

South Dakota Public Utilities Commission  
Tatanka Ridge Wind Project, LLC  
Docket EL 19-026  
Response to Staff's Fifth Data Request

Date: October 28, 2019

Data Request:

- 5-1) Will the Applicant agree to the following condition to mitigate potential impacts to whooping cranes:

*Applicant shall establish a procedure for preventing whooping crane collisions with turbines during operations by establishing and implementing formal plans for monitoring the project site and surrounding area for whooping cranes during spring and fall migration periods throughout the operational life of the project and shutting down turbines and/or construction activities within 2 miles of whooping crane sightings. The South Dakota Game, Fish, and Parks will be consulted on the procedure to minimize impacts to whooping cranes.*

If no, please explain why.

Response:

5-1) No. The Applicant will not agree to the above condition because the site is in a location where whooping cranes are unlikely to be present. As detailed in Janelle Rieland's Supplemental Testimony, provided on October 28, 2019, whooping cranes are not included for Deuel County on the South Dakota Game, Fish, and Parks State and Federally Listed Threatened, Endangered and Candidate Species Documented in South Dakota by County. Updated on 07/19/2016 (<https://gfp.sd.gov/userdocs/docs/ThreatenedCountyList.pdf>). Additionally, the migration corridor with 95% of documented occurrences of the whooping crane in South Dakota is over 30 miles west of the Project (U.S. Fish and Wildlife Service 2007, <https://ecos.fws.gov/ServCat/DownloadFile/152181>), and the U.S. Geological Survey (2018) whooping crane corridor is 38 miles west of the Project (<https://www.sciencebase.gov/catalog/item/5a314a72e4b08e6a89d707e0>).

We suggest the following condition:

*Applicant shall establish a procedure for minimize the risk of whooping crane collisions with turbines during operations. The applicant will coordinate with the South Dakota Game, Fish, and Parks on the procedure to minimize impacts to whooping cranes.*

Response Prepared by:  
Janelle Rieland



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**Data Request:**

5-2) Please explain the whooping crane mitigation strategies implemented at the following adjacent wind facilities owned by Avangrid: Buffalo Ridge I, Buffalo Ridge II, Coyote Ridge, and MinnDakota.

**Response:**

5-2) If a whooping crane is observed within or immediately adjacent to the Plant, operations personnel will immediately notify the Plant Manager and maintain visual contact with the bird. If the whooping crane is displaying risky behavior in proximity to turbines (e.g., on the ground, flying at rotor swept height) operations personnel will notify the Plant Manager. The Plant Manager can implement risk reduction measures (curtail turbines) if there is a potential for turbine interaction. Notification to U.S. Fish and Wildlife Service Office of Law Enforcement and South Dakota Game, Fish and Parks will be made within 48 hours of positive identification of a whooping crane observation within the Plant. Wildlife incidents will be documented in the internal database to monitor for potential patterns.

**Response Prepared by:**

Janelle Rieland

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**Data Request:**

- 5-3) Please refer to Condition 26 of the Settlement Stipulation in this docket that was not accepted by the commission (<https://puc.sd.gov/commission/dockets/electric/2019/el19-026/settlement.pdf>).
- a) How should cumulative impacts from adjacent wind facilities, such as Buffalo Ridge II, be considered when analyzing sound compliance with regulatory limits?
  - b) Does the Applicant have any proposed modifications to Condition 26 to address the concerns raised by Commissioner Fiegen during the October 15 commission meeting? Please explain.
  - c) How does the Applicant propose to analyze and measure cumulative sound impacts during post compliance testing? Should the condition be Project only, or consider all wind turbines within a reasonable proximity to the residence? Please explain.
  - d) Refer to the Applicant's response to Staff Data Request 2-33.
    - i. For Receptors H14 and H17, are the turbines associated with Buffalo Ridge II the primary source of sound when looking at the cumulative sound level for these residences?
    - ii. What is the regulatory sound limit for Buffalo Ridge II? How should the Commission evaluate cumulative sound impacts when one wind facility has a higher regulatory limit than the adjacent wind farm being evaluated for cumulative impacts?

