

CIBO 31th Annual Meeting Summary

October 14-16, 2009

The Omni La Mansion del Rio

San Antonio, Texas

I. Opening Session

John C. deRuyter, E.I. DuPont de Nemours & Company, CIBO Chairman

John deRuyter, E.I. DuPont de Nemours & Company, opened the meeting by introducing the new members and guests. Although there is a full agenda, participation is encouraged. CIBO continues to enhance its reputation as a broad based organization providing balanced information and input on energy and environmental matters important to industry. The number of issues have increased at an overwhelming pace. The membership provides inputs and comments that give focus and direction to CIBO activities. Membership is a critical effort for CIBO. We will be proposing a new class of membership in an effort to increase and enhance CIBO membership. Litigation activities continue at a rapid pace. Contributions to the litigation fund are greatly appreciated. The usual “ around the room ” introductions was done prior to the membership report.

II. The Convergence of Energy, Environment, and Economy

Jim Connaughton, Constellation Energy

Bob Weyland, US EPA

Nick Speyer, SourceOne, Inc. – A Veolia Energy Company

Jim Connaughton, Constellation Energy, was a member of the Bush Administration before joining Constellation Energy and is currently handling the litigation between Constellation Energy and the State of Maryland over the acquisition by EDF. Jim opened the session with an overview of energy and the economy.

At the peak of energy demand in the middle of last year, we sent \$700 billion overseas for oil. This amount was roughly equal to the first stimulus package. On the environment side, we are spending tens of billions of dollars on existing regulations, not counting those rules implemented by the Bush administration or those rules that are now being tightened. Offsetting those expenditures are estimated health benefits, claimed to be hundreds of billions of dollars.

Climate change costs could run into the trillions of dollars in the future with benefits that are harder to quantify, as the impacts are in the future to an extent not yet predictable with any certainty. Of the energy contribution, 50% of the CO₂ emissions comes from coal fired electric generation and 20% from transportation. For coal fired power, there are only two choices. Either carbon capture and sequestration can be done successfully or coal can't be used. On the transportation side, we have the same problem only for oil. Only electricity can provide the mobility for transport, presuming a limit to the amount of biofuel that can be developed. Electricity gets back to coal firing. If oil and coal can ' t be

used, renewables and nuclear are the only available alternatives. There is a limit to the amount of renewables that can be implemented. Even generous assumptions only come to 20 or 30% supply by renewables. That means 70% of the supply would have to come from either CCS or nuclear.

There are already in existence 9 US mandates (7 federal and 2 regional) covering a variety of GHG/energy issues. The new CAFÉ standards are already in law. There is a law on lighting standards (incandescent bulbs will be outlawed). There are energy efficiency standards on appliances. The ever increasing air quality standards will drive power generation away from fossil power. There are renewable fuel standards. There are 30 states with regional GHG requirements. Most states are adapting or will adapt the federal building standards for increased building efficiency. There is an agreement for accelerated reduction of chlorofluorocarbons that extends the Montreal Protocol. These compounds are much stronger GHGs than CO₂. There are federal subsidies for energy efficiency and reduced fuel use. With these existing mandates, some 8 billion tons of CO₂ equivalent will be reduced. With the goal of reducing the international generation of CO₂ by 40 billion tons, the US has in place the standards necessary to meet a 2020 standard, without any new legislation.

After 2020, more would need to be done. This is really the source of the debate going on now, as the proposals are relatively modest to 2020, but ratchet up strongly during the decade of the 2020s. With regard to used nuclear fuel storage, eventually recycling will become a requirement. The storage on site has been reliably demonstrated. Currently, about half the on site storage has been used. That can be increased. Current fuel practice only uses 10% of the available energy. Recycling the fuel doubles the amount of use, which reduces the storage requirement by half. There is enough storage available for decades to come. With regard to energy security, the key is to move to electric vehicles which substitutes electrons for imported oil.

The electric generation would have to be primarily domestically sourced (i.e. nuclear, renewables, gas, and coal). Constellation estimates that these vehicles could be charged at night for 60 cents/gallon with nuclear fuel. This savings over gasoline would pay off the additional first cost penalty of the hybrid electric vehicle. With regard to costs, a "valid" cost of equipment has not been agreed upon. Constellation is basing their numbers on the AREVA design with 5 plants. If fewer plants are built, costs per Kw will increase. Also, the penetration of hybrid electric vehicles alters the economics (capacity factor, scale issues, fuel value, etc.).

Bob Weyland, US EPA, is the leader of the Energy Strategies Group at the US EPA looking at GHG approaches. The EPA is moving forward on GHG regulations. The administration has made it clear to the agency that they should move ahead without waiting for the US Congress. Electric generation in the US is 72% fossil and 19% nuclear. Hydro is now 6% and renewables are 3%. Renewables are doubtful as a reliable source of base load power. A coal plant takes on the order of 50 months and a nuclear plant takes on the order of 100 months to put into operation. That means that a new nuclear plant will have a tough time contributing to a 2020 reduction.

