
**STAFF'S SECOND MEMORANDUM ON REQUEST FOR LIMITED AND TEMPORARY
WAIVER OF CROWNED RIDGE WIND, LLC**

TO: COMMISSIONERS AND ADVISORS
FROM: KRISTEN EDWARDS, AMANDA REISS, DARREN KEARNEY, ERIC PAULSON, AND JON THURBER
RE: DOCKET EL19-003: REQUEST FOR LIMITED AND TEMPORARY WAIVER OF CROWNED RIDGE WIND, LLC
DATE: JANUARY 6, 2020

Pursuant to the Final Decision and Order Granting Permit to Construct Facility (Permit), Crowned Ridge Wind, LLC (Crowned Ridge) is required to construct and operate the facility in accordance with descriptions made in the Application and all commitments made in response to data requests.¹ In its Application and responses to Staff data requests Crowned Ridge committed to using Low Noise Trailing Edge (LNTE) blades on all wind turbines. Therefore, Crowned Ridge is obligated to construct and operate all turbines with LNTE blades under the Permit issued by the Commission.

On December 13, 2019, Crowned Ridge filed a Request for Limited and Temporary Waiver (Temporary Waiver), requesting the Commission to temporarily waive the construction and operation of LNTE blades until early summer of 2020. Crowned Ridge also filed sound modeling and affidavits supporting the Temporary Waiver. On December 18, 2019, Staff filed a Memorandum on Request for Limited and Temporary Waiver of Crowned Ridge.

On December 30, 2019, the Commission held a ad hoc meeting on this matter and Intervenors Kristi Mogen and Amber Christenson (Intervenors) presented additional information. At this hearing, the Commission deferred action on the Temporary Waiver request until Staff could answer the following questions:

- 1) Does the turbine model, and the way it is being utilized (including software), comply with the Permit that was granted?
- 2) Do the changes in hub height on turbines numbers CR1-89, CR1-90, CR1-91, and CR1-97 from 80 to 90 meters comply with the Permit that was granted? Is the Applicant expected to exceed the shadow flicker regulatory limit as a result of the hub height increase?
- 3) Does the updated sound study, utilizing a 0.3 ground attenuation factor for the waiver period, show compliance with the sound requirements in the Permit?
- 4) Does the Applicant maintain valid county permits for the Project?

¹ See Condition 2 of the Permit. "Applicant shall construct, operate, and maintain the Project in a manner consistent with (1) descriptions in the Application, (2) Application supplements and corrections, (3) commitments made by Applicant in response to data requests, (4) the Final Decision and Order Granting Permit to Construct Facility, and attached Permit Conditions, (5) all applicable industry standards, (6) all applicable permits issued by a federal, state, or local agency with jurisdiction over the Project, and (7) evidence presented by Applicant at the evidentiary hearing."

STAFF'S ANALYSIS

COMPLAINT PROCESS

Condition 3 of the Permit outlines the complaint process available to parties that seek enforcement of the conditions of the Permit. Consumer complaints are processed pursuant to ARSD 20:10:01:07.01 through 20:10:01:11.01, inclusive. These rules provide all parties adequate notice, a fair opportunity to present information and be heard by the Commission.

The complaints filed by Ms. Mogen on December 30, 2019, that are not directly related to the LNTE waiver should be treated as separate consumer complaints. However, Staff believes there are specific allegations within the complaints that may impact the LNTE mitigation plan and should be considered in this waiver request. Staff evaluated the following allegations specific to the LNTE waiver request:

- What impact does different ground attenuation factors, specifically 0.3, have on the LNTE mitigation plan and compliance with sound limit?
- How does the change in hub height impact sound, and was it incorporated in Crowned Ridge's LNTE sound analysis?
- Was the correct sound power profile modeled by Crowned Ridge for the turbines that were constructed?

Staff will provide a preliminary analysis and recommendation on the specific complaints that the Commission directed Staff to opine on. However, all parties should be given adequate notice and an opportunity to respond to Staff's determination and recommendation on each complaint.

Staff recommends the Commission only considers the LNTE request at the January 7, 2020 commission meeting. While the parties go through the formal process on the other complaints, Staff does not believe there is justification to suspend the Permit.

INTERVENOR MOGEN'S ALLEGATIONS AGAINST STAFF

Ms. Mogen alleges that Staff wrote the staff memorandum without consultation with the Intervenors. Staff's memorandum is a living document and may be edited or updated based on new information. Commission Staff submitted discovery to Ms. Mogen on December 23, 2019 to request information on potential errors in staff's memorandum and any analysis of the waiver request so our consultant could consider their findings. The discovery and responses were filed with the Commission on December 27, 2019. Commission Attorney Reiss discussed the waiver request with Ms. Mogen via telephone on December 23, 2019 and December 27, 2019. Staff considers the opinions and concerns of all parties through phone conversations, written comments, and responses to discovery.

