IBERDROLA
RENEWABLES

May 12, 2011

Mr. Iain Fisher
CEQA Project Manager
Energy Division
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102-3296

Re: Tule Wind Project – Response to Data Request No. 16

Dear Mr. Fisher:

Tule Wind, LLC (Tule Wind), a wholly owned subsidiary of Iberdrola Renewables, Inc. (IRI) received Data Request Number 16. IRI's response is enclosed for your use.

If you have questions regarding this information, please contact Patrick O'Neill at 858-712-8313 or 858-437-7422.

Sincerely,

Jeffrey Durocher
Wind Permitting Manager

cc (via e-mail): Greg Thomsen, BLM (GThomsen@blm.gov)
Thomas Zale, BLM (Thomas_Zale@blm.gov)
Jeffery Childers, BLM (jchilders@blm.gov)
Rica Nitka, Dudek (rnitka@dudek.com)
Patrick O'Neill, HDR Engineering (Patrick.oneill@hdrinc.com)

Noise

1. *Please calculate and provide the combined wind turbine noise level at the property line of the closest non-participating residence in terms of the octave band sound levels from 31.5 Hz through 8000 Hz.*

Response: Project-related sound levels were calculated using Cadna-A, an acoustical analysis software package designed for evaluating environmental noise from stationary and mobile sources. Cadna-A is a three-dimensional noise model based on International Standards Organization (ISO) 9613, "Attenuation of Sound during Propagation Outdoors," adopted by the ISO in 1996. This standard provides a widely-accepted engineering method for the calculation of outdoor environmental noise levels from sources of known sound emission.

The nearest non-participating residence (Home 1-McAllister property) from their property line to the nearest turbine is 1,525 feet from turbine R-2. Table 1 presents the spectral wind turbine noise level at the nearest non-participating residential property boundary. The boundary is located approximately 800 feet south/west of the residence. The table outlines the unweighted hourly L_{eq} for octave bands from 31.5 to 8 kHz.

Table 1. Spectral Property Line Airborne Noise – Wind Turbines Only

Receptor ID	L_{eq}, dBA	Octave Band Center Frequency, Hz Wind Turbine L_{eq}, dB								
		31.5	63	125	250	500	1000	2000	4000	8000
Home 1(at boundary)	52	67	62	58	55	51	45	36	16	0[a]

[a] Value is below the calculation threshold and estimated to be 0 dB.

As presented in Table 1, the wind turbine generated spectral sound levels predicted to occur at the nearest non-participating residential property boundary range from 0 to 67 dB dependent on the octave band. The sound levels presented in Table 1 are not representative of the ambient sound level or spectral distribution of sound that would be experienced with the proposed turbines, because only wind turbine generated sound is included. The contribution of existing sound sources and other project components would likely resulting in higher sound levels, particularly in the mid and high frequencies.

Table 2 presents the spectral combined sound level at the nearest non-participating residential property boundary. The table outlines the unweighted hourly L_{eq} for octave bands from 31.5 to 8 kHz. The combined sound level was calculated by adding the predicted wind turbine sound level and the existing average 23-hour Leq measured on site.

Table 2. Spectral Property Line Airborne Noise – Wind Turbines and Ambient

Sound Source	Octave Band Center Frequency, Hz Wind Turbine L_{eq}, dB								
	31.5	63	125	250	500	1000	2000	4000	8000

Wind Turbine Sound	67	62	58	55	51	45	36	16	0[a]
Exisiting Ambient Sound	47	51	50	47	39	31	29	27	26
Combined Sound (Existing Ambient + Wind Turbine)	67	62	59	56	51	45	37	27	26

[a] Value is below the calculation threshold and estimated to be 0 dB.

As presented in **Table 2** the combined spectral sound levels predicted to occur at the nearest non-participating residential property boundary range from 26 to 67 dB dependent on the octave band. The contribution of existing sound sources resulted in higher sound levels in the 125 Hz, 250 Hz, 2000 Hz, 4000 Hz and 8000 Hz bands.

The sound analysis estimated project-related sound levels by incorporating a number of modeling techniques whose net effect over-estimates noise propagation in the project area. These techniques include modeling the turbine with the greatest noise emission, assuming that the ground is 100% acoustically reflective, that the noise levels associated with the hot weather package (which includes additional noise from cooling equipment in the nacelle) were occurring all of the time, and applying other techniques as described in response to Question 16 of Data Request 14, that are conservative because they over-estimate project related noise levels. Table 3 summarizes the conservative modeling assumptions and their effect on modeling results.

Table 3. Modeling Assumptions and Influence on Calculated Sound Level

Modeling Assumption	Effect on Calculated Sound Level
Guaranteed sound level v. maximum manufacturer stated	+2 dB
Continuous use of hot weather package[1]	+ 2.6 dB
Reflective ground	+3 dB
Continuous downwind conditions for all directions[2]	≈ 0 to 2 dB
Use of 128 2.0 MW turbines vs. 128 1.5 MW turbines[3]	≈ 0 to 5 dB
Total increased effect on calculated sound level	7.6 to 14.6 dB

1 Lower emission modes of the hot weather package would be used during nighttime hours as the mode modeled will only be used in temperature above 98° F.

