CIBO Regulatory Compliance Workshop
August 2, 2007
Portland, Maine

I. Wet/Dry Scrubber Fundamentals Workshop - Carl Bozzuto, Alstom Power

Carl reviewed the fundamentals of wet and dry SO2 scrubbing systems, covering lime and limestone systems as well as sodium based systems. System equipment includes the absorber itself, the spray system, the additive handling system, and any solids handling equipment. Rough cost comparisons were given for the various systems in order to show a relative comparison of the different systems. It was pointed out that cost escalation has been severe in the past 3 or 4 years and any costs are only a snapshot in time. With the increased activity at the utility level, plus the pressure from the IGCC suppliers, the permit process at the utility level is driving down the emission levels for SO2.

II. The Complexities of Corporate Energy and Environmental Decision Making - John DeRuyter, E.I. Dupont de Nemours & Company

The corporate pressures come from serving stakeholders, which include shareholders, customers, communities, and employees. Each of these groups has different concerns and priorities. Most large companies have established certain core values. Health and safety is of very high concern for chemical companies. Usually the goal is “zero lost work” incidents. Environmental stewardship, ethical behavior, and respect for individuals are typical goals. There are often internal corporate goals. At DuPont, one energy related goal is to hold energy use to 1990 levels through 2010. Another is to obtain 10% of energy use from renewables. Sustainability, water consumption, fleet fuel efficiency, and effectiveness of environmental management represent other corporate goals.

International competition impacts most of our businesses. Environmental pressures in the US are different than some of global competitors. Energy prices are high and volatile. The infrastructure is aging as is the workforce in many of the fundamental manufacturing industries.

Price projections for fuels and materials are a guess. The DOE EIA forecasts look optimistic today. No one really knows the price of fuels out in the future. Yet investment decisions have to be made with longer term projections of costs and returns. Energy costs are variable costs for most products and are dependent upon product mix, price level, and weather.

For a “Greenfield” project, time is needed for R&D, process development, reviews, and optimization. There are always limitations on capital. Facilities with pounds out the door have priority. Energy efficiency that directly impacts the product will get notice. Pure energy efficiency improvements often do not get priority. Retrofit projects need a funding mechanism. Projects that increase production tend to win. Operation and maintenance is a continuous process that needs to be examined for opportunities on a routine basis. The environmental drivers include existing permit, SIP call units, BART eligible units, Boiler MACT, PM2.5, NAAQS reductions, climate change initiatives, PSD/NSR implications, and local issues.

Fuel option limitations are driven by existing equipment capability. Typically coal cannot be fired in a gas fired package boiler. Stoker fired boilers have fuel specifications. PC units might be able to fire gas and

oil. Existing coal fired units are nearly always cheaper to operate than gas and oil fired boilers. Land fill gas has a lower heating value than natural gas, impacting burner and fuel line performance. Process off gas may not have enough heating value to sustain stable combustion. Natural gas is not available everywhere. Biomass is not economical if a new boiler is needed to burn the fuel.

Evaluation of fuel and energy supply alternatives can take different forms depending upon complexity. World demand for basic materials are driving costs up. Labor shortages are showing up across the board (welders, boiler makers, start up engineers, etc.). Risk analysis can help provide perspective on the problem, but is complex and costly. As an example, a plant built in the 50s with solid fuel boilers may have had additional boilers added over the years along with modest environmental equipment. The plant infrastructure is aging and needs attention. Due to efficiency upgrades, the steam load is lower so the boilers are operating at reduced loads. Staffing has been reduced to remain competitive. The community has suffered from job losses (roughly 8 jobs lost in the community for job lost at the plant). Now some new environmental regulations are driving the need for additional environmental equipment. The plant product is barely profitable. Now a decision has to be made.

III. Considerations of ICI Boilers in State and Regional Environmental Decision Making - Andy Bodnarik, New Hampshire Dept. of Environmental Services

The process starts with the identification of the air quality goal or goals. Baseline levels need to be identified. Control processes and their performance need to be identified. Sources need to be located. For Regional Haze, the goals are to prevent impairment of visibility and to return visibility to natural levels by 2064. The process requires “reasonable progress” toward that goal with the first milestone being in 2018. The regional group is MANE-VU. Air modeling is done. Sources are identified. Individual sources are modeled to determine impact. Key pollutants need to identified for visibility impairment. For the Northeast, sulfate particles are the major source of visibility impairment. SO2 is the pre-cursor to sulfate particles. The major sources of SO2 then need to be identified.

Electric generating units are the largest source of SO2. Heating oil, kilns, and domestic wood stoves all contribute to haze impairment. For heating oil, lower sulfur fuel is the easiest sulfur control approach. Costs will likely increase. Compliance time has to consider the phase in of the fuel. For ICI boilers, fuel switching, combustion controls, sorbent injection, and wet scrubbers are all potential control options. There is a large range of costs. The compliance time is 2 - 3 years after the rule is adopted. Energy and environmental impacts need to be considered. Cost estimates range from a few hundred $/ton SO2 to many thousands of $/ton. A technical support document is prepared which identify a suite of control measures. Resolutions and policy statements are issued. Consultations are undertaken with other states and regions. Resolutions are then adopted. These contain a set of principles for implementing the Regional Haze rules. Consultations go all the way to Georgia, Tennessee, and the Great Lakes.