**Response:**

- 5-3) After listening to the recording the October 15 commission meeting, we offer the following additional clarification to address Commissioner Fiegen's question. Our response to Data Request 2-33(e) is re-tabulated in the following table with an additional column to more clearly portray how the Tatanka Wind Farm minimally influences cumulative sound levels at non-participating receptors modeled in Attachment N within 1 mile of an existing Buffalo Ridge II turbine.



ID	Distance to Nearest Buffalo Ridge II Turbine	Distance to Nearest Tatanka Turbine	Existing Buffalo Ridge II Project Sound Level	Future Tatanka Project Sound Level	Combined Cumulative Sound Level	Cumulative Increase
	(feet)	(feet)	(dBA)	(dBA)	(dBA)	(dBA)
H14	2,727	6,803	41.2	31.2	41.6	0.4
H17	4,790	6,949	37.7	31.6	38.7	1
H25	5,020	4,416	37.3	34.8	39.2	1.9

Note: dBA = decibel (A-weighted scale)

During the October 15 commission meeting, it was indicated that the sound level at H14 was increasing by 10 dBA. As shown above, the existing sound level from Buffalo Ridge II is 41.2 dBA. The Tatanka turbines, the closest of which is over 6,800 feet from H14, contributes 31.2 dBA which results in a cumulative level of 41.6. This is an increase of 0.4 dBA. This increase is not discernable by human ears and does not present a compliance concern for either Buffalo Ridge II whose limit is 50 dBA or Tatanka whose limit is 45 dBA. The sound level at H14 is primarily influenced by the Buffalo Ridge II turbine which is substantially closer.

- a) It is helpful to understand the nuances of how sound levels add, as acoustical math is not “normal” math. Acoustical addition is non-linear, as decibels are a logarithmic quantity. Acoustically, 50 dBA + 50 dBA = 53 dBA. Accordingly, 50 dBA + 40 dBA = 50 dBA. Given the logarithmic nature of decibel addition, the potential maximum cumulative increase between Tatanka and Buffalo Ridge II is 3 dBA.

When comparing similar sound (traffic to traffic or wind turbine to wind turbine) the following relationships occur:

- A change of 1 dBA cannot be perceived by humans, except in carefully controlled laboratory environments
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference by humans
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected

Thus, for two projects such as Buffalo Ridge II and Tatanka, the cumulative increase is at most 3 dBA. To ensure a thorough response, an additional analysis was prepared.

Figures DR5-3(a)-1 and DR5-3(a)-2 depict the cumulative sound levels resulting from simultaneous downwind operations of Buffalo Ridge II and Tatanka (see response to 5-4 for discussion of downwind modeling methods). Also included on this set of predicted sound level contours is a second set of contours depicting areas where there is a potential increase of 1, 2, or 3 dBA is predicted. The greatest increase (3 dBA) occurs in the areas furthest from both projects, where consequentially, the overall cumulative sound levels are lower. When one is closer to either project, the sound level is dominated by that closer project and the sound attributable to the other project, or increase resulting from it, is low.

A simplified approach to decibel addition is provided in the following table.

When two decibel values differ by:	Add the following amount to the larger value:
0 to 1 dB	3
2 to 3 dB <sup>1</sup>	2
4 to 9 dB <sup>1</sup>	1
10 dB or more <sup>1</sup>	0

Source: Architectural Acoustics, M. David Egan, 1988

<sup>1</sup> Accurate to +/- 1 dB.

Given the unique characteristics of acoustical addition, the distance between Buffalo Ridge II and Tatanka turbines, as well as this additional analysis cumulative levels have been analyzed.

