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# Technical Focus, Energy & Environmental Committee Meetings

**September 9-10, 2014**
**Radisson Hotel, Reagan National Airport**
**Arlington, VA**
**(703) 920-8600**

# M I N U T E S

## TUES-WED September 9-10, 2014

**TECHNICAL FOCUS GROUP SESSION**
**Jason Philpott,** Eastman Chemical Company, Technical Committee Chairman

Overview of Grid Interconnection Possibilities – **Jason Philpott,** Eastman Chemical Company

**Jason Philpott** provided an overview of the potential options for a hypothetical plant. In this plant, there were 3 boilers with the same capacity at the same pressure. However, most of the time, the steam demand is less than the total capacity and the bulk of the steam is used at a lower pressure. This provides an opportunity to generate some electricity to use more of the steam as well as to recover some of the energy that is lost through a pressure reducing valve. The economics of this choice will depend upon location.

Typically there is an energy charge and a demand charge for electricity. The energy charge will be reduced and the demand charge will be replaced by a back-up charge. This step could be accomplished with a back pressure turbine. In order for the plant to island, a second turbine would be required so that one turbine can come down. A start-up system will be needed with a stand by generator. The system will also require a condensing system in the event that the proportion of steam demand and electric demand varies. In addition, there is no VAR support from the grid and there is no frequency control from the grid. These will have to be factored into the control system for the plant. These all require additional capital.

Further options include selling power to the grid, buying and selling to the grid, economic dispatch, and demand response. When selling, consideration must be given to becoming an EGU (greater than 25 Mw to the grid). Each of these options has advantages and disadvantages and will be very site specific. Pricing issues for the ancillary services (voltage support, frequency control, etc.) need to be considered.

Optimization of Steam & Electric Generation Assets – **Denis Oravec**, AAI-JMP Engineering

**Denis Oravec** noted that the operating challenge is to meet the plant steam and electrical demand reliably while operating smoothly, reliably, consistently, and safely. Environmental constraints have to be observed. All of this is to be done at the lowest possible cost. Steam flows are often prioritized with regard to multiple fuels (biomass, coal, natural gas, etc.). Considerations include boiler load allocation, turbine load allocation, head pressure fluctuations, tie line control, and economic load shedding. A real time energy management system (EMS) is required to sit over the normal control systems. A rule based supervisory control system is used to provide a prioritized, multi-constraint strategy for operating the plant.

Different fuels are treated as virtual boilers. Each master is tuned for a specific fuel. Within the given constraints, the system allocates the total steam demand and calculates the incremental cost for the next pound of steam. Minimizing the incremental (or marginal) cost for the next pound of steam is not normally a specific consideration for a boiler operator. Global constraints (emissions, fuels, etc.) have precedence over local constraints. The turbine allocation system takes into account the differences in the turbines on the site. Similar constraints are involved. The goal is to generate the lowest cost electrical generation, having generated the lowest cost steam.

Header pressure control is used to maintain stable header pressures throughout the system. Tie line control is used to manage the purchased power (or selling power). Real time pricing can be used. This allows the system to continuously calculate the cost of producing power that can be compared the purchase price of electricity. A "make/buy" decision can then be made. Again, the marginal cost of generating the next kilowatt of electricity. The system advised how much electricity should be bought or sold and the optimum turbine extraction, condensing, and venting mix to produce additional generation.

Another consideration is isolating the control system from the internet if real time pricing is used. This can be done with a separate computer connected to the net and information transfer based on spread sheets. There are 3 operating envelopes – the equipment, the system, and cost. The system is integrated with the existing controls and works in concert with any of the major controls systems. Operational benefits include improved demand side operations, greater stability, reduced steam venting, prioritized fuel use, maximum asset utilization, minimized emissions, and minimized cost.

Electrical Islanding for Industrial Facilities – **Mark Lively,** Lively Utility

**Mark Lively** pointed out that "the market rules". One can delay or avoid the market for a period of time with enough money or force, but eventually the cost becomes prohibitive and the market re-establishes itself. The first electrical station (Edison's Pearl Street Station) was an island. Early office buildings were an island. Self-generators bought from electric utilities because they were cheaper than operating as an island.

