Classification: **Public**

Anne-Marie Griger
Permitting Manager
RES
11101 W. 120th Avenue, Suite 400
Broomfield, CO 80021

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RE: Wind Turbine Spacing for the Proposed Bitter Root Wind Power Plant

The distance between wind turbines in a wind power plant is an important parameter when developing and optimizing wind power plant layouts. One consideration for determining the appropriate wind turbine spacing is the impact of wake induced turbulence on wind turbine loading. Using operational data from Vestas global wind turbine fleet, as well as theoretical modelling using the Risoe developed Dynamic Wake Meandering load model, Vestas has determined that the structure of wind turbine wakes and the subsequent impacts on WTG loading can be well characterized for turbine spacing as low as 2 rotor diameters (2RD). Below 2RD spacing Vestas recommends that a wind turbine curtailment strategy be implemented for the relevant direction sectors due to the increased modelling uncertainty in this near-wake case.

For the Bitter Root project, Vestas has completed a detailed analysis of the wind characteristics and the associated loading on the Vestas V136 wind turbine using the independently certified Vestas Site Check (VSC) software. This analysis has been completed considering multiple potential turbine layouts with wind turbine spacing as low as 2.2 rotor diameters, and has shown acceptable fatigue and extreme loading. Vestas can therefore confirm that turbine spacing of as low as 2.2 rotor diameters has been assessed for the Bitter Root wind power plant and is acceptable with no requirement for associated wind turbine curtailment.

Yours sincerely,

Kenneth Braun
Senior Manager, Wind & Site Engineering
Vestas Americas

1417 NW Everett St. US-97209 Portland
Dir: +1 503 327 2045, kebra@vestas.com

Vestas Americas

1417 NE Everett Street, Portland, OR 97209, USA
Tel: +1 503 327 2000, vestas-americas@vestas.com, www.vestas.com
Company Reg. Name: Vestas - American Wind Technology, Inc., Communication name: Vestas Americas