The changes underway in regulations were initiated under the Clinton administration. They are still moving forward. The Clean Air Act is old and out of date. Change is needed. However, the legislative process is slow and convoluted. The new Utility MACT standards are going to make it more difficult to continue to burn oil in utility plants. There are still some 17 Gw of oil plants left in the US. These will likely shut down or convert to natural gas. This will likely drive up the cost of home heating in the US. Emissions of fine particulates, nitrates, sulfates, and acid rain have all come down since 1990. The announcement of the CAIR rule prompted industry to invest \$15 billion on SO2 scrubbers and SCRs. In spite of the vacatur of the CAIR rule, it was a remarkably successful program. The CAMR rule was vacated and will now be supplanted with the Utility MACT. The comment period ended at the end of August. The next steps include review and assessment by the agency. A total of 880 units are proposed to require testing.

Based upon testing done by the industrial units, a number of HAP will not be tested as the results showed that these are not a problem. The Utility MACT will "drive the train". The standard for the chloride will likely set the need for scrubbing. The mandate for the scrubber would automatically reduce SO2. These reductions would not be available for trading. As a result, NOx will be the driver for CAIR. Oil firing will be separated out as a separate class for Utility MACT. The source categories for the revised CAIR are under consideration. The number of states is still undecided.

For the Industrial Boiler MACT, the Area Source MACT is almost done. The major source piece awaits the conclusion of the test program. The no emissions reduction floor will have to go away. The HBCA is on the table. There are meetings scheduled on the topic. However, inclusion will be difficult.

The CISWI rule and the definition of solid waste is going on in parallel. EPA 's Office of Solid Waste is leading the development of a definition of solid waste. OSW is holding to the concept of something that is discarded as being a waste. Units that burn waste have to be taken out of the boiler classification. These two rules need to be coordinated as a result.

The survey database has over 1500 facilities with 13,000 boilers. Many are very small boilers firing gas. The major issues include sub categorization (boiler type, fuel type, industry type), the use of surrogates, HAP for gas, HBCA, and treatment of units that installed controls to meet the vacated rule. EPA is struggling with these issues as they are coming together in a bottleneck.

Policy issues on the statutory side include NSPS, MACT, NAAQS, Permitting Issues, and Definition of Solid Waste. Legislative issues include the various GHG bills and energy bills. All of these issues are inter-related and that implies the potential for train wrecks if these activities are not coordinated and dealt with in a holistic manner. In the solid waste debate, the air side is heading towards allowing "clean biomass " to be classified as fuel. Further, these units would come under the Industrial Boiler MACT and not Utility MACT. This is because the definition of Utility MACT covers only plants

using fossil fuels. Since biomass is not classified as a fossil fuel, the unit burning biomass would not be classified as a utility unit and would fall under Industrial Boiler MACT.

Nick Speyer, SourceOne, Inc. – A Veolia Energy Company, which was founded in 1997 and purchased by Veolia in 2007. SourceOne does energy management and GHG assessments worldwide. Veolia is a large water technology company and is more known for purchasing TriGen Company, which operates steam systems in many cities in the US. Nick presented a case study on a biotech company in Cambridge, MA. Expensive electricity and district steam utilities, along with unreliable service were the main drivers. For this biotech company reliable electric supply is mission critical. A 5.2 MW gas turbine with a duct fired HRSG was proposed as the backbone of the new central plant. Aux boilers and city steam are available for backup. Grid electricity and emergency generators are also available. The capital investment was \$12 million. Savings amounted to \$2 - 4 million/yr. With the reduction of natural gas costs, the system is now saving \$2 million/yr, but the early operations practically paid off the investment.

The plant gets up to 85% efficiency for combined electric and thermal efficiency. The plant has been very reliable with only one unplanned outage during the first 3 years. Most of the savings come from the summer and winter months. While reliability was the main driver, the total GHG reductions amounted to 11% as a result of the increased efficiency. As a result, the City of Cambridge cited the plant for a “Go Green” award. There has been NPR exposure and tours of the facility are now routine. Now the sustainability aspect is the project highlight.

While the project is a success, there is increased risk. These include increased direct exposure to natural gas volatility, indirect exposure from electric and steam purchases, active portfolio management, complexity, and portfolio management. What make this work is the appropriate load shape, energy costs, tax credits, RES, GHG considerations, and carbon risks. Sustainable projects that are not economically justified are not sustainable. This project saves as much CO₂ as a 5 MW wind farm, but is much less expensive.

III. Project Applications and Development

Ben Schlesinger, Galway Group

John Huryn, The Babcock & Wilcox Company

David South, Technology and Market Solutions, LLC

Peter Anderson, Environmental Resources Management

Vince Albanese, Fuel Tech, Inc.

Ben Schlesinger, Galway Group, has been a past president of the American Natural Gas Association and has nearly 40 years experience in the gas industry. A key feature of the gas market is that gas well drilling has responded to changing gas prices. The Henry Hub price has become the marker price for North American gas prices traded on the various changes. The North American rig count has dropped by 60% since the price of natural

gas dropped during the recession. With the application of horizontal drilling to shale formations, the North American supply is now self sufficient.

Proved reserves are reported by the EIA. The estimated reserves include probable, possible, and speculative reserves. Most of the shale gas is in the possible reserves. The spectacular growth has been in the Fayetteville and the Marcellus shales. The Marcellus is close to the Northeast markets, but the pipelines are not adequate. The shale formation wells drop off in production quickly. This means that for shale formations to continue to be productive, there has to be continued drilling. However, drilling is down right now.