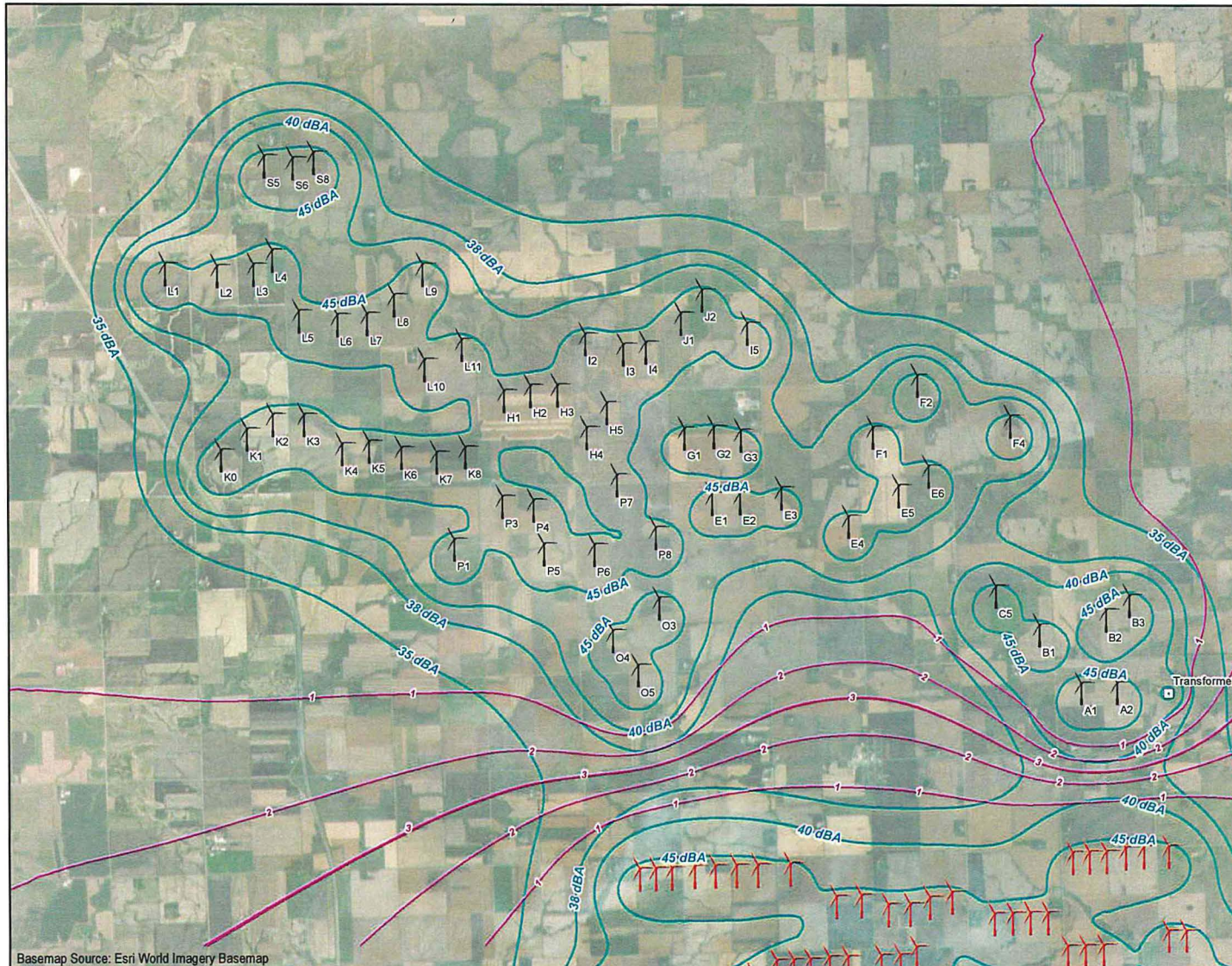
- b) The Applicant believes this additional information clarifies the lack of a significant adverse cumulative effect. The Applicant has not identified any proposed modification to Condition 26 of the Settlement Stipulation previously agreed to with Commission Staff.
- c) Condition 26 of the Settlement Stipulation agreed to with Commission Staff appropriately requires that the compliance assessment focus on periods when the closest turbines to the measurement point are operating at full capacity. Given the distance between the existing Buffalo Ridge and Tatanka turbines and the resulting predicted sound levels, special methods to assess compliance are not anticipated.
- d) i. Yes. The turbines associated with Buffalo Ridge II contribute more sound than those associated with Tatanka.
  - ii. The standard applicable to Buffalo Ridge II is 50 dBA. Adjacent may mean to some that the Buffalo Ridge II and Tatanka turbines are in close proximity to each other when they are over 1.5 miles apart. Condition 26 of the Settlement Stipulation appropriately

focuses on conditions when the closest turbines to the measurement point are operating at full capacity.

