note, however, that these units would be expected to operate much less than 100% capacity factor, and to have improved ESP performance after the hot-side to cold-side conversions.