Ms. Mogen did not communicate any of her concerns regarding the ground attenuation factor with Staff in advance of the Commission meeting. If Ms. Mogen did communicate her concern, Staff would have explained why Mr. Hessler does not believe that a 0.0 factor is an appropriate assumption to include in the sound model for winter seasons. Staff continues to be available to discuss Ms. Mogen's concerns.

COMMISSIONER QUESTIONS

1) Does the turbine model, and the way it is being utilized (including software), comply with the Permit that was granted?

Intervenor Mogen asserted that Crowned Ridge constructed an unknown number of 2.7 MW wind turbine generators, and provided photographs showing that certain turbine components installed by Crowned Ridge can be used for a 2.7 MW turbine model. Ms. Mogen alleges that Crowned Ridge is in violation of Condition 2 of the Permit because Crowned Ridge constructed a different turbine model than what was requested in the Application and granted in the Permit.

In Section 6.1 of the Application, Crowned Ridge stated that “the Crowned Ridge Wind Farm turbine layout will consist of 130 three bladed, upwind, horizontal-axis wind turbines which originate from the GE 2 MW-116 model series.” (*emphasis added*). In Table 6.3 of the Application, Crowned Ridge further described the turbine model as a GE 2MW-116, with a generator nameplate capacity of 2.3 MW.

In response to Staff discovery set 1, the Applicant provided a statement from the turbine manufacturer, General Electric, identifying that there is no difference in hub height, rotor diameter, sound profile, or amount of shadow flicker between the 2.72 MW turbine and a 2.3 MW turbine in the GE 2 MW-116 series. Therefore, the physical characteristics of the turbine and anticipated impacts are quite similar regardless of the nameplate capacity. Although nameplate capacity is not defined in South Dakota law within the energy facility siting statutes or associated administrative rules, nameplate capacity is defined for tax purposes in South Dakota Codified Law 10-35-1.3(4) as the number of kilowatts a power generation facility can produce, as assigned to the power unit by the manufacturer and determined by the secretary. (*emphasis added*)

In response to Commission Staff discovery, General Electric Project Director Jeffrey Sendzicki stated all installed turbines at the Crowned Ridge Wind Project are nameplated at 2.3 MW. This response provides confirmation of the nameplate capacity from the manufacturer of the units. Based on the Applicant’s response to Commission Staff discovery, the equipment hardware (Generator, Gearbox, Hub, Tower, and Converter) is aligned with the 2.3 MW-116 model, and the turbine software is installed on each turbine to the 2.3 MW level. While certain components may be capable of being used on a turbine that generates a higher output of electricity, as long as the turbine as a whole is designed and constructed in a manner that limits the maximum power output to 2.3 MW, Staff believes the turbine model is in compliance with the permit.

For additional support, Staff obtained the current Generator Interconnection Agreement (GIA) between Crowned Ridge, Otter Tail Power Company, and Midcontinent Independent System Operator, Inc. In Appendix A to the GIA, Crowned Ridge Wind Project is described as a generating facility composed of eighty-seven GE 2.3MW wind turbines.

2) Do the changes in hub height on turbines numbers CR1-89, CR1-90, CR1-91, and CR1-97 from 80 to 90 meters comply with the Permit that was granted? Is the Applicant expected to exceed the shadow flicker regulatory limit as a result of the hub height increase?

Intervenor Mogen asserts that Crowned Ridge increased the hub height on turbine numbers CRI-89, CRI-90, CRI-91 and CRI-97 from 80 meters to 90 meters, which equals 10 meters or approximately 33 feet. Intervenor Mogen alleges that Crowned Ridge Wind, LLC is in violation of Condition 2, stating the Applicant did not construct the Project in a manner consistent with the Application and Application supplements, and may be in violation of Conditions 34 (shadow flicker regulatory limit), 26 (sound level regulatory limit), and 22 (turbine model change).

Crowned Ridge agrees that the hub height increased on the above turbines from the July 29, 2019 preconstruction filing, but Crowned Ridge asserts that there is no requirement to provide notice of a hub height change and it intended to provide the information in the as-built compliance filing pursuant to Condition 44. Crowned Ridge does not address Intervenor Mogen’s argument that the hub height change violates Condition 2 requiring the Applicant to construct the facility consistent with the Application and Application supplements.