**Response Prepared by:**

Mark Bastasch





- LEGEND**
- Cumulative Tatanka and Buffalo Ridge Sound Contours
  - Cumulative Increase (dBA)
  - Tatanka Turbine Location
  - Buffalo Ridge II Turbine
  - Transformer

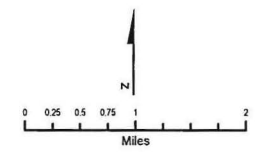
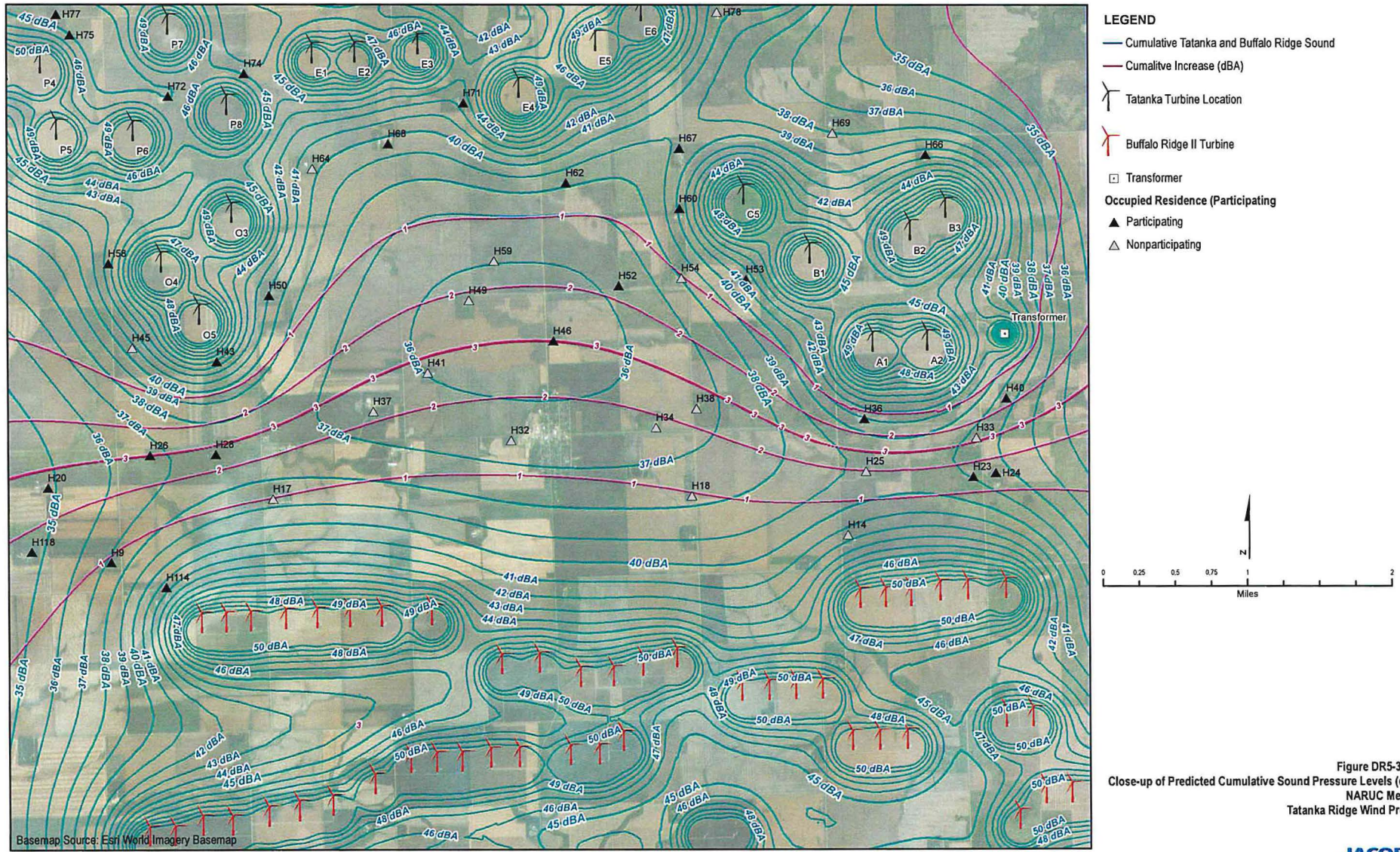


