STATE OF IOWA
DEPARTMENT OF COMMERCE
BEFORE THE IOWA STATE UTILITIES BOARD

IN RE:	:	
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APPLICATION OF MIDAMERICAN ENERGY COMPANY FOR A DETERMINATION OF RATEMAKING PRINCIPLES	:	**DOCKET NO. RPU-2014-0002**

DIRECT TESTIMONY
OF
JENNIFER A. McIVOR

Q. Please state your name and business address.

A. Jennifer A. McIvor, 7215 Navajo Street, Council Bluffs, Iowa 51501.

Q. By whom are you employed and in what position?

A. I am Vice President, Environmental Programs, Compliance and Permitting for MidAmerican Energy Company ("MidAmerican").

Q. Please describe your current responsibilities.

A. My current responsibilities are twofold. First, I manage the environmental programs to ensure MidAmerican and its facilities obtain the appropriate permits and remain in compliance with permit conditions and the associated regulatory requirements. Second, I integrate environmental assessments of existing and anticipated environmental regulations into planning and operating decisions of business units, advise management of the impact of proposed regulations, and develop potential compliance strategies.

Q. Please describe your educational background and business experience.

A. I received a Bachelor of Arts Degree with a concentration in Environmental Studies from the Wilkes Honors College of Florida Atlantic University, a Juris Doctorate from Vermont Law School, and a Master of Environmental

Management from the Yale School of Forestry and Environmental Studies. I was admitted by examination to practice law in Iowa and Nebraska and maintain my licensure in both states. During law school, I clerked for the Nebraska Attorney General Office of Agriculture, Environment and Natural Resources. During graduate school, I clerked for The Wilderness Society in Washington, D.C. I joined MidAmerican in 2008 as an environmental coordinator at Walter Scott Energy Center. I joined the environmental services department as a senior environmental coordinator in 2010 and was promoted to director, environmental programs in 2012. In 2014, I was promoted to my current position.

PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to address the environmental impact of MidAmerican's proposed new wind power project—the Wind IX Iowa Project ("Wind IX" or "Project") and to sponsor Section 4.2 (Environmental Impact) of MidAmerican's application for the establishment of ratemaking principles ("Ratemaking Principles Application") that will govern MidAmerican's development of Wind IX. My testimony is based upon the development of up to 162 megawatts ("MW") of wind energy generation. The volume of the Ratemaking Principles Application containing the above-described information (i.e., Section 4.2) is identified as Volume I in this docket.

REGULATORY REQUIREMENTS

Q. Would you identify and briefly describe all of the environmental permits required to construct and operate Wind IX?

A. MidAmerican has identified the permits and approvals that will be required to construct and operate each of the sites that will eventually comprise the proposed Project. It is anticipated that each Project site will require very few environmental approvals for construction because of the agricultural nature of the likely turbine locations, and will require no environmental permits for operation. Although the construction contractor will need to obtain a National Pollutant Discharge Elimination System ("NPDES") permit from the Iowa Department of Natural Resources ("IDNR") for Project-related construction storm water discharges, it is not anticipated that any other environmental permits will be required.

Q. Will MidAmerican obtain all permits and approvals necessary to construct and operate Wind IX?

A. Yes. MidAmerican will obtain all necessary construction and operating permits and approvals in a timely manner, as it has done with respect to all eight (8) of our prior MidAmerican wind projects.

Q. Will MidAmerican meet and abide by all terms and conditions imposed by the necessary permits and approvals?

A. Yes. MidAmerican will abide by all such terms and conditions.

ENVIRONMENTAL IMPACT TO THE STATE AND COMMUNITY (41.3(4)"b")

Q. Please compare the proposed facilities with other feasible sources of supply as it relates to the environmental impact to the state and communities where the facilities will eventually be located.

A. Wind IX compares favorably with other feasible sources of supply as it relates to environmental impacts. MidAmerican will obtain easements for the parcels of land for each of the wind turbines that comprise Wind IX and will purchase the

land for any necessary substations. Each turbine is expected to occupy an area that is approximately four-tenths (0.4) of an acre. Although a portion of the property where each turbine resides will no longer be available for agricultural production, this will be a relatively small amount of property (i.e., four-tenths of an acre per turbine). Moreover, construction of Wind IX will not significantly affect agricultural production in the surrounding area.