The advantages of grid connection include economies of scale, reliability, efficiency, and lower staff requirement. The idea behind islanding is to "get off the grid". This capability would avoid some of the issues associated with transmission and distribution as well as generation. The original response to setting up the grid was to nationalize the grid. The US chose to regulate the industry rather than nationalize the industry (although there are federal and municipal power authorities). Under the definition of a utility, any sale of electricity in interstate commerce would make a company a utility, which would bring all of that company's operations under regulation. Several companies would build large electrical facilities but run as an island in order to avoid the sale of electricity and become a utility.

In the 1970's, there was an energy crisis that lead to rationing of gasoline and the Fuel Use Act of 1978, which forbad the use of natural gas for steam and power generation. In addition, the Public Utilities Regulatory Policy Act (PURPA) was passed to encourage the use, cogeneration, efficiency, and alternative fuels. PURPA forced utilities to buy cogenerated power at the "avoided cost". Such "qualified facilities" were exempt from the provision of being considered a utility. As deregulation took hold, the functions of utilities relative to generation and reliability were assigned to an Independent

System Operator (ISO). Generation was deregulated. Wires and lines were left with the regulated utility. Never the less, the Federal Energy Regulatory Commission (FERC) still regulates all sales of electricity for resale (ie the generator sells to a system and the system sells to the end user).

In the 70s we had "energy unrest". Today we have "environmental unrest". These periods of "unrest" cause changes in legislation and regulation. What these ultimate changes in regulation will be is still to be determined. The proposed CO2 regulations will cause some changes in dispatch of the operating assets.

**GOVERNMENT AFFAIRS SESSION**
**Anthony Reed, Archer Daniels Midland Co.,** *Government Affairs Committee Chairman*

Overview – **Salo Zelermyer**, Bracewell & Giuliani, LLP

With Congressional elections coming up in early November, there is a lot of activity in Congress as the fiscal year ends on Sept. 30th. Foreign policy has a habit of impacting these activities and changing the nature of the election debate. Scott Segal, Bracewell & Giuliani, LLP, will be reviewing the election trends at the luncheon address. Aside from what might be called for in the geopolitical issues, government funding for the next fiscal year has to be handled (another continuing resolution?) and energy issues will come up with respect to energy security in Europe. Immigration issues looked like they might have been higher, but other issues have dominated the considerations of the White House. Another issue that has been in the news has been "tax inversion". This issue has come up with some of the mergers and acquisitions that have proposed to relocate outside the US to avoid US taxes.

Legislative Priorities – **Jason Herbert,** Bracewell & Giuliani, LLP

The House priorities were released on Sept. 4th. There will be a vote on the continuing resolution as well as an energy bill and a jobs bill to be sent to the Senate. The waters of the US (WOTUS) issue will likely be addressed in the House bill. The President has indicated there will be a veto on this proposed restriction. The Senate is expected to set up votes on a continuing resolution, LNG exports, foreign policy, and ExIm bank re-authorization. The likelihood of passage of anything substantive is rather slim. Most of these activities will be "messaging" and "positioning" for the election.

Regulatory Actions – **Salo Zelermyer,** Bracewell & Giuliani, LLP

EPA sent its final 2014 Renewable Fuel Standard to the OMB on August 22nd. The proposed rule suggested a reduction in the ethanol target in gasoline. This problem comes about as the limit for blending is 10% ethanol, but the requirement for the total amount of ethanol keeps increasing. The prior requirement would have needed the blend to be greater than 10%. The proposed rule will reduce the total amount of ethanol requirement.

During the week of July 27th, the EPA held public hearings in Washington, Denver, and Pittsburgh to gather comments about the Clean Power Proposal 111(d). States and localities have also started lining up. Twelve states have filed a law suit seeking to stop the implementation of the rule. The EPA rule on coal combustion residues (CCRs) is scheduled to be released Dec. 13th (after the election). The Senate has not scheduled a time to take up a House passed bill on the subject.

**ENERGY SESSION**
**Frederick (Fred) P. Fendt,** The Dow Chemical Company, Energy Committee Chairman
**Robin Mills Ridgway**, Purdue University, Energy Committee Vice-Chairman

Natural Gas Risk – **Ben Schlesinger**, Benjamin Schlesinger and Associates LLC (BNA)

The shale gas production in the US has grown substantially in the past few years. The biggest contributor has been the Marcellus shale. It now takes about 3 weeks to bring on a new well. By contrast, it takes 2 – 3 years to bring on a new pipeline. Thus, there are still locations that are flaring natural gas due to lack of infrastructure. Still, most of the production is making it to the market. The current production rate is 17.5 BCF. The Marcellus is well connected, although most of gas is flowing south instead of north.