Gas demand consists of residential, commercial, industrial, and electric generation. The residential and commercial markets are stable. The industrial markets have been in decline for the last decade. The power markets had a major surge of plant capacity in the late 90s and early 2000s. There will likely be another surge in the next decade as electric demand increases and new plants are currently not being built.

A number of LNG receiving terminals have been built. Current capacity is 12 BCF/day. However, actual imports are under 1 BCF/day. LNG will likely be traded across the Atlantic (both ways) depending upon current price. The futures prices expect that LNG will move away from the Gulf Coast toward Europe. In the winter, there will be a lot of LNG imported to the US. North American gas is well below the crude oil price in \$/MMBTU. Global gas supplies are long, but demand is down.

Pipeline constraints are holding off some of the shale gas. World gas markets will increasingly affect US buyers. Prices will remain low for a couple of years (to 2012), but then price volatility similar to the last 10 years will result.

John Huryn, The Babcock & Wilcox Company, reported on a boiler supplier's view. Process steam flow requirements need to identify as gross or net. Lead time volatility varies greatly with equipment supply, shop load, and prior commitments. Sometimes the spec is too detailed. A very thick specification with 2 weeks to bid is likely to cause a no-bid or a budget bid. If not, more contingency might be added to the price. Insufficient time is related to the thick spec. Too little information is not good either. Enough information is needed to guide the design process. Set the emissions specification to what is really required. Added reductions result in added cost. Learn the technology from the suppliers and purchase based on the technologies that result in the lower overall project cost. Absolute low price creates incentives to cut corners, which could lead to higher O&M costs during the project. Open book projects can help assure that cost factors are as reported. Finally, only request firm price bids when needed. Projects that still need approvals should be budget bids. It helps the suppliers as well as providing reasonable information to the project owners.

David South is president of Technology and Market Solutions, LLC. He reported on industrial energy alternatives. There are a number of competing challenges in the industrial market. These relate to energy, environment, economics, and the market. Fuel prices, fuel supply, carbon intensity, and energy efficiency all impact the cost of energy,

which in turn impacts the economics. Environmental requirements not only impose costs, but also reporting requirements due to Sarbanes Oxley. Finally, the overall market provides the basic demand level for industrial products. Energy alternatives can possibly provide flexibility and optionality. There could be opportunities to avoid or reduce costs.

Legal situations could be avoided sometimes by having the option for an alternative. Hedging is a good practice, but it is not perfect. Fuel supply risks should evaluate the life cycle and supply chain effects. Energy efficiency implies avoided energy supply. As time goes on, more of these impacts will have cost or price value. Thirty states have some kind of renewable portfolio standard. Most of these states are not going to make their targets. Consequently, penalties will be assessed, which will serve to drive up costs. Some renewable fuel use can provide renewable energy credits (RECs).

Increased efficiency reduces emissions and waste disposal costs. Co-firing of existing boilers with biomass or industrial byproducts can reduce the environmental impact. New facilities can incorporate solar or renewable energy options. There are a variety of national and state incentives to use these sources which can provide revenue streams to improve project economics. Stimulus funding provides for loan guarantees and grant funds. The grant funds convert tax credits into cash. State funding is also available in many states. RPS deadlines are approaching. Fuel flexibility provides supply, delivery, price leverage, and options for GHG compliance. State and regional programs are already in place for GHG regulations. Federal programs will be in addition to these programs.

Vince Albanese, Fuel Tech, Inc., is senior vice president for environmental affairs for Fuel Tech. Vince gave some comments on environmental compliance risk. While many in industries made a plea for regulatory certainty, the CAA is not set up to truly allow that. The NAAQS must be reauthorized every 5 years. The HAP regulations are to be revised every 8 years. The visibility rules provide for a “glide path” that can be used to make adjustments to the requirements if the path is not achieved. Familiarity with the statutory provisions is a requirement.

Technical due diligence on control technologies can save a company money. Combinations of technologies could be less costly and more effective than monolithic selection of one technology for control. Production cycles, maintenance schedules, and Best Operating Practices issues need to be considered. The technology supply chain should be well understood particularly with regard to assigning performance risks. The concept of value at risk is a means of helping to understand risk issues associated with environmental requirements.

The CFO 's office needs to know the required CAPEX for environmental compliance now and in the future. Companies must disclose environmental liabilities and sources affected in their Annual Reports. Further publicly held companies could face lawsuits if the stock is downgraded because of unreported environmental liabilities. In a sample company, the annual emissions for NOx and SO2 were 32,000 tons of NOx and 40,000 tons of SO2. With NOx at \$3,000/ton and SO2 at \$500/ton, the total value of emissions leaving the stack is \$58 million. This level of money qualifies for asset management.

Peter Anderson, Environmental Resources Management, reported on the carbon aspects of industrial energy and environmental programs. The new world agenda compels these issues to be inextricably linked. The heightened focus on energy management is driven by cost issues as well as environmental issues. An integrated strategy leads to operational efficiency, reduced costs, and reduced environmental footprint, including GHG emissions.

Energy sources include traditional fuels, cogeneration, biomass, renewables, and low carbon impact fuels. Energy efficiency programs include boiler efficiency, steam systems, heat containment, heat recovery, process cooling and air compressors. The impacts from these programs add up to maybe 10%. This is important, but not a game changer. Other options include carbon markets, offsets, RECs, and green power.