Wind IX is not expected to have any significant impact on plants or wildlife. Prior to construction of the turbines, each parcel of property will be evaluated to ensure that the proposed siting of the facilities on that parcel will not likely have a detrimental impact to any threatened or endangered species or critical habitat. Because the turbine locations are anticipated to be largely on land that is currently being used for agricultural crop production, significant impacts to federal or state endangered or threatened species are not anticipated. In addition, because the turbines will be located on property that maximizes each turbine's wind profile, the turbines will not be in areas with trees and associated habitat necessary to support avian or bat species. Therefore, it is not anticipated that Wind IX will significantly impact avian or bat species or their habitats. Furthermore, because operation of Wind IX will also not result in any impact to air quality or water quality, operation of the Project will also not result in any significant impacts to terrestrial and aquatic plants and wildlife. Thus, Wind IX is not expected to have any significant negative impact on plants and wildlife and compares favorably to fossil fuel generation as there are no air emissions or wastewater effluent discharges from the Project's generation.

Q. Would you describe MidAmerican's efforts to minimize accidental releases of contaminants from Wind IX and any programs or plans that will be employed by the Project in the event an accidental release does occur?

A. MidAmerican will develop and employ a number of emergency response plans to ensure that any spills and releases that may occur are minimized. In addition, MidAmerican will prepare any required Spill Prevention, Control and Countermeasure Plans and Storm Water Pollution Prevention Plans for use at each Project site.

IMPACT OF THE WIND ENERGY ON AIR, LAND AND WATER

Q. What is the expected impact of Wind IX on air, land, and water resources?

A. Construction, maintenance and operation of the Project will be in accordance with planning and zoning requirements. The Project's generation will have no air emissions or wastewater effluent discharges. Because each turbine encompasses approximately four-tenths of an acre, a small amount of agricultural land will be taken out of production, even if all of the sites are currently being utilized as agricultural land. Although other renewable energy resources also have beneficial environmental attributes, all other renewable resources would likely have greater impacts on the environment. For example, although solar energy would not have any air or water emissions, the land resource required for large arrays of solar panels and/or collector systems (approximately 10 acres per installed megawatt) is greater than the land impact from a wind energy resource. Similarly, energy produced from biomass could have a greater impact on land resources than wind energy if it involved the harvesting of an alternative fuel source, such as lumber. Therefore, among the renewable alternative sources, wind energy represents a

leading technology for renewable energy with minimal environmental impacts and maximum environmental benefits. Therefore, I conclude that the Project will be consonant with reasonable utilization of air, land, and water resources, considering available technology and the economics and environmental attributes of available renewable and conventional generation alternatives.

Q. Please describe how MidAmerican implements measures to protect sensitive species and habitats.

A. There are three statutes which afford protection to avian and bat species in the U.S.: the Migratory Bird Treaty Act ("MBTA") of 1918; the Bald and Golden Eagle Protection Act ("BGEPA") of 1940; and the Endangered Species Act ("ESA") of 1973. All three statutes prohibit unauthorized harm to protected species. All but three native North American migratory avian species are protected by the MBTA, and eagles are afforded additional protection under the BGEPA. In addition, the Indiana bat is listed as endangered under the ESA; it has the potential to occur throughout southern Iowa. All counties in Iowa have been identified by the U.S. Fish and Wildlife Service ("USFWS") as potentially containing habitat for the northern long-eared bat, a species which is under consideration for protection under the Endangered Species Act. In 2012, the USFWS issued updated guidance, the Land-Based Wind Energy Guidelines, to advise wind project owners and developers how to address avian and bat risks under the MBTA and ESA. In 2013, the USFWS issued Eagle Conservation Plan Guidance to advise wind project owners and developers how to address risks to eagles under the BGEPA.

MidAmerican thoroughly evaluates proposed project sites to determine the risk they might pose to protected avian and bat species, and works cooperatively with the USFWS and IDNR to avoid and minimize those risks. The Wind IX projects will undergo preconstruction avian surveys to establish baseline avian presence, preconstruction acoustical monitoring to establish baseline bat presence, and at least one year of post-construction avian and bat mortality monitoring. These data will be used to develop site-specific bird and bat conservation strategy plans that document MidAmerican's efforts to avoid impacts to protected species where possible, and to mitigate impacts which cannot be avoided.