Staff views the hub height as a physical characteristic of a turbine model. As such, a change in hub height does not constitute a change in turbine model, and a filing pursuant to Condition 22 is unnecessary. In terms of the sound limit in Condition 26, the Applicant considered the taller hub height in the sound model that supports the LNTE waiver request, which demonstrates compliance with the regulatory limit.

To ensure compliance with the shadow flicker limit in Condition 34, the Applicant submitted an updated study. Staff finds that three receptors had the potential to be adversely impacted as a result of increasing the hub heights of turbine numbers CRI-89, CRI-90, CRI-91, and CRI-97. Below is a table that shows the impacts on those receptors. Three participating receptors are expected to see a slight increase in shadow flicker each year, however they still remain below the regulatory limit of 30 hours per year. The hub height change has no predicted adverse shadow flicker impact on any non-participating residences.

Receptor	July Preconstruction filing (hrs/year)	Current filing (hrs/year)	Delta (hrs/year)
CR1-C17-P	26:48	27:13	+ 0:25
CR1-C19-P	21:25	22:03	+ 0:38
CR2-C150-P	10:01	10:18	+ 0:17

Crowned Ridge states that the change in hub heights of the four turbines was directly associated with Crowned Ridge’s deferral of 100 MWs since fewer 80 meter hub height turbines are needed to qualify the facility for production tax credits. On September 12, 2019, Crowned Ridge notified the Commission of the deferral and provided an updated map of turbines that will be constructed and the turbines that will be deferred. Staff believes this filing presented an opportunity to discuss the hub height change. In the filing, Crowned Ridge stated that “the sound and shadow flicker studies are unchanged.” This statement is

incorrect, as the deferral resulted in small shadow flicker increases for participating residences as shown above.

An Increase in hub height increases a turbine's tip height, and tip height is used to calculate state and county setbacks from property lines and right-of-way of public roads. A change in hub height from 80 meters to 90 meters increases the tip height from 452 ft. to 485 ft. South Dakota Codified Law 49-13-24 establishes that turbines shall be set back at least 500 feet or 1.1 times the height of the tower, whichever is greater, from any surrounding property line. By increasing the hub height 10 meters, the setback from property lines increased from 500 ft. to approximately 534 ft. Crowned Ridge verified that the four turbines comply with all setback requirements.

Staff agrees with the Intervenor that the Applicant did not construct the facility consistent with the Application or the July 29, 2019 preconstruction filing. While Crowned Ridge argues there is not a requirement to provide notice of a hub height change, Staff is unaware of a request to have hub height flexibility in the Application or granted in the Permit.

From an impact perspective, the change in hub height did not result in a material impact to sound or shadow flicker levels, and the project complies with the setbacks required by state and local governments. The Intervenor did not raise any concerns about additional adverse impacts when comparing the 90 meter hub height turbine to the 80 meter hub height turbine during the proceeding.

Commission Staff recommends the Commission provide Crowned Ridge an opportunity to respond to the Intervenor's position on compliance with Condition 2 and Staff's positions discussed above. In addition, Commission Staff recommends the Commission provide the Intervenor an opportunity to explain the negative impacts of increasing the turbine hub height from 80 meters to 90 meters. Staff further recommends the allegation and responses be done through a formal complaint process. Staff will continue to evaluate the materiality of the change in hub height through that process if the Commission decides to take this issue as a formal complaint.

Based on Staff's analysis of the impact associated with this potential non-compliance of Condition 2, Staff does not believe revocation or suspension of the Permit is appropriate.

3) Does the updated sound study, utilizing a 0.3 ground attenuation factor for the waiver period, show compliance with the sound requirements in the Permit?

At the ad hoc meeting on December 30, 2019, Intervenor Mogen argued that the sound model used to support the LNTE temporary waiver request should have assumed a ground attenuation factor of 0.0. Ms. Mogen's rationale for the 0.0 ground attenuation factor is that the turbines will be operating without LNTE blades during winter and, therefore, the model should have zero for noise being absorbed into the ground. During the meeting, Mr. Haley felt the use of a ground attenuation factor of 0.3 may be reasonable. The Commission directed Staff to analyze the waiver request for sound compliance using a 0.3 ground attenuation factor.

Staff requested Crowned Ridge to model the LNTE waiver request using a 0.0 and 0.3 ground attenuation factor. The results provided to Staff by Crowned Ridge shows additional turbines would need to be

curtailed, beyond the 6 proposed in the original LNTE waiver request filing, for compliance with the regulatory limit. Specifically, in the case with a ground attenuation factor of 0.3, a total of 16 turbines would need to be curtailed in order for the model to have all receptors below the regulatory limits established in the Permit.

