Appendix B: SCR on Eastern Wall-Fired EGUs

Here is a look at real-world hourly CAM emission data for wall-fired eastern EGUs retrofitted with SCR and operated during the summer ozone season:

[attachment “2006 Wall-fired Dry-bottom Eastern EGUs with SCR charts.xls "]

We see a consistent pattern of reductions from 0.3 - 0.6 lb/mmBtu down to 0.05 lb/mmBtu when the SCR is operating on these wall-fired EGUs. If we take a closer look at the period when the SCR was actually operating, we find the following operating statistics:

[attachment "2006 wall-fired EGU Ozone Season summary data sheet.xls"]

The summary table indicates that there is little variation in average emissions depending upon averaging time. For example, the average ozone-season average NOx emission rate was 0.041 lb/mmBtu, the average 30-day average was 0.041 lb/mmBtu, and the average 24-hour average was 0.042 lb/mmBtu. Because most cost-effectiveness calculations should be based upon annual averages, it seems appropriate to assume an annual average emission rate of 0.04 lb/mmBtu for that task.

The median values showed a little more variation than the average values, and lower than the average values, indicating that the distribution is skewed slightly by some of the higher emission rates.

Because the BART Guidelines recommend a maximum 30-day rolling average, we also have data for this parameter and it indicates much more variation, as one might expect for this extreme value.

The bottom section of the table is most important in that it attempts to relate the ozone-season average emission used in the cost calculations the 30-day average emission typically used in establishing permit limits. This data appears to support a 30-day limit of 0.06 lb/mmBtu.

However, because these EGUs are only required to meet mass emission limits--lb/hr instead of lb/mmBtu, the SCRs may be “tuned” to meet a lb/hr target instead of lb/mmBtu. So, as load drops, there is no reason to maintain the SCR efficiency (and the lb/mmBtu rises), as long as the lb/hr target is met. If that is the case, then it is probably more useful to look a the ratios of the mass emission rates to determine the true ratio of maximum 30-day average to annual average emissions if the SCR were always operated to maximize its effectiveness; the tabulated results indicate that this ratio is 1.4:1 for these EGUs.

If we can assume that a modern SCR retrofit can achieve 0.04 lb/mmBtu on an annual average, and that an SCR that is operated to achieve its maximum effectiveness would typically result in maximum 30-day average emissions no more than 1.4 times the annual average, then we could assume that a 30-day rolling average limit of 0.06 lb/mmBtu would provide more than an adequate margin of safety for the EGU to operate.