The policy statements set up a course of action toward reasonable progress. Implementation of lower sulfur oil, control equipment for EGUs, reductions for non-EGUs, etc. are all laid out through 2018. Requests are made to the other states, such as the mid West to obtain reductions from those states transporting criteria pollutants into the Northeast. There is a revised federal 8 hour standard for ozone, a revised federal PM2.5 for NAAQS, and some impacts from the Boiler MACT decision. All sources are being affected. All regions are being effected. Lower sulfur fuels and additional controls are likely.

IV. Industrial Emissions Control Technology Guidance Document Overview - Kevin Dougherty, Fuel Tech, Inc.

Drivers for NOx control for non EGUs include RACT (8hr), Ozone (8hr), SIP call, CAIR opt in, Regional Haze, PM2.5, NSPS, and ACOs (administrative compliance order). Flexibility is critical for non-EGUs. Specific needs and characteristics of non EGUs are different for different industries (i.e. forest products, chemical processes, refineries, steel, food, automotive, etc.). The role of modeling needs to be assessed. The feasibility for options may well depend on the experience base with certain types of technology. The guidance document will update the CIBO NOx RACT document and will add to that SO2 scrubbing and the particulate collection systems.

V. General Discussion - Fred Fendt, Rohm and Haas Company, Facilitator

One issue that was brought up was the "pick and choose" permit process, where permit levels are selectively taken from different data sets and different plants with differing fuels and driven into a permit request. Guidance documents can be helpful in addressing some of these issues. Digging into the background of the data in question is important. Some permits are in the BACT clearinghouse database are for plants that were never built. Unfortunately, a lot of homework needs to be done to find all of this data.

The question of costs for these projects and the cost considerations to be used for RACT or BACT determinations was raised. It was noted that there are cost models on the OTC web site that can account for the full cost of projects and allow for retrofit difficulty factors. More data is needed for costs on smaller units. At least in the Northeast, utility cost figures for large projects are not being quoted as reasonable costs for smaller plants. One question was why $/ton is used as a figure of merit. This stems from the trading system that prices allowances in $/ton. On an economy wide basis with trading, this approach drives projects that have the lowest cost/ton to be undertaken rather than projects with higher cost per ton as a benefit to the economy. As projects get smaller and smaller, the cost per ton goes up. Further, the smaller sources are not as uniform as the larger sources, leading to greater variability.

Another question that was raised was cities and communities that are basically exempt from area source controls. Traffic lights, traffic flow, public transport, etc. can influence the level of pollution and emissions. With cities and towns being exempt, little is done on this problem. It was pointed out that Houston tried to implement limitations such as lawn mowing hours, time of day controls, etc. Every one of these restrictions was restricted due to local unpopularity. This is a political problem that requires political solutions. Leaf burning was successfully banned with municipal collection and pick up of leaves. Community outreach, public education, and incentive programs are being utilized to help address program. It is a long process and very expensive.

As the Northeast shares a border with Canada, cross border issues need to be addressed. Canada does contribute to regional haze in the area. Some states have met with Ontario and would like to meet with Quebec. The Canadians complain that the mid West has been shipping pollution to Canada. At the meeting, the province of Ontario announced that the largest coal fired plants would be shut down in the next 10 years. That left the "glide slope" approach looking like a delay tactic. Replacement of the lost power could be an issue. A new nuclear plant has been announced (2016?). Energy efficiency is being

pushed. More hydro will be required. Timing will be an issue, as growth is anticipated on both sides of the border.

The “opt in” provisions could allow smaller units to buy allowances in the future. The banking provisions stimulated early reductions with banked allowances. With the CAIR program, the value of these allowances may be diminished. The size of the banked allowances was of concern. There were similar concerns for the NOx program, but the size of the available allowances is smaller. Further, more units were required to add controls rather than buy allowances.

Another issue is new technology introduction. Some flexibility is likely to be needed in order to bring a new technology on line. However, enforcement issues come to the fore if the unit does not meet the specific regulation. The typical answer is “enforcement discretion”. Although DOE does have some help for demonstration programs, they are looking at 250 Mw size levels for their projects. The smaller industrial boiler is not really eligible. Companies that have put in controls in anticipation of Boiler MACT do not want get penalized in the next round of enforcement.

One idea for ozone attainment is so called “smart NOx control”. The concept would involve predicting about 2 days ahead that an ozone event would occur. At this time, controls would be implemented to mitigate the NOx and hence the ozone. There are a number of issues including the forecasting, the price of credits during the incident, the types of controls to be mandated (including shut down?), emergency generation, and peaking generation. The value would be that during the rest of the time, a less stringent standard could apply with a lower NOx price. On the industry side, there could be some opportunities. Batch processes can be rescheduled. Switching to gas during an emergency might be cheaper if coal could be used the rest of the time. The forecasting problem has risks on both sides. Calling an emergency that doesn’t pan out is one risk. Worse would be not calling an emergency that showed up. Some aspects of this type of control were instituted for high energy demand days. In this case, the peaking units come on that do not have controls which increases the NOx level that exacerbates the problem.

With regard to outreach to help industrial plants, the DOE tools for steam systems and efficiency are very helpful. There is never enough training. Making the free training seminars more available at more times would be helpful. Working more closely with CIBO about getting information out to our industrial members would also contribute. Understanding the process and finding the resources is a big hurdle for getting projects initiated. Another area is the programs and funding sources that are available from the states. Digesting such information and making it available in a simplified manner would be useful, as plant managers don’t really have the time to scour the web. DOE does have some programs. Getting together with them could promote better use of their tools. Augmenting the Energy Star program as well as other reward or recognition programs could also provide additional incentive to move projects forward.