It seems like everyone wants to know about your carbon emissions. Senior management, EPA, Congress/Administration, State agencies, shareholders, employees, students, SEC, investors, customers, other stakeholders, and environmental groups. With regard to GHG legislation, there is still a long way to go in the debate. Before the final legislation passes, the likely inclusions are emphasis on decarbonizing power generation, investment in energy efficiency, and the promotion of “ clean ” technology. Even a small emitter at the level of 25,000 ton CO₂/yr could face an annual cost of over \$600 K with \$25/ton CO₂ allowance cost.

EPA is moving forward under the CAA, which is not the ideal instrument and may have unwanted consequences. Many companies are now requiring GHG impacts of a project as part of capital appropriation funding requests. GHG project identification is part of strategic planning. Some companies are looking to gain strategic advantages by being “ ahead of the curve ” with regard low impact technology projects. Strategy development is needed now in order to minimize the impacts of operating in a carbon constrained world. Quality data is needed. Energy efficiency successes need to be documented to take advantage of any potential benefits for early action, etc.

III. What did we hear?

Scott Darling, Alcoa, Inc.

Gary Merritt, Northern Star Generation

Robert Stemen, Applied Heat Recovery

John Kuhn, Celanese

Ann McIver, Citizens Thermal

Scott Darling, Alcoa, Inc., pointed out that there used to be over 30 aluminum smelters in the US in the early 70s and there are now less than 10.

Gary Merritt, Northern Star Generation, started off with admonition that the past is being used against industry and that legacy issues are important. In any project, it is important to know the past history in order to understand how to proceed. Perception is

reality in politics. The people who are now making decisions regarding the environmental actions have been presented with industry 's past indiscretions and have no knowledge of what has been done to correct the problems. Facts are being interpreted to be something that fits perception.

Today, facts are being presented to imply a problem. Pictures from the 1930s steel mills and power plants are used to communicate the picture that coal mining, coal fired plants, and steel making are dirty operations that need to be controlled. Cumulative impacts of regulations are not presented. Costs include cost of energy, cost of products, employment, cost of education, cost of health care, cost of government, cost to government (the government is the largest consumer of electricity), and competitiveness.

Industry will have to be more aware of the multi media impacts of regulations in areas not closely followed. This includes water impacts, waste management, waste fuels, water quality regulations, and RCRA. As state budgets get tighter, fees are being increased to raise revenues. Permit fees have increased. Fines are increased. Coal mining practices from the early 1900s are being presented as current practice. Ash is being presented as "toxic soup" . More public outreach is needed showing the results of reclamation. More publications are needed on how much reductions have actually occurred. If coal is to be used in the future, there will need to be a much better public relations effort.

John Kuhn, Celanese, has worked on both plant and environmental activities for Celanese. Most of their sites have natural gas fired boilers for process steam. There is one plant with several coal fired boilers. The major concern is the uncertainty associated with all of the potential regulations, legislation, and legal decisions that will impact the plant. Further, these activities are intertwined and interrelated so that impacts in one area have consequences in the other. Government grants and incentives appear to be an area that we need to take better advantage of. For the coal fired plant, the Industrial Boiler MACT, the CAIR rule, SO₂ emissions modeling, and coal ash disposal all have potential to impact costs and requirements. The uncertainty of GHG regulations has caused the economic evaluations to discount carbon costs.

Ann McIver, Citizens Thermal, is the Director of Environmental Affairs of Citizens Energy Group. Citizens Thermal sells energy (steam and electricity) in the Indianapolis region. If regulations will increase the cost of operations and compliance, it will increase the cost of energy to their customers. Citizens Thermal spent \$12 million to get into compliance with the proposed Industrial Boiler MACT by 2006 in order to avoid competing with larger entities that would be impacted by the CAIR and CAMR rules. Then the rules were vacated. The chances for proactive action in anticipation of the revised Boiler MACT are now highly unlikely. This means delays. Delays increase costs. The steam customers can all leave the system, either by alternate heat sources or by relocation.

Consequently, education and outreach is becoming more important. Tours and education programs for regulatory staff and others have been undertaken so that these folks can get a first hand understanding of how the plants work and what the issues are. Quarterly

meetings with customers are being held so that customers can understand the implications of the various potential impacts. Research efforts on biomass are being undertaken. One of the issues is that Indianapolis will not allow the amount of truck traffic that is needed to supply the fuel. (As a comment, Alcoa spent \$300 million ahead of compliance with the proposed Industrial boiler MACT).

Robert Stemen, Applied Heat Recovery, pointed out that as an equipment supplier, one of the reasons to become a CIBO member is to hear from customers about the issues and to get a feel for the types of issues that the customers are facing. This type of information would be used to help develop potential solutions. With the level of uncertainty involved in all of the potential regulations, it is truly difficult to come up with major equipment solutions to all of these problems.

During the discussions, the two major themes were the uncertainty and the lack of public outreach. These two issues color all of areas that have an impact the industrial power house. One consideration for CIBO is that these activities get beyond the industrial boiler aspect. Energy efficiency issues can encompass the entire plant. General public outreach is beyond the scope of CIBO activities. One other comment was that some of these audits, investigations, and developments can lead to new opportunities.

IV. Environmental Modeling & Health Risk Assessment

Jay Hoffman, Trinity Consultants, Inc.