Q. Will Wind IX be beneficial in minimizing emissions associated with the generation of electricity?

A. Yes. The Project's generation of electricity will be a source of zero air emissions. To demonstrate the air emission benefits resulting from the installation of the Project, the table below provides a comparison of MidAmerican's generation system air emissions rate with and without Wind IX's 162 MW. For purposes of demonstrating the potential environmental benefits associated with the Project, the MidAmerican generation system was modeled for the year 2016.[1] The emissions rates cited below were calculated based on the 2016 modeled, projected generation for the entirety of MidAmerican's generation resources in that year, with and without the 162 MW of Wind IX.

[1] The year 2016 was modeled under two scenarios; with and without the 162 MW of Wind IX. The first scenario includes all previously approved generation installed by December 31, 2013, plus the remainder of Wind VIII to be installed in 2014 and 2015 (without the 162 MW of Wind IX). The second scenario includes all of MidAmerican's generation resources, including the 162 MW of Wind IX.

MidAmerican Generation System			
	SO_2 pounds per MWh[1]	**NO_X pounds per MWh[1]**	**CO_2 pounds per MWh[1]**
2016 MEC emissions with all previously approved generation in service by 12/31/15 [1] (Does not include the 162 MW of Wind IX)	**0.839**	**1.320**	**1,046**
2016 MEC emissions with the 162 MW of Wind IX[1]	**0.826**	**1.300**	**1,030**

Notes: 1. The emissions reduction benefits are not solely for MidAmerican's rate base customers.

Q. Why was the year 2016 selected for your analysis of emissions comparison?

A. The year 2016 would be the first full year that reflects the full impact of all wind generation potentially added as part of Wind IX, through December 31, 2015. Two scenarios were evaluated for 2016 to determine the effect of the 162 MW of Wind IX: one with the said 162 MW and one without the 162 MW of Wind IX. As reflected in the table above, the projected emissions rate for 2016 decreases for each pollutant if the 162 MW is added to the MidAmerican portfolio under Wind IX.

POTENTIAL REGULATORY EMISSIONS REDUCTION DRIVERS

Q. What is the status of federal climate change regulation?

A. On April 2, 2007, the U.S. Supreme Court held that greenhouse gas emissions, including carbon dioxide, are air pollutants covered by the Clean Air Act.[2] The Supreme Court found that the Environmental Protection Agency ("EPA") was required to determine whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare.

[2] *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007).

In April 2009, the EPA responded to the Supreme Court's decision by proposing a finding that greenhouse gases do contribute to air pollution that may endanger public health or welfare. EPA finalized this Endangerment Finding on December 7, 2009. Subsequently in June 2010, EPA finalized a greenhouse gas emissions Tailoring Rule to "tailor" the major source applicability thresholds for greenhouse gas emissions under the Prevention of Significant Deterioration and Title V programs of the Clean Air Act and to set a Prevention of Significant Deterioration significant emission increase threshold for greenhouse gas emissions. The Tailoring Rule focuses on the largest sources, increasing the emission thresholds at which Prevention of Significant Deterioration ("PSD") requirements become applicable to greenhouse gases, as compared to other regulated pollutants. Without the Tailoring Rule, lower emission thresholds would take effect, requiring a multitude of stationary sources to obtain Clean Air Act permit coverage, in what EPA has deemed "absurd results" in its defense of the Tailoring Rule.

In a June 23, 2014, decision[3], the U.S. Supreme Court vacated part of the Tailoring Rule, determining that EPA had overreached its authority under the Clean Air Act to modify the PSD applicability thresholds. As a result, a source may not trigger PSD or Title V permitting requirements solely on the basis of its greenhouse gas emissions, but sources which must obtain PSD or Title V permits anyway must incorporate greenhouse gases into those permits.

Q. Are there other rules that address greenhouse gas emissions besides the Tailoring Rule?

[3] *Utility Air Regulatory Group v. Environmental Protection Agency*, Slip Op. No. 12-1146.

