

APPENDIX F - DESIGN SAFETY CERTIFICATION



Panther Grove II Wind Project

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Date:	DNV reference:	Customer reference:	Confidentiality Classification:
19 July 2024	10285337-HOU-L-01-A	Panther Grove II	Commercial in Confidence

Subject: 10285337 – Panther Grove II Memo

To Whom it may concern:

Copenhagen Infrastructure Partners (CIP) have requested DNV to provide the status of certification for two wind turbine models namely the Vestas V163-4.5 MW and the Nordex N163/5.7, comment on certification status and certification aspects that are currently pending for these turbine models, and track record of these turbine models in the North American market. Therefore, DNV has outlined the status of certification, any associated risks related to pending steps in certification, and track record of these turbine models in the discussion below.

Vestas V163-4.5 MW

The V163-4.5 MW turbines have been certified according to the IECRE OD-501 scheme and received a Design Evaluation Conformity Statement (DECS) according to IEC 61400-1 Ed. 4 (2019) [1]. According to Vestas, the Type Certificate is expected by Q4 2024. The type approval process includes certain additional verification steps primarily related to mechanical loads testing, power performance testing, and a few others on a prototype turbine. Therefore, type certification follows the design basis evaluation and design certification typically within 12 months or a similar time after the issuance of the design certificate. The first commercial deliveries of the V163-4.5 MW turbines commenced in 2023, however as of Q1 2024, there are no operational commercial installations of the V163-4.5 MW. The V163 prototype installed in Østerlid, Denmark started power production on 14 July 2023.

Vestas has extensive experience in certifying wind turbines, and while there have been some delays in certifying some models in the past, DNV is not aware of Vestas failing to certify a turbine model. The closest relative of the V163-4.5 MW turbine model namely the V150-4.0/4.2/4.3/4.5 MW turbines are developing a significant track record with over 5,000 units globally [2] and 1,282 units installed in North America [3]. Vestas has secured Type Certification for the V150 turbine model. Therefore, DNV sees minimal risk associated with the pending Type Certification for the V163-4.5 MW turbine model given Vestas' well-established track record of securing type certification for the predecessor turbine platforms/models.

Vestas is a well-established turbine supplier with a strong presence in the North American market and Vestas has demonstrated capability to resolve complex technical issues with the V150 turbines operating in North America. This provides additional confidence that Vestas is most likely to continue in a similar fashion when V163 turbines are commercially installed in the North American market in the future.



Nordex N163/5.7

The Nordex Delta4000 Series turbine models have been certified according to IEC 61400-1 Ed 3+ A1 and GL Technical Note 067 Rev. 5:2013. The N163/5.X (including 5.7 MW rating), a part of the Nordex Delta4000 Series, received a DECS and Type Certificate from TÜV SÜD on 28 September 2023 [4][5].

As of 2 April 2024, 2,801 Delta4000 Series turbines have been commissioned globally, which includes 606 units installed in North America with commercial installations ongoing and Nordex reports a strong order book for the Delta4000, with over 16.1 GW of firm orders as of April 2024. While 435 N163/5.X turbines have been installed in Europe and South America, there have been no installations of the N163/5.X in North America as of April 2024.

Nordex is a well-established turbine supplier with a strong presence in the North American market. The Delta4000 platform is an evolution of the predecessor Delta platform, the first of which were the N100/3300 and the N117/3000, both first installed in 2013. Like other new turbine models or platforms, the Delta4000 Series has experienced some technical issues in recent years. In DNV's experience, some of Nordex's RCAs, particularly for the AW3000 platform (legacy Acciona platform), have taken longer to complete than typical industry expectations. More recently, Nordex has been quicker to address or resolve new issues impacting the Delta4000 Series turbines, to a level within DNV's expectations for the industry. This provides additional confidence that Nordex is most likely to continue in a similar fashion when N163 turbines are commercially installed in the North American market in the future.

I hope this letter is consistent with your expectations. Please contact Mia Miller at mia.miller@dnv.com if you have any questions regarding this letter.

Best regards,

For DNV Energy USA Inc.

Mia Miller

Wind Turbine Engineer

Miller, Mia Digitally signed by Miller, Mia
Date: 2024.09.09 14:43:01
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References

- [1] DNV RC, "Design Evaluation Conformity Statement", IECRE.WE.CS.24.0204-R2, dated 26 January 2024.
- [2] Vestas website "vestas.com" consulted on 1 July 2024.
- [3] Vestas, "Blue Note H2 2023", dated Q1 2024.
- [4] TÜV SÜD Industrie Service GmbH, "Design Evaluation Conformity Statement", Report No.: 014.36.2.03.23.08, dated 28 September 2023.
- [5] TÜV SÜD Industrie Service GmbH, "Type Certificate", Report No.: 014.36.2.01.23.03, dated 28 September 2023.