Written Responses for the Missouri Commission's Feb 4 2016 Workshop

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1. Please identify planned unit retirements

   None. Neither Dogwood Energy, nor its co-owners in the Dogwood Energy Facility, which are municipal utilities and power authorities located in the states of Missouri and Kansas, currently have any plans to retire any of the generating units that comprise the Dogwood Energy Facility. The Dogwood Energy Facility is a highly efficient natural gas-fired combined cycle power plant with room for further expansion of generating capacity on the site.

2. Please provide the estimated cost of compliance with the final Section 111(d) rule based on each of the following scenarios or assumptions:

   a. Missouri uses a mass-based approach and allocates allowances pro-rata based on an historical baseline (sometimes referred to as grandfathering) using one of the following parameters:
      i. CO2 emissions
      ii. Heat input
      iii. Net Generation

      Future costs of compliance of an environmental program not yet developed or implemented are difficult to determine and depend on a wide variety of assumptions regarding the following: fuel prices, variable operating costs of existing and new generating facilities, construction of new generating facilities, electricity pricing within regional markets, the ability and willingness of allowance holders to trade allowances both within and between states, and many other factors, including each generation owner's incentive to achieve compliance goals.

An argument could be made that the cost of CO2 allowances, and therefore the energy-related cost of CPP compliance, should be closely related to the relative differences in fuel prices and generator efficiencies and costs of operation. This argument would include important assumptions, including, willing and able buyers and sellers of allowances, no market inefficiencies (such as minimum supply requirements under fuel contracts that would cause generating units to operate at a loss based on variable cost), and sufficiently stringent compliance enforcement requirements to prevent violations. In the current climate of low natural gas prices, and at current coal prices and existing generator efficiencies in Missouri, the additional energy production-related cost of compliance could be a reasonably small percentage of the current generation production costs in the state in 2022. Under this argument, if the cost of natural gas increased substantially without similar changes in coal prices, the energy-related cost of compliance would also increase.

In general, however, the state of Missouri will have the best opportunity to achieve compliance with the CPP and keep its compliance costs as low as possible if, instead of the grandfathering methods referenced in the question, CO2 allowances are allocated to the generator owners that will need to run their fossil fuel generators in order for the state to achieve compliance. Following this principle would limit the amount of CO2 allowance trading required among generator owners within the state for Missouri to achieve CPP compliance, thereby limiting the potential impact for CO2 allowance costs to increase the cost of energy in Missouri. Projecting which generating units will be needed to operate to ensure compliance is well within the capabilities of current generation dispatch models and is quite achievable in terms of implementing this method.

For a mass-based approach with allowances allocated pro-rata based on any of the three historical baselines described in the question, a maximum amount of CO2 allowance trading will be required to achieve CPP compliance in Missouri. Each of these methods places allowances in the hands of generation owners whose facilities can't operate in the future if Missouri is to achieve compliance with its CPP goals. Therefore, these allowance holders (if they don't already also own the less CO2-emissions-intensive generating facilities, such as natural gas-fired combined cycle facilities, that will need to be operated) will either need to sell their allowances or build new generating units that emit less CO2, or both, in order for Missouri to achieve compliance. In both cases, the cost of CPP compliance in the state of Missouri increases, either through increased energy costs that include CO2 allowance prices or a utility's base rates for the capital cost of new facilities.

Based on Dogwood Energy's initial analyses, the compliance cost results for the three referenced grandfathering methodologies are similarly poor over a wide range of generating fuel price assumptions, with the Net Generation method producing marginally better results than the other two methods. Depending on

the modeling, pricing and trading behavior assumed, allocating allowances under any of the three methods described could cause Missouri to fail to achieve compliance with the CPP without the construction of new generating units by the allowance holders and the resulting increase in base rates and the compliance costs of Missouri consumers.

b. Missouri uses a mass-based approach as described in scenario "a" and allowances are either:
   i. Irrevocable even if a unit retires or
   ii. Redistributed to existing affected units if a unit retires

   Based on Dogwood Energy's analyses, energy-related compliance costs incurred by consumers are reduced when CO2 emissions allowances are allocated to the fossil fuel generating units that need to be operated in order for Missouri to meet its CPP compliance emissions goals. Allocating allowances to generating units that have retired is an inefficiency that will increase the energy-related costs of compliance to Missouri consumers. In order to achieve the greatest reductions in compliance costs, the allowances for retired units should be reallocated to the fossil-fueled generating units that will need to operate instead of the retired facility.

c. Missouri uses a mass-based approach and allocates allowances as described in Scenario "a" and includes set-asides for one or more of the following:
   i. Renewable energy projects
   ii. Energy efficiency projects
   iii. Existing NGCC output-based

   Allocating adequate CO2 emissions allowances to the least CO2-emissions-intensive fossil fuel units, such as NGCCs, that need to operate at high levels in order for Missouri to meet its compliance goals under the CPP will reduce the cost of compliance incurred by Missouri consumers. In order to achieve the lowest potential cost of compliance, any set-aside should be consistent with the level of operation needed from NGCCs in order to achieve compliance with the CPP in Missouri.