A. Yes, there are three proposed rules that would directly limit carbon dioxide emissions from power plants.

On January 8, 2014, the EPA re-proposed its Carbon Pollution Standard for New Power Plants.[4] These new source performance standards for greenhouse gases would apply to new fossil fuel-fired power plants greater than 25 megawatts and would affect all fossil fuels, including coal and natural gas. The proposed rule would establish a new source performance standard of 1,000 pounds of carbon dioxide per megawatt-hour (CO_2 lb/MWh) for large natural gas-fueled plants and 1,100 CO_2 lb/MWh for new coal-fueled plants. The agency expects that new coal-fueled power plants could meet this standard with the installation of carbon capture and sequestration technology. Once finalized, a carbon standard for new units would trigger requirements under the Clean Air Act to develop standards for existing units as well. EPA has not taken action to finalize the proposed carbon standard for new units as of the time of this filing.

On June 2, 2014, the EPA proposed regulations to address greenhouse gas emissions from existing fossil-fueled generating facilities, referred to as the Clean Power Plan, under Section 111(d) of the Clean Air Act.[5] The Clean Power Plan aims to reduce carbon dioxide emissions from existing power plants 30% from 2005 levels by 2030 based on a 2012 emissions baseline. The rule would set unique carbon dioxide emissions intensity targets (i.e., pounds of carbon dioxide per megawatt-hour) for each state.

The EPA's proposal calculated state-specific emission rate targets to be achieved based on four building blocks that it determined were the "Best System

[4] 79 Fed. Reg. 5, 1430 *et seq*.
[5] Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, which the agency calls the Clean Power Plan, 79 Fed. Reg. 117, 34,830 *et seq.*

of Emission Reduction." The four building blocks include: (a) a 6% heat rate improvement from coal-fueled generating facilities; (b) increased utilization of existing combined-cycle natural gas-fueled generating facilities to 70% capacity factors; (c) increased deployment of renewable and non-carbon generating resources; and (d) increased energy efficiency. Under the EPA's proposal, states may utilize any measure to achieve the specified emission reduction goals, with an initial implementation period of 2020-2029 and the final goal to be achieved by 2030. The EPA is taking comment on its proposal until October 16, 2014, and is scheduled to issue final rules in June 2015.

Also on June 2, 2014, EPA proposed regulations to address greenhouse gas emissions from modified or reconstructed fossil-fueled generating facilities under Section 111(b) of the Clean Air Act.[6] A modification is any physical or operational change that increases a unit's emissions; reconstruction involves the replacement of facility components to an extent that the capital cost of the new components exceeds 50% of the capital cost to construct an entirely new comparable facility. Under the proposal, reconstructed fossil-fueled sources would have to meet a limit of 1,900-2,100 CO_2 lb/MWh, depending on the size the unit. Modified fossil-fueled sources would need to meet a unit-specific limit based on an energy efficiency improvement audit of the facility. Reconstructed and modified natural gas-fueled units would need to meet the same standard proposed in the new sources rule, 1,000-1,100 CO_2 lb/MWh, depending on the size of the unit. The EPA is taking comment on the modified sources proposal through October 16, 2014.

[6] Carbon Pollution Emission Guidelines for Modified and Reconstructed Sources: Electric Utility Generating Units, 79 Fed. Reg. 117, 34,960 *et seq.*

Q. What is your expectation regarding further governmental restrictions on air emissions from fossil-fueled generation?

A. I believe the trend line clearly points toward a continued tightening of the restrictions over time. While the future of legislative changes remains unclear (see below), the actions of the Executive Branch continue to signal growing restrictions on fossil-fueled generation.

Q. Are there regulations in addition to potential carbon restraints that affect fossil-fueled generation?

A. Yes. There are three additional rules with significant impacts to fossil-fueled generation, including the Mercury and Air Toxics Standards ("MATS"), the proposed coal combustion residuals ("CCR") rule, and the proposed Effluent Limitation Guidelines ("ELGs") rule.

