POWER SUPPLY TASK FORCE MEETING
WATER AND LIGHT ADMINISTRATION AND ENGINEERING BUILDING

A meeting of the Power Supply Task Force was held March 20, 2008 at 5:30 p.m. at the Water and Light Administration and Engineering Building in the Energy Services Conference Room, 105 E. Ash St. Attending the meeting was:

Task Force:
John Conway, Chair
Tom Baumgardner, Vice Chair
Ernie Gaeth, Member
Tom O'Connor, Member
Dick Malon, Member
Dick Parker, Member
Hank Ottinger, Member
Dave Wollersheim, Member
Bob Roper, Member

Columbia Water and Light Staff:
John Glascock, Interim Director
Jim Windsor, Manager of Rates and Fiscal Planning
Tina Worley, Utility Services Manager
Connie Kacprowicz, Public Information Specialist
Jay Hasheider, Energy Management Specialist
Mike Schmitz, Engineering Manager
Tad Johnsen, Power Production Superintendent
Marilyn Thorpe, Administrative Support Supervisor

Kiah Harris, Principal, Management Services Group, Burns and McDonnell
Matthew Lind, Development Engineer, Burns and McDonnell
Mark Imel, P.E., Director, Performance Management Energy Services Group, Burns and McDonnell
Adam Young, Project Engineer/Financial Analyst, Burns and McDonnell

Kat Hughes, Columbia Daily Tribune
Sean Powers, Columbia Missourian
Ryan Kind
Win Colwell

APPROVAL OF THE DECEMBER 13, 2007 MEETING MINUTES:
John Conway opened the meeting at 5:30 with the introduction of everyone present.

REVIEW OF SUPPLY SIDE ANALYSIS:
Kiah Harris, Principal, Management Services Group, Burns and McDonnell gave a brief overview of what was to be discussed at the meeting. First was the Supply Side Findings followed by the Demand Side Management findings. He said he would be detailing the integration of the two. Kiah said the Supply Options included; solar, wind and biomass options; local and remote

coal fired options; local gas fired combustion turbine and engine generator options, including combined heat and power; pumped hydro storage options and; market purchase of capacity and energy. Mr. Harris said three levels of carbon tax were provided in the analysis. Values of $0, $10 and $30 per ton were used in the models to compare the impacts of the tax.

The Demand Side Options included: HVAC modifications; lighting; appliances and; thermal envelope. Mr. Harris said on the supply side that all futures included renewable energy to meet Columbia Water and Light's Renewable Portfolio Standard. He said consideration of carbon tax impacts the optimal supply side portfolio. Mr. Harris said that transmission upgrades to area transmission facilities owned by others could increase the import capability of CWL by approximately 80MW. He said using the existing internal generation or adding other needed generation internal to the system would prolong the need to make improvements to the transmission facilities reducing the losses associated with the imports.

Mr. Harris said the supply side analysis was modeled and simulated using the Strategist resource software. The program used the assumptions applicable to the supply side analysis to determine the optimal portfolio of resources to meet the energy needed. He said after this analysis was done in Strategist, the lowest Net Present Value scenarios under a No CO2 tax and $10/ton CO2 tax environment were modeled in PROMOD. This was done to compare the scenarios against other supply resources that require more detailed hourly production cost analysis.

Mr. Harris said with the current assumptions the lowest cost portfolio contained:

- 50MW of new coal plant
- 34MW of engine generators
- Market capacity and energy
- This future requires about $200 million investment or long term Power Purchase Agreement for coal unit.

Kiah Harris said Burns and McDonnell needed direction from the Task Force. They need to know from the Task Force:

What type of supply side future is considered to be:

- Pursued by CWL
- Used as basis for DSM comparison

How aggressive should DSM penetration be:

- Customer managed
- CWL managed

Matthew Lind, Development Engineer, Burns and McDonnell then took over the presentation on Supply Side discussion

Mr. Lind outlined the Supply Side Options. He referred to Appendix A, Study Assumptions of the report. Tom O'Connor voiced his concern of the lack of concentrated solar thermal analysis in the report. Mr. Lind said the mid-west unlike the southwest was not conducive to a lot of solar energy. Therefore, there was not a lot of time spent on solar analysis. Mr. Lind said wind energy would be more economically attractive to the mid-west. He identified the supply side options and the assumptions used in the study. He explained that certain options had to be modeled in an hourly chronological model to properly review operating characteristics. Mr. Lind described demand and

energy forecast that would be used in the analysis. Various scenarios regarding the Strategist software analysis were discussed.

Jim Windsor asked if the wind analysis was just based on energy and did not address capacity and variability issues associated with wind. Kiah said it was replacing energy only.

Dick Parker requested a run done where wind replaces coal and Wartsilia engines.

Mark Imel, P.E., Director, Performance Management Energy Services Group, Burns and McDonnell, then took over for the Demand Side Management part of the presentation. He described the distribution of CWL customers by rate class. He identified the four sources of information for the Demand Side analysis. They included: Columbia Land Use Database; DOE Energy Information Administration; CWL Personnel and EPA ENERGY STAR program. He said the Energy Information Agency (Department of Energy) was one of the resources of data for natural gas modeling. Mr. Imel provided the benchmarks that established LEEDS certification. He explained the HVAC and lighting savings costs estimates. He said appliances as a whole would not have a major impact on building savings potential. Regarding Industrial Demand Side Management Opportunities Mr. Imel said that only a limited number of accounts would be considered because most of the accounts corporate policy dictated energy efficiency already.

Hank Ottinger said the thermal envelope in industrial and commercial should be evaluated. Mr. Imel explained that due to the size of the buildings and significant areas of interior space that are not impacted by the envelope that it was difficult to do an accurate analysis.

Mr. Imel discussed end use of energy usage and demand side management options. He went over graphs that showed projections of local impact from CWL managed demand side management programs and customer managed demand side management programs.

There was some discussion about the Council mandate regarding Kyoto. Dick Parker said he thought the Task Force needed to be able to tell City Council what it will cost to meet Kyoto.

The Task Force Committee decided to meet again at 5:30 p.m. on Monday, March 24 to discuss the report as a committee and form some ideas on what direction they want Burns and McDonnell to go to help with the Task Force's decision making.

The meeting was adjourned at 9:00 p.m.

Prepared by: Marilyn Thorpe