d. Missouri uses a mass-based approach and allocates allowances based on updating output-based allocations where affected sources and potentially one or more of the following are eligible to receive allocations based on their pro-rata share of updated generation levels each compliance period:
   i. Renewable generating resources that began operation post 2012
   ii. New/uprated nuclear
   iii. Energy from qualified biomass
   iv. Energy savings from post 2012 demand-side energy efficiency measures

   Based on Dogwood Energy's analyses, a method that allocates allowances based on actual or expected operations during the compliance period, if designed

properly, should - in all reasonable potential future cases - result in lower costs of compliance to Missouri consumers than the grandfathering allowance allocation methodology outlined in Scenario "a". Dogwood Energy currently believes that a modeling projection methodology, rather than updating periodically for actual output, will provide more certainty to generation owners and will be more likely to avoid potential gaming of the allowance allocation system. The potential for gaming is reduced somewhat in an update system if allowances are allocated based on shorter time periods, but that may provide even less certainty for generators.

e. Missouri uses a mass-based approach and, similar to the RGGI regional auction model, auctions allowances with proceeds deposited into an energy efficiency investment fund. Assume a market clearing price per allowance of:
   i. $5.50;
   ii. $7.50.

   Dogwood Energy has not specifically analyzed CO2 allowance auction scenarios, but the analyses we have performed indicate that allowance prices in an auction in Missouri would likely need to clear at higher levels than $7.50 per ton of CO2 in order to successfully ensure Missouri's compliance with the CPP emission targets for the state. Studies performed by RTOs and consulting groups of which Dogwood is aware have pointed to CO2 allowance costs ranging from $40 to $60 per ton as being required for CPP compliance in the Central United States, given the assumptions made in their studies. In general, an auction mechanism would create larger volumes for trading and a higher net demand for allowances, increasing the price per ton and the total cost, in comparison to a direct allocation of allowances to the least CO2-emissions-intensive fossil-fuel generating units, such as NGCCs, in Missouri.

f. Missouri uses a mass-based approach and allocates allowances as described in Scenarios "a" or "d" and includes a new source complement.

   Dogwood Energy believes that it will be important to include new sources (new generating units) in the allowance allocation methodology in order to effectively eliminate "leakage." Many stakeholders have expressed significant concern regarding the "leakage" issue in the CPP, and it should be explicitly addressed in Missouri's plan. Dogwood Energy recommends an explicit inclusion of new sources in the allocation methodology consistent with their contribution to Missouri meeting its required compliance goals, so that the new source complement is included in the total pool of allowances to be allocated to both existing and new fossil-fueled generation sources in Missouri.

g. Missouri uses a mass-based approach and allocates allowances as described in Scenarios "a" and "d" and sets aside five percent (5%) of allowances for renewable energy or energy efficiency.

Dogwood Energy believes that failing to allocate all available allowances to fossil fuel generators that need them in order to ensure Missouri achieves CPP compliance will increase the energy production costs that Missouri consumers will pay as part of total compliance costs. Renewable energy facilities and energy efficiency projects will not need allowances to produce the required energy or reduce Missouri's energy needs, and the fossil fuel facilities will need the allowances in order to operate. However, to the extent the allowances set aside for such renewable energy and energy efficiency projects are consistent with the amount of energy that the least CO2-emissions-intensive fossil-fueled generators no longer need to produce to satisfy energy demand in Missouri, the impact on energy production costs should be minimized. After that, the Commission's concern regarding the costs of these projects should pertain to how much, if any, of the capital and fixed operating costs of these projects Missouri consumers will need to pay for in Missouri utilities' base rates.

3. Please describe any anticipated reliability issues or capacity constraints if Missouri implements a compliance plan that includes the following scenarios or assumptions.

   In general, Dogwood Energy believes that with adequate time and planning for achieving compliance with Missouri's CPP goals, reliability issues and capacity constraints should not occur. If the allowance allocation methodology is determined early enough to allow adequate preparation for changes in generation dispatch and if the CO2 allowances are allocated consistent with the projected generation dispatch required for Missouri to comply with the CPP, then there should not be any insurmountable impact on reliability or constraint of capacity.

4. If Missouri uses a mass-based approach without a new source complement and allocates fixed irrevocable allowances pro-rata based on an historical baseline without any set-asides, to what extent would your company's compliance approach likely rely upon purchasing allowances from the market and/or building new natural gas combined cycle capacity? Explain if and how this would this change if the new source complement and/or an alternative allowance allocation process were used?

   Under those circumstances, Dogwood Energy would likely receive slightly less than one-third of the allowances needed for it to fully support Missouri's compliance with the CPP. As a result, Dogwood Energy would have to purchase allowances if they were available at an economic price based on projected natural gas, coal, and SPP electricity market prices. If the allowances were not available at an acceptable price, Dogwood Energy would not be able to operate economically and would be forced to restrict its generating output to the allocated level of allowances. We estimate that this result would deprive Missouri consumers of the potential reduction of more than 3 million tons of CO2 emissions from the Facility.