Jay Hoffman, Trinity Consultants, pointed out that EPA has used modeling since its inception. Modeling is used to anticipate the impacts of emissions reductions, to design monitoring networks, and to evaluate SIPs. The “workhorse” models range from simple Gaussian plume models to significantly more complex “gridded” 3D models. The amount and sophistication of the model data and inputs vary significantly. Some myths about the models are that the models are biased to produce high estimates or that the models can be finagled. The models themselves are not particularly biased. The input can be biased, but the models are relatively neutral. Further, there is a protocol that has to be observed in providing input and using the model so that the amount of “ finagling ” is limited.

All sources can be modeled, but terrain issues are a significant problem. The dynamics of the daytime and nighttime atmospheres are very different, particularly over land and in the summer. During the summer days in the continental US, the atmosphere is well mixed vertically to between 1,000 and 2,000 meters above the local ground level. This called the daytime planetary boundary level. At night over land, the degree of mixing in the lower atmosphere is dramatically reduced. Never the less, the lower atmosphere is generally mixed as there is no separation of oxygen and nitrogen in the atmosphere. In a clean atmosphere, NO and NO₂ are moderately stable, particularly at night. In a “ polluted ” lower atmosphere, NO tends to be scavenged by ozone. At night the ozone is depleted and the NO or NO₂ tends to last longer. During the day, oxygen and NO₂ forms ozone with sunlight. During the night, some NO₃ can be formed. These are unstable and react with VOCs or NO₂ to form nitrates. Once nitrates are formed, they are not available to

form new ozone. There is some evidence that the sum of the ozone and NO₂ stays relatively constant at night. This would imply that surface scavenging is relatively slight. However, there is very little data on surface reactions in the literature. The long range transport (100+ kilometers) of ozone is well documented due to the stability of ozone aloft at night. Due to horizontal mixing, the ozone formation impact of any NO_x source decreases with downwind distance.

All sources of NO_x contribute to ozone formation during the day. It is unlikely that NO_x release height is a strong factor in ozone formation.

Mike Meister, Trinity Consultants, reported on a case study on a risk assessment project. Risk assessments are driven by air toxics permitting, cumulative risk, RCRA Hazardous Waste Combustion permitting, MACT HBCA, Environmental Justice, EIS, Ecological Risk, Toxic Tort, Nuisance Litigation, and residual risk. Air Dispersion Modeling is used for NAAQS, State Ambient Standards, and Air Toxics Standards. Pathway specific risk analysis protocols include hotspots analysis and other aspects of risk pathways.

Limitations of air dispersion models include the single pathway problem, lack of population data, and poor results when compared to actual data at specific monitor locations or specific times. Population characteristics have an influence on the potential risks. Human health risk assessment (HHRA) includes direct inhalation, ingestion of soil, consumption of fish, indoor vs. outdoor, dose rate, etc. Risk is an estimate of the probability that an adverse health impact may occur. There is direct exposure and indirect exposure. The media includes water, air, soil, above ground produce, and animals (fish, chicken, beef, milk, eggs).

The HHRA process starts with facility characterization and dispersion modeling. An exposure scenarios are evaluated leading to estimated media concentrations, The exposure is quantified. This leads to a calculation of risk and hazard. The uncertainty needs to be estimated and is both qualitative and quantitative. For carcinogens, a cancer risk is calculated. For non carcinogens, a total hazard index is calculated. The risks are summed for all compounds of interest. Summation is probably not mathematically correct.

EPA Region 6 developed a tool called a Risk- MAP. This spread sheet system is compliant with HHRAP and validated and transparent. Another tool is called BREEZE. Uncertainty is characterized with respect to a wide range of inputs and includes model input accuracy, performance accuracy, pathways, and risk sensitivity. The case study concerned mercury. Mercury is emitted from boilers. The proposed limit was 60 lb/yr. The worst case pathway was fishing in a body of water, where the fish accumulates mercury and is consumed locally. The model calculates a hazard quotient for the mercury. EPA indicates that 99.9% of mercury ingestion comes from fish. Ingestion rates for average consumption and subsistence consumption are estimated. The calculations assume all mercury reaches the river and 15% of the mercury becomes methyl mercury. There are limited chemistry and deposition algorithms. Worst case factors are used for a first pass calculation. These include worst case fish, subsistence consumption, and no

rejection from the body.

V. Environmental Issues Impacting Energy

Maxine Dewbury, The Procter & Gamble Company

Rob Kaufmann, Koch Companies Public Sector, LLC

John C. deRuyter, E.I. DuPont de Nemours & Company

Gary Merritt, Northern Star Generation

Topics for this session include GHG Regulations, NAAQS, Combustion Issues, and Waste Issues. **Rob Kaufmann**, Koch Companies Public Sector, LLC, noted that a number of actions are underway on GHGs. The EPA Endangerment Finding is out. EPA tailpipe standards are proposed. The Johnson memo has been pulled back. The PSD and Title V issues have been proposed. The GHG Reporting Rule has issued but is not yet in the Federal Register. The reporting is annual. There is no 3rd party verification, but a higher level than Title V is required for self certification. Biogenic CO₂ is not included in the 25 K tonnes threshold. However, once at 25 K tonnes, biogenic CO₂ needs to be reported. Industrial wastewater and landfills are not included at the moment. A facility can drop out of the requirement if it is below 25 K tonnes for 5 years in a row or if it is below 15 K tonnes for 3 years in a row. Confidential business information is to be addressed through a separate rule making. Combustion sources can use best available monitoring methods during the first 3 months (with extension to 12 months). After that, the required monitoring equipment must be installed. A 4 tier system is in place. If combustion sources only, abbreviated reports for 2010 are acceptable. If the plant has a CEM system, it is required to upgrade the CEM to include CO₂. Common stack sources can measure and report consolidate emissions. With 2 or more units of 250 MMBTU or less, reporting can be consolidated.