In response to Intervenor Mogen's Complaint 1, Crowned Ridge stated that Mr. Haley reconsidered his position on the possible use of a 0.3 ground attenuation factor and Mr. Haley finds that 0.5 is the proper factor to use. Mr. Haley notes that the results produced by the model are conservative based on other assumptions used within the model. In addition, Crowned Ridge provides further support for the 0.5 factor from Mr. Lampeter, who states that the use of a 0.5 ground attenuation factor is intended to represent all seasons and that historical post-construction sound level testing has confirmed that using 0.5 in models is proper.

Staff consulted with our noise expert, Mr. David Hessler, on this issue. Mr. Hessler recommends that a ground attenuation factor of 0.5 be used. Moreover, Mr. Hessler agreed with the statements made by Mr. Haley and Mr. Lampeter and found them to be consistent with standard industry practice. Given this, Staff does not object to the methods used by Mr. Haley in the original sound study supporting the LNTE Waiver request.

4) Does the Applicant maintain valid county permits for the Project?

i. Grant County

Pursuant to Grant County Ordinance, all questions of interpretation and enforcement are first presented to the County Zoning Officer. The decision of the County Zoning Officer may then be appealed to the County Board of Adjustment, whose decision may be appealable to the courts as provided by law.^[1] Section 803 of the Ordinances specifies that the Zoning Officer issue a stop order whenever any work is being done contrary to the provisions of the county ordinance.

Staff contacted Grant County State's Attorney to investigate the status of any complaints in Grant County. The information shared by the State's Attorney is that Ms. Mogen and Mr. Robish have filed 6 complaints against Crowned Ridge as of December 31, 2019. The first complaint was an allegation that Crowned Ridge had not obtained all permits prior to commencement of construction. The complaint sought a stop order. The Zoning Officer investigated and determined that Crowned Ridge was in compliance, as it had obtained all required permits.^[2] Ms. Mogen and Mr. Robish appealed the decision to the Board of Adjustment, which affirmed the Zoning Officer's decision at a meeting on December 9, 2019.

According to the State's Attorney, Ms. Mogen and Mr. Robish have filed five additional complaints, each seeking a stop order. The Zoning Officer has investigated these five complaints, found no violations, and

^[1] See Ord. 2004-1.

^[2] The allegation was that Crowned Ridge had not obtained a permit from the PUC for Crowned Ridge II. The County determined that was not a "required permit" for purposes of Crowned Ridge I construction.

denied the stop orders. The complaints have been appealed to the Board and will be heard at the Board's next regular meeting in January.

Other than the appeal of the PUC permit, one case is pending in circuit court. That case, 25CIV19-009, is an appeal from the Grant County Board of Adjustment's issuance of CUP08172018. The Petitioners in the case are Allen Robish and Kristi Mogen. According to a motion filed by Petitioners on December 20, 2019, the case is premised on "conflicts of interest of members of the Board of Adjustment as well as a wrongfully permitted transmission line." This appeal of the CUP was filed in January of 2019 and was known to the Commission at the time of the issuance of the permit in EL19-003. Therefore, it cannot be a basis for a violation of the Permit.

ii. Codington County

There are no pending court cases, other than the appeal of EL19-003, in Codington County with respect to Crowned Ridge.

Information provided to Staff by Crowned Ridge, as well as filed in the docket by Ms. Mogen, indicates that Crowned Ridge commenced construction of 27 turbines and an operations and maintenance facility prior to the issuance of county building permits. It is Staff's understanding that Crowned Ridge paid a fee of \$54,108 for the construction of the 27 towers without a permit, and a fee of \$1,154 with respect to the operations and maintenance building in accordance with Chapter 1.02 of Codington County's Zoning Ordinances. Crowned Ridge states the alleged work on the operations and maintenance facility was for ground work to prepare a temporary laydown yard for the transmission line. Crowned Ridge asserts they paid the additional administrative fee for expediency reasons.

The Commission has addressed similar violations for state facility permits, most recently the Prevailing Wind Park Project. In Docket EL18-026, the Commission accepted a settlement assessing a \$30,000 fine to Prevailing Wind Park, LLC for starting construction before the permit allowed. The Applicant paid the fine as assessed, and Prevailing Wind Park, LLC maintains a valid state facility permit.