In contrast, Dogwood Energy's analyses indicate that if Missouri NGCCs were allocated CO2 allowances approximating their operation at a 80% capacity factor using the equivalent allowances from the most CO2-emission-intensive generation facilities in Missouri, the resulting changes in generation dispatch would bring Missouri to within 5% of complying with the Interim Step 1 Period 2022-2024 CO2 compliance threshold limits set by the EPA.

5. Are you aware of an approach that Missouri may be able use in its plan to address emissions leakage to new units while minimizing cost and reliability impacts? If so, explain the approach. If not, which approaches to address emissions leakage in the state plan would be most likely to increase cost or cause reliability concerns?

   Yes, Dogwood Energy is aware of growing support for the US EPA's mass-based approach to include the new source complement as part of each State's overall CPP compliance strategy to avoid leakage. As stated above, Dogwood Energy also believes that including new generation sources and the new source complement in the allowance allocation methodology, rather than keeping them separate, should result in lower increases in energy production cost to Missouri consumers for compliance with the CPP.

10. Is there a trading approach that will mitigate any anticipated reliability concerns or capacity constraints (i.e., is there a specific combination of states, RTOs, trading ready etc.)?

    Dogwood Energy believes that multi-state or regional CO2 allowance trading may be a valuable tool to reduce the cost of compliance to Missouri consumers in meeting the compliance goals of the CPP. At this time, Dogwood Energy is not specifically aware of an optimal configuration of states or regions that would most benefit Missouri. However, permitting trading of allowances with neighboring states in which Missouri's generation owners also have generation facilities, such as Kansas, Nebraska, Arkansas and Illinois, could certainly lead to benefits in terms of administration and economies of scale for reducing energy-related compliance costs to Missouri's consumers.

12. Could another state's approach to CPP compliance (rate vs. mass, allocation approaches, trading approaches, new source complement, etc.) affect your utility's compliance with the CPP in Missouri? If yes, please explain.

    Dogwood Energy does not own or operate generation facilities in other states, so it is unlikely that another state's approach to compliance will directly affect our compliance with the CPP in Missouri, as long as the Dogwood Energy Facility is allocated enough allowances to fully contribute to meeting Missouri's CPP compliance goals. Indirectly, another state's approach could impact any

generating facility's compliance with the CPP in Missouri as a result of its impacts on electricity market pricing or allowance trading costs, if such trading exists with another state.

20. Does your utility expect adequate coordination between MISO, SPP, and AECI in order to facilitate CPP compliance? What is your utility doing to communicate with these entities regarding CPP compliance? Please explain.

Dogwood has been involved during the past few years with providing input to and feedback on SPP's evaluations and analyses of CPP compliance within the SPP RTO region through the SPP's Strategic Planning Committee, Market and Operations Policy Committee, and Members' Committee. Dogwood fully expects that SPP, as the Reliability Coordinator for its RTO region, will coordinate with its members and the appropriate state environmental agencies regarding the CPP.

At this time, it is not obvious that there has been a significant level of coordination among SPP, MISO and AECI regarding the CPP. The interregional transmission planning structures that are in place among those entities should ensure coordination for transmission planning purposes. However, without a particular forum, such as one sponsored or directed by the state of Missouri, coordination on more than reliability and transmission planning issues may not take place at a level of detail that would be useful to Missouri utilities' implementation of the CPP. To date, as a member of SPP, Dogwood Energy has not taken any steps to coordinate with either AECI or MISO regarding CPP compliance.

21. What steps are MISO, SPP, and/or AECI taking to ensure adequate coordination with each other and their members regarding CPP compliance? Please explain.

SPP, MISO and AECI are the parties in the best position to answer this question. However, Dogwood Energy is aware that SPP has spent a considerable amount of time analyzing the potential impacts of the CPP on its region and initiating discussions with the appropriate state agencies regarding the results of its studies.

22. What transmission and/or distribution upgrade or building needs does your utility anticipate as a result of the CPP (e.g., new lines, upgrades to transformers or substations, AMI)?

    Dogwood Energy does not expect to build or upgrade any transmission or distribution lines itself, since it does not own or operate such assets other than its interconnection facilities.

23. MISO and Platts recently estimated (http://www.platts.com/latest-news/electric-power/houston/misos-expected-cost-to-comply-with-us-cpp-varies-21631026) that changes in several factors, including the price of natural gas (between $2.30 to 6.30/MMBtu), could lead to large ranges in the potential cost of compliance with the CPP. How does your utility plan to mitigate the risk of compliance cost overruns due to natural gas market uncertainties?

    Based on its analyses, Dogwood Energy believes that a methodology of allocating Missouri's CO2 allowances to the least CO2-emissions-intensive fossil-fuel generating facilities, such as NGCCs, will make a significant contribution to any plans to mitigate the risk of compliance cost overruns due to any uncertainties, whether they are in the natural gas market, coal market, allowance trading market or otherwise.