The US DOE has approved enough LNG exports to place the US as second in the world for LNG exports behind Qatar. A DOE study indicated that such exports are actually beneficial to the US economy and will create jobs. At this point, the DOE has no issues with approval of LNG exports. The first hydraulic fracturing operation was used in the 1940s. Since then, over 1 million wells have been "fracked". Each year, as many as 35,000 wells of all types are produced. The pathways to the water table are nil, other than the bore hole itself. The water table is typically at a few hundred feet, perhaps a thousand feet at most. The shale beds are down on the order of 5,000 ft.

Regarding the accusations of either benzene or methane contamination, these products have value. No firm is willingly losing these products. Shale gas has significantly reduced the price of natural gas. In the production fields, the cost is lower than the benchmark price on the Gulf Coast. Natural gas can substitute for coal in power plants and large vehicle fleets. For older, less efficient power plants, the CO2 reduction can be as much as 70%.

For large trucks and buses that are constantly in use, natural gas is economical. For smaller vehicles that are not constantly in use, electric vehicles appear to make more sense. Finally, chemical manufacturing is starting to move back to the US to take advantage of the low price of natural gas as a feed stock. The increased production of oil and gas is having an impact on world oil prices as the US is only importing half as much oil as originally planned. There are shale gas resources in other parts of the world. However, it will take some time for these fields to be produced. Part of this is just due to the time it takes to bring a new technology on line. The other part is due to the fear that is being promoted by the environmental groups.

**ENVIRONMENTAL COMMITTEE SESSION**
**Stephen (Steve) Gossett, Eastman Chemical Company**, Environmental Committee Chairman
**Robert (Rob) Kaufmann**, Koch Companies Public Sector, LLC, Environmental Committee, Vice-Chairman

The anti-trust admonition was given. The minutes from the last meeting were approved as written.

Water Rules Update – **Ann McIver,** Citizens Thermal

We are preparing comments on Waters of the US (WOTUS). Although the rule is being framed as a "clarification", it is clear that the proposed clarification will result in a greatly expanded definition of

what constitutes the "waters of the US". This expansion will impact all of the other regulations that impact water including discharge permits, storm water permits, temporary puddles, etc. Effluent ditches may now be considered WOTUS and thus require discharge permits into the ditch rather form the ditch into the river. That would mean that if multiple ditches are used on site and then collected to a final ditch that is treated before going into a river, discharge into each ditch would be regulated as opposed to the final discharge.

Water Intake Rule 316(b) – **John Goetzmann**, Black & Veatch Corporation

The rule was published in the federal register on August 15, 2014. The effective rule date is October 14, 2014. The NPDES compliance requirement is 45 months later, or July 14, 2018. If an NPDES permit expires before that date, the applicant will have to meet with the permitting authority to establish the date. Likewise the implementation would be within 8 years. There are 8 different components that impact all facilities including Fish and Wildlife Service consultations, source physical data, cooling water intake structure data, source water baseline biological characterization data, cooling water system data, method of IM compliance, entrainment performance studies, and operational status.

In the larger facilities, there will be more data required. Also the impact component for the larger units dominates. There are 7 options available for impact mortality (IM) compliance. These include closed cycle cooling towers, velocities, modified traveling screens, and combinations. The performance standard is less than 24% impact mortality. For facilities of greater than 125 million gal/day, additional studies are required, including the consideration of air cooled condensers. In addition, non-water impacts need to be studied and reported. These studies need to be peer reviewed. Other agencies can get involved (Army Corps of Engineers, Historic Preservation Office, Tribal Consultations, Fish and Wildlife Service, and Maritime Fishery Service.

Litigation on the 316 (b) Rule – **Fredric P. Andes**, Barnes and Thornburg LLP

The rule could have been a lot worse. The EPA wanted everything to be cooling towers. The rule ended up with a case by case determination in the permitting process (hence the number of studies required). The rule covers plants of greater than 2 million gal/day. For those that are below that level, best professional judgment is applied. All units have to make the same demonstration that the compliance plan is effective. The flexibility provided in the rule was a disappointment to the environmental groups.

