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Planning for the Utility MACT

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On March 16, Environmental Protection Agency (EPA) proposed Mercury and Air Toxics Standards (“Air Toxics Rule”) for coal-fueled electric power generating plants. The rule was based upon the Maximum Achievable Control Technology (MACT) provisions of the Clean Air Act Amendments. The MACT process involves establishing emissions limitations on 187 listed hazardous air pollutants (HAP) based upon the average emissions of best performing 12 percent of plants. The rule is scheduled to be finalized by November 2011. Power plants will then have 36 months to specify and install control equipment to meet a compliance deadline of November 2014.

Planning for the upcoming MACT in combination with other regulations such as the Clean Air Transport Rule (CATR) will require significant effort to minimize risks and costs. ADA Environmental Solutions (ADA) is assisting plant owners to analyze existing emissions and develop potential compliance scenarios. The most significant aspect of these evaluations is determining which plants may require the addition of large capital equipment such as scrubbers and baghouses and which plants can achieve compliance with low-capital cost technology such as activated carbon injection (ACI) for mercury and dry sorbent injection (DSI) for SO₂, acid gases, and condensable particulate matter. This is determined by an analysis of the capabilities of the existing equipment at each plant and the new emissions standards. Now that the proposed rule is released, operators can narrow the potential compliance options and refine their decision deadlines. The incremental cost per kW of retrofitting emission control equipment is inversely proportional to the size of the plant. An additional consideration for small units, especially older, less efficient plants, is the capital breakeven point between retrofitting and replacing the power with other options such as new gas combined cycle plants. Therefore, for many older plants and/or smaller power plants, an approach that avoids large capital expenditures is often preferred and could lead to a reduced number of forced retirements.



With tight compliance deadlines, decisions for all levels of capital projects must be made early to provide sufficient time for procurement, construction, and startup of the new equipment. Due to competition for resources during periods prior to regulatory implementation, plants should start the evaluation of options as soon as possible. Some plants began initial planning efforts before the proposed rule was announced to make sure there was sufficient time for thoughtful planning and implementation. For this multi-pollutant regulation, retrofits must be designed to meet compliance

levels for several pollutants, leading to more than one configuration change; such as the addition of both a scrubber and a fabric filter. Retrofitting a unit with a scrubber will require higher capital investments and a longer timeline than other retrofits such as a fabric filter for particulate control, dry sorbent injection for acid gas, and condensable particulate control, or an activated carbon injection system for mercury control.

EPA proposed emission limits on three subcategories of pollutants and a work-based standard on a fourth:

- Mercury – limits should prevent

91 percent of mercury in coal from being re-leased to the air

- Acid gases, using HCl as a surrogate for units without scrubbers
- Non-mercury metals such as arsenic and chromium
- Organic air toxics (including dioxins) will be addressed with a work practice standard.

The primary performance data used to establish control limits were from the recent EGU MACT information collection request (ICR). A review of the ICR data provides information on the air pollution control configurations that represent the top performers. It is not surprising that units with fabric filters, either installed as the primary particulate control or as a polish downstream of an electrostatic precipitator, represent the majority – over 60 percent – of the top performers for particulate matter. We expect many plants to consider retrofitting with a fabric filter, which also has the benefits of decreasing the costs of mercury control when using activated carbon injection, due to lower sorbent requirements. EPA has proposed a compliance level for total particulate matter, which includes both condensable and filterable fractions. Sulfuric acid contributes to the condensable fraction. For many units firing higher sulfur coals, especially those with SCRs, the level of sulfuric acid in the flue gas will require additional control such as DSI.

Most of the top performers for HCl are configured with scrubbers. However, the proposed limit is such that some units firing lower chlorine coals – for example PRB – will achieve compliance without additional controls and many can achieve compliance with trim technologies. Fabric filters in conjunction with dry alkaline sorbents will also achieve some HCl trim, which could obviate the need for a scrubber to meet HCl limits on units firing low chlorine coals. Several plants in the eastern US are reviewing options to meet the current or projected SO₂ regulations associated with CATR. These include both scrubber upgrades and new installations, which will provide co-beneficial HCl control and may improve mercury removal at some plants. Because scrubbers have been demonstrated to be effective at removing HCl, EPA has proposed that SO₂ can be used as a surrogate for acid gases on units with scrubbers. Wet scrubbers are not as effective at removing sulfuric acid, however, so they may require DSI in addition to a wet scrubber to meet the particulate limit on some units.

In order to meet expected demand resulting from the Air Toxics Rule, ADA has expanded its capabilities for testing and measurement services to evaluate various control options such as ACI for mercury, coal additives for mercury control, and dry sorbents for acid gas control. We are also using experience gained during the initial mercury control market, when 150 ACI systems were installed to meet mercury limits in 19 states and Canada. To prepare for the larger market we are expanding capacity to fabricate a more standard ACI system design as the market is expected to grow to 400-600 systems over a three year period. We are also offering DSI systems for acid gas control including HCl and sulfuric acid.

We also predict a need for expanded production of activated carbon (AC). To meet the shortage created by the State mercury market, ADA Carbon Solutions completed construction and is now operating its new coal-based AC production plant in north-west Louisiana that has the capability of making 150 million

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pounds of AC per year. To satisfy the demand for up to a billion pounds per year of AC that will be required for a Federal MACT rule, plans are in place to build additional AC production plants.

It is important to begin planning early to meet the rapidly approaching compliance schedule. ADA offers low CAPEX solutions, including ACI systems for mercury control, DSI systems for acid gas and condensable particulate control, as well as insights into how different control options may interact in a regulatory future, where impacts to the flue gas, fly ash, landfills, and water discharges must all be considered. ♦

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