On the Endangerment Finding, the statement has been made that this finding will be out before the end of the year. There are 2 key parts. The first is that GHGs can be reasonably anticipated to endanger public health or welfare. The second is that emissions from relevant source categories cause or contribute to this air pollution. The finding will be directed toward vehicle emissions. There may be litigation against the finding. The tailpipe standards proposal is a companion piece to make CAFÉ standards more stringent and is direct response to Mass v EPA Supreme Court Case. This was part of a deal with California and the auto manufacturers. This is due to go final by the end of March 2010.

The Johnson Guidance on the Deseret plant had to do with the a permit requiring CO₂ controls. The Johnson Guidance stated that GHGs were not regulated pollutants as there were no standards for GHGs. The Obama administration announced that they would reconsider the Johnson Guidance. However, the EPA has now stated that the Johnson Guidance was correct.

The PSD Tailoring Rule involves PSD and Title V. The concern is that the final Endangerment Finding and the final GHG Tailpipe standards combination would trigger PSD. The PSD source threshold is 100/250 tons. The Title V threshold is 100 tons. Thus,

the number of PSD permits would rise to 41,000 from 280 and the number of Title V permits would increase to 6.1 million from 14 thousand. There would be \$15 billion in addition costs to the states. EPA plans to raise the threshold to 25,000 tons for GHGs. Over the next 5 years, EPA plans to investigate streamlining options including revisions to the calculations of potential to emit. In the 6th year, a new rule would be promulgated with revised applicability. The legal justification for these changes is the “ absurd results ” doctrine which would contravene Congressional intent. Also administrative necessity would be invoked as state programs would be impossible to administer.

Problem areas include legal justification vulnerable to challenge, streamlining techniques, retroactive liability, and lower thresholds remain on the books under state laws. Some states have already selected 10,000 tons as the threshold. BACT is not addressed in the PSD tailoring rule. Yet states will need to be ready to address BACT requirements by the end of 2010. EPA is planning to provide “ guidance ” to the states. The work group is charged with evaluating GHG reduction technologies, costs, and performance, encouraging cost effective, high performing new technologies, and looking at multi-pollutant reduction opportunities. The work group membership includes EPA, NACAA, NRDC, ED, Clean Air Trust, states, autos, paper, utilities, oil, and lawyers. The issues include few BACT experts, few industries, design changes on the table, fuel switching on the table, outside the box thinking discouraged due to the short time frame, top down policy, reporting structure (to CAAAC), and “ right ” EPA staff involvement. Also, top down BACT allows for cost consideration. Another question is the cost threshold that would trigger rejection.

Boiler NSPS has been remanded to EPA. EPA is thinking about including GHGs under NSPS. This might also impact what BACT might be.

Maxine Dewbury, The Procter & Gamble Company, reported on NAAQS issues. Population, GDP, vehicle miles, and energy use have all increased substantially in the last 40 years. During that time, emissions have been reduced by 60%. In the last 10 years, the ozone and PM2.5 standards have been tightened. There will be revised non-attainment area designations. The impact on businesses is that retrofit controls are required on sources and permit issues now involve LAER instead of BACT. The latest standard is 75 ppb for ozone. However, EPA is reconsidering the standard and could select 70, 65, or 60 ppb for ozone. Of course, with the lower standards, there will be more non-attainment areas. The PM2.5 standards were also reduced. The lead standard has been reduced from 1.5 micrograms/m³ to 0.15 micrograms/m³. The NO₂ standard has been reduced. The SO₂ standard is under review. All of these standards have to be reviewed every 5 years.

John C. deRuyter, E.I. DuPont de Nemours & Company, reported on the combustion issues. The CAIR rule focused only on SO₂ and NO_x. It was based on the acid rain, cap and trade approach to emissions reductions. It was intended to help with ozone, PM2.5, and regional haze. The rule was vacated, but then remanded to EPA. The court stated that EPA did not have authority to change Title IV Acid Rain allocations, that the timeline failed to ensure that downwind states had time to achieve, and that the cost effective standard was not appropriate. The CAMR rule, was vacated and remanded. This used

CAIR benefits in phase I and 70% reduction in phase II. This will now be rolled into Utility MACT. Regional haze is progressing slowly. The Carper bill would require 90% mercury reduction. EPA is working to propose a new CAIR rule. The original rule was directed to utilities.

There is now serious consideration of including ICI boilers in the rule. Issues include the level of NO_x reductions, technology requirements for large vs. smaller units, the timing of controls, trading, Section 126 petitions, and Utility MACT implications. The impacts on industrials will be increased cost of electricity, possible inclusion of cogen units, a shift toward gas by utilities (and subsequent price increases), and a shift in attainment possibilities. The OTC is proposing phasing. They are working with LADCO and VISTAS. There is also consideration that the CAIR rule should apply to the entire US, rather than just east of the Mississippi. For SO₂, the second phase would likely require scrubbers to meet the requirements for the larger units.