The states are also somewhat confused about the application of the rule. The rule became effective for judicial review on August 29, 2014. Petitions for review can be filed within 120 days. Petitions can be filed in the Court of Appeals for any circuit. Multiple cases on the same rule will have to be consolidated in one court for decision. EPA came up with the "race to the courthouse" approach. By Sept. 8th, petitions had to be filed. EPA will then bundle those petitions and send them to a judicial panel for multi-district litigation. The panel will hold a lottery to decide which circuit court gets all of the consolidated cases. Parties may then file motions to transfer the case to one of the other circuits. The "winning" court will then decide whether to keep the case or transfer it. Once the court has been selected, a briefing schedule will be issued. At least 3 sets of briefs will be needed – opening briefs by petitioners, responses by EPA and interveners, and replies by petitioners. After that, oral arguments are scheduled. Outside parties may intervene with amicus briefs. After that, a decision could be made. After a decision is handed down, the decision could be appealed. The litigation

could go all the way to the Supreme Court. During all this time, the rule is in effect. In the meantime, states will be putting 316(b) provisions in permits. Since the rule provides options, a lot of negotiating will take place.

Railroad Ties – **Jeff Schumaker**, International Paper

For non-hazardous secondary materials (NHSM), AF&PA has met with EPA on their position on using railroad ties as fuel. The Office of Solid Waste has adhered fanatically to the definition of solid waste that essentially states that if a material has been "discarded" it is a waste. AF&PA has made the argument that the creosote in rail ties is similar in many ways to oil. As such, the EPA has stated that rail ties can be considered a fuel as long as they are burned in a boiler that can burn the ties and that were "designed to burn" oil. If a unit was designed to burn rail ties, but not designed to burn oil, the rail ties are not considered a fuel.

NAAQS Update – **Cindy Langworthy**, Hunton & Williams LLP

The NAAQS are ambient standards that are to provide adequate health with a margin of safety. The margin of safety is at the judgment of the administrator. Once the NAAQS are set, the areas are designated "attainment", "non-attainment" and not classifiable. Once designations have been made, the states are required to submit State Implementation Plans (SIPs). These plans must include a schedule for bringing the area into compliance as well as the means for achieving compliance. The SIP must be in place within 3 years of a new standard. Compliance is supposed to be in 5 years, but in some instances may take longer. With a new standard, New Source Review comes into play. There are 6 criteria air pollutants. There have been petitions for 4 additional pollutants (GHGs, CO2, NH3, and H2S). The NAAQS are supposed to be reviewed every 5 years. EPA has rarely made that schedule.

The ozone NAAQS review is underway. EPA staff recommendations are at 60 – 70 ppb. This range is based on thoracic and epidemiology studies for lung function and other issues. The Scientific Advisory Committee (CASAC) also has recommended 60 – 70 ppb with the additional statement that 70 ppb would not provide "an adequate margin of safety". It is likely that a change to the secondary standard will be proposed. This standard is based on the protection of vegetation (tobacco is sensitive to ozone). A complex series of calculations would provide an average from 8 am to 8 pm that would be applied on either a one year or a 3 year average. For SO2, the EPA has established a 75 ppb 1 hour standard. The controversy on this proposal was that air modeling would be used rather than monitoring. That has been held up. EPA issued 29 non-attainment designations based on monitoring. No other changes were made to designations. EPA did not want to use unclassifiable as that designation carried no obligations. Several groups filed suit. A consent decree was reached with 3 phases. In phase 1, the larger sources will be included. There were 2 more phases. States and many industries filed comments opposing the consent decree. Never the less, EPA filed to enter the consent decree. The motion has been briefed and a decision is forthcoming. For those areas designated as attainment or non-classifiable, the areas would have to confirm that status every 3 years. Infrastructure SIPs were due in June 2013. Nonattainment SIPs were due in August 2013. Monitoring was the required basis.

In Jan. 2013, the DC Circuit held that PM2.5 NAAQS are subject to Subpart 4's nonattainment implementation requirements for PM (as opposed to the general provisions). EPA promulgated a rule on June 6, 2014 that classified all nonattainment areas as moderate and provided 6 years for

attainment. Missing SIPs are due by Dec. 31, 2014. Several environmental groups have petitioned for review. Other requirements will be submitted in the fall. The most recent standard is 12 micrograms/m3. EPA intends to finalize those designations by Dec. 31, 2014. Permitting is a continuing problem as there are no good measurement techniques for PM2.5 that accounts for all precursors. Guidance leaves open the possibility for photochemical grid modeling.