Mercury and Air Toxics Standards. On February 16, 2012, EPA finalized the MATS for fossil-fueled electric generating sources, and established maximum achievable control technology limits on emissions of mercury, non-mercury metals, and acid gases. The standards target a 90% reduction in mercury emissions, an 88% reduction in acid gas emissions, and a 41% reduction in sulfur dioxide emissions beyond those reductions expected from interstate-transport rules for air emissions.

The MATS limits established by EPA are based on control efficiencies expected from the installation of scrubbers for sulfur dioxide and acid gases, baghouses for metals, and activated carbon injection for mercury. The EPA expects facilities to comply with the new standards through a combination of strategies, including the use of existing emission controls, upgrades to existing

controls, installation of new emission controls, and fuel switching. In the event that one of these strategies is not technically or economically feasible, the unit must be shutdown.

Coal Combustion Residuals proposed rule. In December 2008, an ash impoundment dike at the Tennessee Valley Authority's Kingston power plant collapsed after heavy rain, releasing a significant amount of fly ash and bottom ash, coal combustion byproducts, and water to the area surrounding the plant. In light of this incident, federal and state officials have called for greater regulation of the storage and disposal of coal combustion byproducts. In May 2010, the Environmental Protection Agency released a proposed rule to regulate the management and disposal of coal combustion byproducts, presenting two alternatives to regulation under the Resource Conservation and Recovery Act ("RCRA"). One option was to regulate coal combustion byproducts under RCRA Subtitle C as a hazardous or "special waste," which would require special handling of coal combustion byproducts from the point of generation and impose restrictions on disposal. The other option was to regulate coal combustion byproducts under RCRA Subtitle D through the establishment of minimum nationwide standards for the disposal of those materials. Under either option, surface impoundments utilized for coal combustion byproducts would have to be closed unless they met more stringent regulatory requirements. In addition, more stringent requirements would be implemented for new ash landfills and expansions of existing ash landfills. EPA has entered into a settlement agreement with environmental groups and ash marketers to make a final decision on the Subtitle D rule by December 19, 2014.

Effluent Limitation Guidelines proposed rule. On April 19, 2013, the Environmental Protection Agency released a prepublication copy of its proposed Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Industry, which would update wastewater discharge rules and limits. Nuclear, coal, oil and natural gas-fueled power plants that generate more than 50 megawatts of power would be required to limit discharges of pollutants from a variety of waste streams under the proposed effluent guidelines. The effluent guidelines would address mercury, zinc, phosphorous, selenium and other pollutants discharges to surface waters through wastewater, coal ash ponds and flue gas desulfurization systems. The proposed limits would be phased in between 2017 and 2022. The proposed rule would establish new or additional requirements for wastewater from flue gas desulfurization, fly ash, bottom ash, flue gas mercury control, combustion residual leachate from landfills and surface impoundments, nonchemical metal cleaning wastes, and gasification of fuels such as coal and petroleum coke. EPA presented four preferred alternatives for existing power plants and one preferred alternative for controlling discharges from new power plants. EPA intends to finalize the ELG rule by September 2015.

Q. How will these rules affect wind generation?

A. Because wind generation is a zero-emission and zero-discharge source of generation, these rules will increase wind generation's relative competitive value and customer benefits as compared to fossil-fueled sources of generation.

POTENTIAL LEGISLATIVE EMISSIONS REDUCTION DRIVERS

Q. What is the status of federal and state climate change legislation?

A. While significant measures to regulate greenhouse gas emissions at the federal level were considered by the United States Congress in 2010, comprehensive climate change legislation has not been adopted.

A number of states have developed climate registries and climate action plans, but few have progressed to requiring binding emission reductions. Neither the Midwest Greenhouse Gas Accord nor the policy options developed by the Iowa Climate Change Advisory Council have moved forward with any recommended binding emission reductions in Iowa.

The Regional Greenhouse Gas Initiative in several Northeast and Mid-Atlantic states requires the reduction of carbon dioxide emissions from the power sector of 10% by 2018. In the Western U.S., currently only California has implemented binding emissions reductions requirements. In 2006, California enacted Assembly Bill 32, the Global Warming Solutions Act, which would reduce California's greenhouse gas emissions to 1990 levels by 2020. It directed the California Air Resources Board to begin developing discrete early actions to reduce greenhouse gases while also preparing a scoping plan to identify how best to reach the 2020 limit. Pursuant to the authority of the Global Warming Solutions Act, in October 2011, the California Air Resources Board adopted a greenhouse gas cap-and-trade program with an effective date of January 1, 2012; compliance obligations were imposed on regulated entities beginning in 2013. The first auction of greenhouse gas allowances was held in California in November 2012 with subsequent auctions being held quarterly.