On the NSPS side, the climate change bills are typically requiring an NSPS for GHGs to get at non covered sources. On Industrial Boiler MACT, the revised timing has been issued. This is tied in with the Area Source Rule and CISWI. The new rules will be proposed by April 15, 2010. The definition of solid waste (as opposed to fuel) is critical. Conventional biomass may be OK. Sludges are likely to be a waste. Verification and analysis of the data needs to be done. The variability of emissions vs independent variables will be needed. There will also be a need to evaluate HAP emissions vs surrogates.

The MACT floor methodology will be important. The Portland Cement MACT and the HMIWI MACT used a vary tight confidence interval for MACT floor. The MACT floor levels are established independently. The HBCA may be lost. However, EPA is looking for states that have used it. The SBA is supporting it. The methodology combined with data will likely result in significantly lower emissions limits.

The start up, shut down, and maintenance (SSM) provisions approach was struck down by the courts. EPA is providing limits during SSM. Work practice standards are preferred to limits during SSM. With the extension of timing, some states are moving on Section 112(j) case by case MACT (NC and NJ). A presumptive MACT standard choice is available in NJ. The CO limits are very low for oil and gas units.

Gary Merritt, Northern Star Generation, reported on the coal ash issue. The TVA dam failure has revitalized the attack on coal combustion byproducts (CCB). A key recommendation in the NAS study was to develop a federally enforceable permit utilizing either RCRA or SMCRA. A coalition has been set up. There is a USWAG web site that has letters to Congress supporting regulation under subtitle D of RCRA. The EPA promised to propose regulations by the end of 2009. It is anticipated that EPA will send a draft to OMB with regulation under subtitle C, perhaps on the basis of the cement kiln dust rules. At the same time, EPA will solicit comments on regulating under subtitle D or a hybrid of C and D. A final package is hoped for by October, 2010.

The Environmental Integrity Project has given EPA a 60 day notice of its intent to sue over failure to review and update effluent guidelines. The Citizens Coal Council had given DOE/OSMRE a 60 day notice of its intent to sue OSMRE over its standards in PA.

The water quality standards for surface water generally contains protection of water supply intakes of 500 mg/l of TDS, 250 mg/l of sulfates, and 250 mg/l of chlorides. There are watershed problems regarding these compounds. The issue has been evaluated by a few states. However, the development of new oil and gas reserves in the shale regions has attracted the focus of regulators. The water from well fracturing is high in TDS. The concern is that end of pipe limits will be set at the water quality standards for all discharges. This could end up making all plants water treatment plants. Comments will be needed once the CCB regulations are published in the federal register. We should also be prepared to respond to the end of pipe TDS issue.

VI. - Government Affairs

Lisa Jaeger, Bracewell & Giuliani, L.L.P.

Karen Neale, Hummingbird Strategies, LLC

The major climate bills are the Waxman Markey bill (HR2454), the Kerry Boxer bill (S 1733) and the Bingaman bill (S 1462). There is also the potential for the Cantwell bill (not yet introduced). The Carper bill has been proposed again as a 3 p bill. The 2 main bills have a renewable energy standard (RES). The differences are relatively small. Utilities can purchase "renewable" electricity from industrials. The base year is 2005. Biomass definitions are different in each bill. The S. 1462 has the broadest definition. The S. 1733 has the most restrictive definition. Building standards are included in all bills. Industrial energy efficiency is not in S.1733. S. 1462 proposes to establish industrial research and assessment centers. CCS demo and deployment programs are in all 3 bills. Nuclear incentives are in all 3 bills. Combined heat and power needs to be beefed up in all 3 bills. The definition of a utility unit needs to be the acid rain definition.

In the HR 2454 an EGU supplies 1/3 or less of its power and is 25 MW or less of electrical output for sale. The S. 1462 has no definition. This is a key point for CIBO. The Cantwell bill has taken a different approach. This takes an upstream cap on fossil carbon that enters the economy. The cap declines gradually and reaches 80% by 2050. The market is 100% auction open only to energy producers and importers. Prices are set by the market with a bounded price collar. The collar increases 6% per year. The distribution of revenues provides for 75% of the revenue to be distributed to every American citizen on a monthly basis. The emission targets for HR. 2454 and S 1733 are 3% for 2012, 17% or 20% for 2020, and 83% for 2050. The point of regulation is phased in with industrials coming in during 2014. The allowance structure of the bills is somewhat different. The House bill had no revenues going back to the government. The Senate bill proposed that 25% goes for deficit reduction. For energy/trade intensive industries 15% of allowances are to be set aside. The bulk of the allowances start out as granted, but fall under auction as time goes on. Cost containment measures include allowance trading, banking, borrowing, strategic reserve, and international allowances

(offsets). Capped sources can use up to 2 billion offsets. There is federal preemption of state GHG programs in the bills, but these are not complete. None of the bills cover the nuisance suits and other liabilities. Costs estimates for the House bill range from \$80 - 111/yr by EPA, \$175/yr by CBO, and a \$566 billion reduction in GDP between 2102 and 2030.