2 This results in the wind blowing in all directions continuously throughout an hour. These are the most favorable propagation conditions (wind blows in all directions all the time).

3 The Tule sound analysis modeled 2.0 MW turbines in a layout that is representative of maximum build-out with a 1.5 MW turbine (resulting in 28 additional turbines that would not actually be constructed).

The net effect of these conservative assumptions shown in the table above is the over-estimation of project-related noise levels on a spectral and A-weighted basis. As shown in **Table 3**, this noise analysis conservatively estimates sound levels at residential property boundaries. Actual noise impacts utilizing a 2.0 MW turbine would be less than modeled due to fewer turbines and larger setback distances.

Please refer to Data Request No. 14, Responses 2 and 6, for further information concerning the modeling methodology and wind turbine generated low frequency sound.

2. It appears the noise floor of the sound level measurement equipment used to conduct the ambient noise measurement survey is 32 dB. Is this correct?

Response: The noise floor of the measurement equipment used to conduct the ambient noise measurement for the Tule Wind Project existing sound level survey was approximately 32 dBA. Noise levels between 32 dBA and 35 dBA are potentially influenced by instrument noise; therefore, it is possible that hourly sound levels, particularly in the evening hours, may have been lower than depicted in Table 4. This is rectified by assuming such measurements were zero (results are largely unchanged), as described below.

Table 4 summarizes existing ambient sound levels measured in the project study area during the week of January 11, 2010. Sound levels indicated in bold are potentially influenced by instrumentation noise.

Table 4. Existing Ambient Sound Levels

Monitoring Location	**Hourly L_{eq} (day), dBA**			**Hourly L_{eq} (night), dBA**		
	Average	**Lowest**	**Highest**	**Average**	**Lowest**	**Highest**
Cottonwood Campground	42	**32**	49	45	**32**	55
Lark Canyon Campground	44	**33**	49	**34**	**33**	**35**
Home #28	51	45	55	45	39	51
Home #42	50	**34**	56	44	**34**	49
Home #47	49	**35**	54	43	**32**	53
Rough Acres Ranch	52	**33**	58	43	**33**	49
Average Ambient Noise Level for Tule Project Area	48	**37**	54	42	**34**	49

Sound levels indicated in bold are potentially influenced by instrument noise; therefore, it is possible that the hourly L_{eq} may have been lower than depicted.

As shown in **Table 4** the lowest hourly L_{eq} at the following sites may be influenced by instrumentation noise: Cottonwood Campground, Lark Canyon Campground, Home #42, Home #47, and Rough Acres Ranch. The monitoring data collected in January 2010 can be adjusted to account for hours potentially influenced by instrumentation noise floor by making conservative assumptions. This analysis conservatively assumed that all hours with an L_{eq} below

36 dBA were influenced by instrumentation noise floor, and that actual noise level during these hours was 0 dBA. It is highly unlikely that existing sound levels are 0 dBA, but were conservatively represented as such. Regardless, the 24-hour average L_{eq} was conservatively recalculated by changing every hour with an L_{eq} of 32 to zero (0). Results of this adjustment are discussed below.

Table 5 summarizes the 24 hour average L_{eq} for all monitoring locations. The column labeled “w/ Noise Floor” indicates the measured sound level without any adjustment. The column labeled “Noise Floor Adjusted” includes and adjustment for measured sound levels between 32 and 35 dBA.

As shown in Table 5 the 24 hour average L_{eq} for most sites is unchanged by the adjustment to account for hours potentially influenced by instrumentation noise floor. The 24 hour average L_{eq} at five of the six monitoring location is unchanged. The 24-hour average L_{eq} is primarily driven by a higher hourly L_{eq} during the early morning rush hours and throughout the day. The 24-hour average L_{eq} at Cottonwood Campground would decrease by 1 dB if sound levels influenced by instrumentation noise were 0 dB.

Table 5. Noise Floor Adjusted Average L_{eq}

Monitoring Location	Average Hourly L_{eq}, dBA		
	w/Noise Floor	Noise Floor Adjusted[1]	Incremental Change, dB
Cottonwood Campground	43	44	-1
Lark Canyon Campground	42	42	0
Home #28	50	50	0
Home #42	49	49	0
Home #47	48	48	0
Rough Acres Ranch	50	50	0

Sound levels have been adjusted to account for the influence of instrumentation noise floor. Measured sound levels between 32 dBA and 35 dBA were assumed to be a sound level of 0 dBA.

While the quietest existing ambient sound levels measuring between 32 dBA and 35 dBA are potentially influenced by instrument noise, the quietest hours have minimal effect on the 24-hour average L_{eq} by which existing conditions were assessed. Please refer to Section 1.2 and Appendix A of the Tule Draft Noise Analysis Report dated February 2011 for further details concerning the measurement methodology and existing conditions.