Q. How is MidAmerican addressing climate change regulation?

A. Climate change represents a major policy issue that will have future, potentially significant, implications for MidAmerican and every other generator of electricity. MidAmerican follows these issues closely to determine the impact on its facilities and planning for future facilities. MidAmerican supports the development of a responsible climate policy that addresses global climate change and reduces greenhouse gas emissions while ensuring reasonably priced energy for consumers.

MidAmerican recently completed emissions reductions projects at two of its facilities, Neal Energy Center Unit 3 and Neal Energy Center Unit 4. These activities included projects to reduce greenhouse gas emissions via plant efficiency improvements incorporated into the air quality control system permits issued by the Iowa Department of Natural Resources. In order to meet certain environmental requirements, MidAmerican will retire four coal-fueled units – Neal Energy Center Units 1 and 2 and Walter Scott Energy Center Units 1 and 2 – by April 2016. MidAmerican will also cease burning coal at Riverside Generating Station, limiting the facility to natural gas combustion, by April 2016. These retirements and operational changes further reduce MidAmerican's CO_2 emissions.

In addition to these projects, MidAmerican is investing in renewable generation sources and energy efficiency programs, both of which assist in mitigating risk associated with climate change regulation, while meeting customer needs.

Q. How would a limit on carbon impact different generation resources?

A. The greater the carbon intensity (i.e., pounds of carbon dioxide emitted per MWh) of the generating resource, the greater the impact on the cost of generation. By way of comparison, coal resources produce approximately one ton of carbon dioxide per megawatt hour, gas resources produce approximately a half a ton of carbon dioxide per megawatt hour, and wind resources produce no carbon dioxide. Therefore, every dollar per ton of carbon dioxide imposed by a carbon limit increases the cost of coal generation approximately one dollar per megawatt hour, or fifty cents per megawatt hour for gas generation. Obviously there would be no corresponding increase in the cost of wind generation.

Q. What impact will carbon limits have on the wind generation?

A. Because the wind generation is a zero emission source of generation, any form of carbon limits will increase its relative competitive value and customer benefits as compared to carbon-emitting sources of generation. In addition, energy generated by a zero carbon emission source will help improve a fleet's overall carbon intensity.

Q. Is it prudent to invest in more wind generation now?

A. Yes. As noted in environmental testimony in MidAmerican's earlier wind projects, we have anticipated a carbon-constrained future and we have worked to diversify our generating fleet with additional low and zero-carbon emitting sources. Carbon constraints will only raise the value of wind generation compared to other sources of generation that produce emissions, such as coal-fueled or gas-fueled electric generating units. This is readily apparent in EPA's proposed Clean Power Plan, under which states have the flexibility to count renewable energy generation towards compliance with their emission targets. Although the final

content of future carbon regulations is not yet known, preparing for future carbon constraints, in whatever form they take, by expanding MidAmerican's wind portfolio now is a prudent investment. Further, adding wind generation is also beneficial in reducing the intensity of other regulated emissions.

Q. Please summarize the environmental impact that you believe will result from the construction of Wind IX.

A. I believe the Project will have a minimal impact on the environment, and represents a sound investment in preparation for future carbon and other environmental constraints.

Q. Does this conclude your prefiled direct testimony?

A. Yes, it does.

STATE OF IOWA)
) ss:
COUNTY OF POTTAWATTAMIE)

I, Jennifer A. McIvor, being first duly sworn, depose and state that the statements contained in the foregoing prepared direct testimony are true and correct to the best of my knowledge, information and belief, and that such prepared direct testimony constitutes my sworn statement in this proceeding.

/s/ Jennifer A. McIvor
Jennifer A. McIvor

Subscribed and sworn to before me this 9th day of October 2014.

/s/ Robyn Stephens
Notary Public – Iowa