GHG 111(d) – **Mike Zebell**, Environmental Resources Management

In June the EPA put forth the "Clean Power Plan". Comments are due by October 16, 2014. The proposed rule is the broadest application of 111(d) to date. The source is required to have an NSPS and the pollutant is not a HAP. The rule applies to power plants (EGU).

There are 2 key parts. The first is that the goals are set up in terms of lbs/Mwhr. States are asked to take a systematic approach in developing plans incorporating direct controls. States are to use the best system of emissions reductions (BSER). The building blocks are efficiency, carbon dispatching, renewables, and other carbon reducing techniques. Each state has a budget for CO2 emissions reductions. The states are to come up with SIPs that will achieve the goals. The overall goal is a reduction of 30% from a 2005 baseline.

States can use renewable portfolio standards, end use efficiency standards, demand side management, planned retirements, averaging, cap and trade, and the inclusion of additional sources. States are encouraged to propose individual and collaborative measures, combining specific measures and strategies both within their states and in partnership with neighboring states.

There was recent US District court decision on a road access in a roadless area. An environmental group filed suit against the US Forest Service over the EIS. The court found that the Forest Service failed to adequately quantify GHG emissions and quantify the social impacts of the GHG emissions. The Forest Service claimed there was no tool to do this. The court identified the Interagency Working Group on the Social Cost of Carbon Technical Support Document. This was a tool for rule making, but now is potentially required for an impact statement or a permit.

RCRA Ash Update – **Mark Calmes**, Archer Daniels Midland Company

EPA is to finalize the rule by Dec., 2014. The rule will apply to EGUs. The indication has been a subtitle D (non-hazardous) designation, but we have seen nothing in writing. In May, Duke Energy signed an enforceable agreement with EPA over a pipe break that caused some ash to enter the Dan River. Under the consent order, the EPA will clean up the site under the Superfund Law and Duke will reimburse EPA for the cost. There was speculation that EPA used the Superfund Law to send a message that they would use whatever strong authority to clean up spills and sites. Legacy sites and their clean-up are being looked up. EPA is also looking at radioactive materials in coal. Naturally radioactive materials that exist in coal most end up in coal ash can possibly end up as a disposal problem.

DOE-NETL is having studies being conducted on materials that may contain rare earth elements and processes to obtain these elements. Coal ash may be a source for these materials. Currently the major source for rare earth elements is China. The DOE is looking for alternatives.

Litigation and Reconsideration for BMACT Suite of Rules
**Lisa Jaeger,** Bracewell & Giuliani, LLP

Briefs are being prepared for the 4 rules that cover the BMACT Suite. The first one is due at the end of September. The affirmative defense suit is in abeyance. The MATS SU/SD Reconsideration is to be determined. The MATS Recon PM CEMs is in abeyance. The 2008 Ozone NAAQS SIPS final is expected early next year. The BMACT rules reconsideration is anticipated by spring. The Effluent Guidelines Rule is to be finalized by Sept. 30, 2015. This is conditioned on getting out the RCRA Ash rule by December.

Comments have been filed on the Social Cost of Carbon. In the NEPA Social Cost of Carbon case, the courts ruled that facilities have to explain why the SCC was not considered (but not requiring that it must be considered). In the MATS rule, states and industry have taken the cost issue to the Supreme Court. The issue is for EPA to consider cost in making rules. This gets to the "appropriate and necessary" finding that is needed to regulate utilities. The Supreme Court made a decision in June that EPA could not require PSD or Title V permits based on GHG alone. Also, EPA has to consider cost, energy, environmental, and other impacts and cannot alter the production for demand for electricity. Further, the EPA exceeded its authority under the Clean Air Act.