Staff contacted Codington County Zoning Officer Luke Mueller, and he indicated Crowned Ridge maintains valid permits from Codington County.

iii. Summary of County Issues

Condition 2 of the PUC Permit requires the Applicant to construct, operate, and maintain the Project in a manner consistent with "all applicable permits issued by a federal, state, or local agency with jurisdiction over the Project." Therefore, to be in compliance with the Commission's Permit, Crowned Ridge must obtain and maintain valid county permits from both Grant and Codington Counties. County ordinances specify the process for determination of compliance with their permits. Pursuant to the ordinances, the County Board of Adjustment has the exclusive jurisdiction to determine whether a violation has occurred that may result in the suspension or revocation of the permit. For that reason, we defer to the appropriate county to determine if any violations to their permits have occurred, which are subject to appeal to the courts as provided by law. The Commission cannot make that determination for the county. At this time, both counties indicate that Crowned Ridge has valid county permits.

STAFF'S RECOMMENDATION ON CROWNED RIDGE'S UPDATED LNTE WAIVER REQUEST

Included in Crowned Ridge's response to Intervenor Mogen's Complaint 1 is an updated LNTE temporary waiver request. The request now identifies that Crowned Ridge will need to curtail four turbines (29, 44, 48, and 95) at wind speeds greater than 6 meters per second. The LNTE temporary waiver request filed on December 13, 2019, identified that 6 turbines (21, 29, 37, 44, 48, and 95) had to be curtailed at wind speeds greater than 9 meters per second. The updated sound modeling now shows fewer turbines need to be curtailed at a lower wind speed. Crowned Ridge informed Staff that the number of turbines that need to be curtailed reduced to four as a result of removing alternative turbines from the model. Further, Crowned Ridge stated the reduction in the wind speed at which the turbines need to be curtailed resulted from a correction to the sound model.

The error in the sound modelling that supported the December 13, 2019, LNTE waiver request is a concern to Staff. Staff expects Crowned Ridge to provide accurate information for the Commission to base its decision. As a result, Staff recommends on-site sound testing discussed below to ensure compliance with regulatory sound limits.

Setting Staff's concern about the sound modeling aside, the affidavits and the sound model filed by Crowned Ridge in response to Complaint 1 do support the updated LNTE waiver request and demonstrate the project is expected to comply with permit limits. In addition, Crowned Ridge identified that the turbines will be operated using GE's newly developed Enhanced Power Curve Operation (EPCO) and this will further reduce sound levels by approximately 1.5 dBA. Finally, Crowned Ridge voluntarily offered to complete post-construction compliance testing to demonstrate the project is compliant with sound limits during the LNTE waiver period.

Based on review of the updated sound model and affidavits, Staff does not object to the updated LNTE waiver request. However, in order to be comfortable with the updated LNTE waiver request, Staff recommends that the Commission require Crowned Ridge to complete a post-construction compliance test in accordance with Condition 26 of the Permit at the start of the LNTE waiver request period. If the compliance testing demonstrates the project exceeds noise limits, Crowned Ridge will then need to make operational changes to bring the project in compliance.

Finally, given the complaints the Commission has received to date, Staff also recommends the Commission require post-construction compliance testing once all LNTE blade attachments are installed on the turbines.

CONCLUSION

A summary of Staff's position on the Commission's outstanding questions and the updated LNTE temporary waiver request is provided below.

- 1) Staff finds the turbines constructed by Crowned Ridge are nameplated at 2.3 MWs and are consistent with Crowned Ridge's Application and Permit. Further, Staff believes that a "material change" filing pursuant to Condition 22 was not required.

- 2) Staff agrees with the Intervenors that increasing the hub height on turbine numbers CRI-89, CRI-90, CRI-91 and CRI-97 from 80 meters to 90 meters is not consistent with the Application and the July 29, 2019, preconstruction filing. However, based on Staff's analysis of the impact associated with this potential non-compliance, Staff does not believe revocation or suspension of the Permit is appropriate. Since this matter does not directly impact the LNTE waiver request, Staff recommends the Commission process this matter as a formal complaint in order to bring the issue to resolution.
- 3) Staff finds that the proper ground attenuation factor to use in the LNTE waiver request sound model is 0.5.
- 4) Staff finds that Crowned Ridge's Conditional Use Permits in Codrington and Grant counties are currently valid.
- 5) Staff does not object to the updated LNTE waiver request, however Staff recommends the Commission require Crowned Ridge to conduct post-construction compliance testing for sound in accordance with Condition 26 of the Permit during the LNTE waiver period. In addition, Staff recommends Crowned Ridge complete a second-round of post-construction compliance testing once all LNTE blade attachments are installed on the turbines.