Figure DR5-3(a)-1  
 Predicted Cumulative Sound Pressure Levels (dBA)  
 NARUC Method  
 Tatanka Ridge Wind Project

Basemap Source: Esri World Imagery Basemap  
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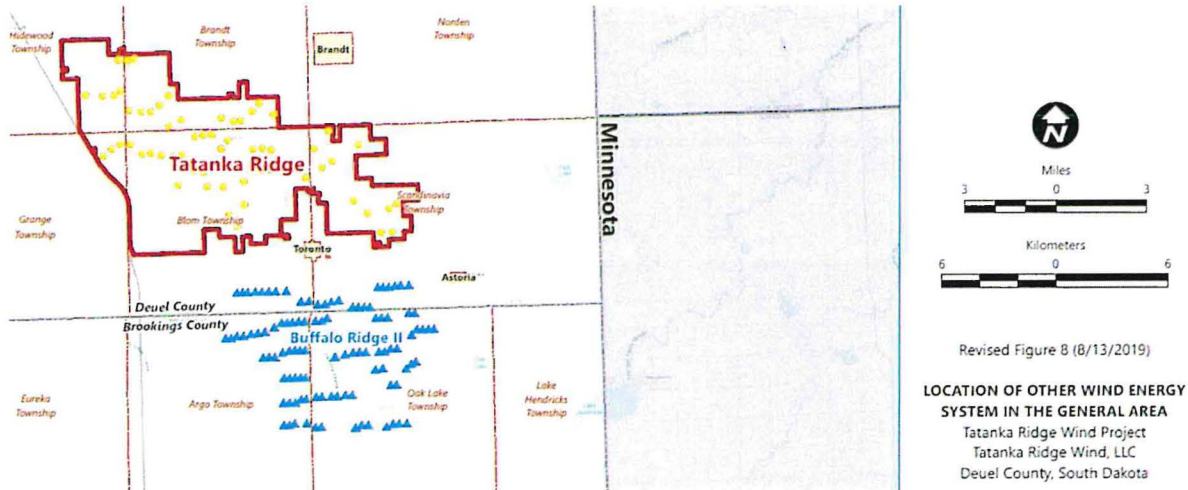
**Data Request:**

- 5-4) Refer to the Applicant's response to Commission Staff data requests 1-3 and 2-23(a). The Applicant stated "distance notwithstanding, one could not be simultaneously downwind from both projects simultaneously."
- a) Please explain the wind direction assumptions used in sound modeling software versus the downwind concept discussed in response Staff Data Request 1-3.
  - b) Is the sound modeling conservatively representing cumulative impacts based on wind direction assumptions included in software? Please explain.

**Response:**

- a) The ISO 9613-2 sound propagation standard we used in this assessment is based on downwind conditions. Downwind conditions always result in favorable propagation and higher sound levels. During the modeling calculation, each residence is considered a "black hole" where the wind is blowing towards it from all directions simultaneously, despite that being an impossibility. Therefore, this is a conservative assumption, particularly for projects such as wind projects where turbines are aligned in linear arrays on multiple parcels of land. For example, when the winds are blowing to the north, a particular residence can only be downwind of some of the turbines at any given time and that particular residence will be crosswind and upwind from other turbines. The modeling method does not consider crosswind or upwind conditions, even though they result in lower sound levels. That is, the modeling calculation presumes favorable downwind propagation from the each and every turbine to the residence, (the residence is considered to be downwind of each turbine simultaneously) a wind condition that does not actually ever occur.
- b) There are two planned wind projects to the north which are over 9 miles away. Given this vast distance, no cumulative impact would be expected. The existing Buffalo Ridge II wind project is located to the south, over 1.5 miles away, which is also a substantial distance when discussing sound conditions. The following image is excerpted from Figure 8 (revised 8/13/2019). The modeling of residences in the Toronto area presumes the wind is blowing south from Tatanka and north from Buffalo Ridge, that is the residences are considered to be downwind from all turbines simultaneously, even though the wind does not blow from the north and south simultaneously. While undoubtedly and

understandably a source of confusion, this is inherent in the ISO 9613-2 modeling method that is commonly and reliably used in this type of analysis.



Response Prepared by:  
Mark Bastasch