EPA issued the 111(d) rule for existing power plants and only gave 4 months for comments. The NAM coalition summary is 50 pages alone. The basic comments include the proposed restructuring of the energy sector and the regulation beyond the affected source category. Irreparable harm is claimed due to a 2020 compliance date for portions of the rule. Impacts include states need to create SIPs, trade exposed sectors, energy intensive sectors, institutional, commercial, and residential. Additional issues include 111 vs 112 (mutually exclusive), category specific endangerment finding, 111(b) and 111(d) rules unrelated and inconsistent, usurpation of state authority, targets not based on BSER, building blocks 2 - 4 cannot be regulated, only fossil fired EGUs covered under 111(d), EPA SIP standards cannot exceed EPA FIP authority, modified/reconstructed sources cannot be subject to 111(b) and 111(d), simple cycle turbines, and arbitrary cost/benefits. Compliance timeframes for SIPs are unreasonable. Implementing rules must come first (credits, biomass, etc.). Cogeneration contribution to emissions reductions must be recognized. Additional comments include mass based emissions targets, credit for prior GHG reductions, and dates for credits.
In BMACT, the briefing procedure started in April.

Comments on NHSM, BMACT, and Area Source have been submitted. CISWI briefs are due in October. The briefing schedule runs to early March, 2015. Currently, there is an agreement to hear oral arguments for all of the cases by the same panel on the same day. Key issues are work practice standards, treatment of startup/shut down/malfunction, the legality of requiring energy assessments, and floor setting procedures.

NHSM and Comparable Fuels Update – **George Faison,** US EPA

The NHSM rule determines what secondary materials are considered to be wastes and what materials are considered to be fuels. The key issues are whether or not the material has been discarded, whether it has meaningful heating value (over 5,000 BTU/lb), whether it is similar to a conventional fuel, and whether it has been processed to convert it to a fuel. If a material is designated as a fuel in the rule, it is not a waste. In April, it was proposed to add 3 materials to the

list of categorical non-waste fuels. These are C&D wood, creosoted treated railroad ties, and paper recycling residuals.

For C&D wood, the material has to be sorted to remove other debris (including lead based paint) or certify that the building that was demolished was lead free. For paper recycle materials, the material burned on site in burners designed to burn solid fuel. For creosote treated railroad ties, it was concluded that although the railroad tie would not compare to "clean wood", it would compare to a unit that burned oil and biomass. As a result, it was decided to consider CTRTs as fuel as long as the material was burned in a unit that was designed to burn biomass and oil. It has been further modified to allow units that used to burn oil, but now burn gas due to the lower price of gas. There was some issue on the use of oil as startup fuel (or gas). The intention was that co-firing of the oil was the basis for the comparability.

They would like to promote the idea of co-firing of gas. Some biomass units put oil on the wood, particularly for startup. Presuming that the oil was "on spec" oil, that procedure would seem to qualify. It was suggested that this kind of statement appear in the preamble to the final determination. Units that have been included are existing stoker, bubbling bed, or circulating fluid bed boilers. There has been a request for hybrid grate and fuel boilers. One of the difficulties will be units that only burn biomass. These units are considered to not be "designed to burn oil".

Boiler MACT Compliance Concerns
**John C. deRuyter**, E.I. DuPont de Nemours & Company
**Amy Marshall**, URS

The proposal reconsideration packages on MATS, Boiler MACT/GACT, and CISWI are due. MATS should come out first. These reconsideration issues include start up and shut down definitions, the minimum CO limit, PM CPMS, and technical clarifications. For GACT, there are start up and shut down definitions and PM standard for low sulfur fuels. One of the issues is whether or not CO is a good surrogate for organic HAP. There is some correlation for organic HAP above 100 ppm. Southern Company cited an Army study that indicated that perhaps benzene or toluene might be more useful with an annual stack test. However, there is some data that indicates that CO correlates reasonably well with both benzene and toluene, so that it still might be an adequate surrogate.

The EPA has responded to the court on the use of the UPL for units that have enough data. The EPA still has to respond to the situation where there is insufficient data. The environmental brief spent over half of their allotted pages to the UPL issue. A Q/A proposal was prepared concerning the oxygen trim system. The goal was to avoid having to report when an oxygen trim system was taken out of automatic. A recommended answer was prepared.

In June, the court vacated EPA's 1998 comparable fuels exclusion that allowed fuel derived from hazardous waste to be burned in lesser regulated industrial boilers. The Boiler MACT fuel definition includes comparable fuels, which could indicate a problem.

**Next Technical Focus Group/Environmental & Energy Committee Meetings**
**TUESDAY & WEDNESDAY, December 2-3, 2014**
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