There are other cost estimates and the results are much higher. The assumptions are critical and the variables many. The Senate Environment Committee hearings are starting on Oct. 27th. There are 5 other committees that may hold hearings and report a bill. Whatever Senate passed bill results must be reconciled in conference with the House bill. The reconciled bill goes to both the House and Senate for passage. The resulting bill, if passed, would then go to the president for signature to become law. From there, the various agencies would then take up the bill to figure out what regulations are needed to make the provisions of the bill become reality.

Healthcare legislation may take up most of the time between now and the end of the year. Next year is a "mid term" election year, which might make it difficult to bring up during the year. There has been a proposal for an energy only bill, but the White House has expressed disfavor with this approach. The Copenhagen challenge is becoming problematical as time marches on. There might be a Kerry Graham bill. Nuclear considerations are in play. The "path to 60" in the Senate has yet to play out.

VII. Energy Session

Fred Fendt, The Dow Chemical Company

Terry Moore, Carbon Shrinks, showed a video of a presentation by president of cement company that accomplished carbon reductions in Texas, (Texas Lehigh Cement). The kiln has a world class rating of 94% capacity factor. The project was looking for "win-win" opportunities that would both reduce emissions and provide increased shareholder value. In the prior year, coal prices were high and supply was an issue, due to mining issues. The president was skeptical at first, but Carbon Shrinks offered a solution that would save money and reduce the carbon foot print.

Alternate fuels were available, but typically resistance has been high to any fuel substitution. Carbon Shrinks thought the use of alternate fuels made sense and took it upon them to engage the potential opposition and solicit their support. A plant picnic was used as an outreach tool to the community, which included plant tours and social interactions with environmental groups. The stakeholder engagement deepened the understanding in the environmental community of issues facing the cement plants. The plant was already permitted for TDF and waste wood, but the plant volunteered to have stack testing to compare emissions with and without the alternate fuels. The results of the testing was a modest reduction in the overall emissions levels. This gave the environmental community some confidence in the fuel switch.

Carbon Shrinks developed a software program to compare capital projects and return on investment. The existing projects were analyzed for carbon reduction opportunities. The carbon costs were initially based on McCain Lieberman, but subsequently on Waxman Markey. These costs can be adjusted as needed, depending on what legislation is passed. Several of the projects showed the possibility of increased returns after the passage of a bill. Interestingly, the first waste wood supplier wanted more money for the fuel (typical of waste fuels). The plant has looked around for other sources and appear to have found a couple of other sources that would be reasonably priced. The fuel rate would be 2 tons/hr, or about 10% of the total heat input. The blend of TDF and wood provides fuel with about the same average HHV of the coal.

VIII. What Keeps Us Up at Night

Fred Fendt, The Dow Chemical Company

Mick Durham, Grain Processing Corporation

Fred Fendt, The Dow Chemical Company, did a top 10 list of issues. The first issue was vendors that claim to solve any and all problems with their one solution. The second was permit writers. Next were sloppy testing personnel. Internal purchasing personnel that over complicate utility systems. Regulatory requirements that are unclear is a problem. Government help that turns industry problems into government empires. Short sighted management that cuts energy efficiency projects when fuel prices are low are the same ones that chastise us for not doing these same projects when fuel prices are high. Vendors that promise the moon are a problem. People that believe industry is evil, greedy, and have infinite resources and also believe that environmental groups are honest and are only interested in protecting Mother Nature.

Mick Durham, Grain Processing Corporation, said they have 2 plants that are very different. One is coal and one is gas. One is grandfathered and one isn't. The company tends to be reactive. As a result, things wait until the absolute last moment. The Iowa monitoring program places monitors and a lead monitor is being proposed near one of their plants. They are considering putting their own monitors next to the state 's monitors to be aware of what trends might be occurring.

The GHG issues are a big concern because the boilers are old and hard to operate. The operators do not want to even look at any other fuel than what they are used to. Finally, quantification of going from PM to PM10 was done years ago. Now we have to go from PM10 to PM2.5. Grain Processing did particle size measurements on the fly ash collected after the cyclone collectors and found that on the order of 30% of the particulate was PM2.5.

IX. Technical Committee

Harvie Beavers, Colmac Clarion, Inc.

On the Technical Committee, we have changed the format to utilize focus groups. The

topics are determined by the input from the members. The biggest issues are the impact of carbon restrictions for those that oxidize carbon for a living and the uncertainty that is prevalent when so many potential regulations are on the way and so many are determined by litigation.

Jay Hoffman, Trinity Consultants, Inc., gave a presentation on addressing the issue of lost knowledge. A Wall St. Journal article in 2006 was titled “ Where have all the welders gone? ” . In June 2009, an article noted that in spite of the recession there was still a shortage of welders, nurses, geotechnical engineers, etc. Although manufacturing has been declining as a per cent of the economy, the US Production Index hit an all time high in July 2007. Improvements in efficiency and productivity have allowed more production for fewer people and inputs. The current recession has been particularly hard on manufacturing. Industrial production increased in the last quarter for the first time since early 2008. Starting salaries for engineers are still increasing in spite of the recession. There is still a shortage of engineers.

X. General Discussion

John C. deRuyter, E.I. DuPont de Nemours & Company

The focus group list resulted from member surveys. The next topic for December is the emissions control systems. Suggestions included adding water technology and CO2 capture to the list. There was also a suggestion to identify the linkages between the various operating issues and the environmental impacts. The carbon footprint reduction group may expand to the carbon footprint management.