

OWP Gennaker GmbH Stephanitorsbollwerk 3 28217 Bremen Germany 25 March 2024

Your ref: GEN-GEO

Our ref: C1389L01-03

For the attention of: Mr. Christian J. Bühring

Dear Mr. Bühring,

Subject : Deviation from grid-shaped geophysical survey lines

OWP Gennaker GmbH is planning the construction of the Gennaker offshore windfarm (GEN) in the Baltic Sea within the 12 nm zone, in German territorial waters, within the coastal waters of the federal state of Mecklenburg-Vorpommern.

For the geotechnical site investigation and reporting, the local state follows the requirements defined in the BSH-No 7004 Standard Ground Investigations. In summer 2023, OWP Gennaker GmbH decided to change the wind turbine generator (WTG) and layout for GEN. This resulted in the requirement for a new BImSchG-permit application and 1st BSH release. As per the latest layout (LS14), the windfarm will consist of sixty-three (63) turbines of 15 MW turbine class.

BSH-No 7004 Standard Ground Investigations defines in Part B the minimum requirement for Geological surveys with geophysical methods. For seismic reflection geophysical surveys, BSH-No 7004 recommends the use of seismic grid lines across the windfarm site with spacing of 500 m in longitudinal and transverse directions.

As part of the geophysical investigations at GEN, seismic reflection parallel lines were acquired between 2013 and 2016 using a boomer system in combination with a streamer (Figure 1). The entire wind farm area was investigated with a total of 166 long profiles, with a distance between the measurement lines of approximately 70 m, without any cross lines. The data quality achieved is described as good.

The adopted GEN approach deviates from the specifications of the BSH-No 7004 Standard Ground Investigations Part B as cross-lines have not been acquired. However, a considerable narrower spacing between seismic lines has been adopted between the long lines than in the BSH recommendations (70 m instead of 500 m spacing).

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The company responsible for the seismic reflection data processing and interpretation, Nautik Nord GmbH, states in this regard that a 10-fold higher number of seismic lines were acquired compared to similar wind farm projects at the time (see Attachment 1) and that as a result of the seismic programme carried out, subsurface structures can be clearly traced via adjacent lines.



Figure 1: Overview of seismic reflection lines at Gennaker OWF (VBW Weigt GmbH, 2016)

Note: Area A (acquired in 2013), Area B (acquired in 2015), Area C (acquired in 2016), map aligned with North.

Locally limited geological structures, in particular three channel infill systems and their extent have been clearly identified in the wind farm area based on the geophysical survey interpretation of the available data, see Figure 2. Both in the preliminary geotechnical investigation carried out in 2016 (5 locations investigated) and 2022 (103 locations investigated), these channel infill areas of the windfarm have been confirmed to be associated with the presence of locally weak thick layers in the upper 20-30 m below seafloor, having different geotechnical signature than outside these areas. In this respect, the objective of the seismic investigations was achieved with the measurement programme carried out.

OWP Gennaker GmbH has considered in the design of the latest (63) WTG layout the currently available geophysical and geotechnical information for the Gennaker windfarm, for example by avoiding positioning WTG in the channel infill areas where deeper occurrence of weaker layers could be possible.





Figure 2: Distribution of channel infill areas at Gennaker OWF (VBW Weigt GmbH, 2016). Map aligned with North.

It should be noted that a geotechnical investigation is currently ongoing with the objective to collect geotechnical data at 58 WTG positions of the latest (63) WTG layout (the remaining 5 WTG locations are waived due to availability of data already from the 2022 geotechnical investigation). Therefore, potential uncertainties related to potential lateral variability of ground conditions for the WTG foundation design are considered to be minimised through this approach.

In accordance with Part A Section 6 of the BSH-No 7004 Standard Ground Investigations, Cathie Associates SA/NV, as Geotechnical Expert for the Gennaker offshore windfarm project, hereby confirm our support to OWP Gennaker GmbH intention to apply for this explained deviation from the formal provisions of the BSH-No 7004 standard regarding the recommendation of a grid-shaped arrangement of seismic survey lines.

Yours sincerely

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Rui Silvano Senior Engineer Cathie Associates SA/NV

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Attachment 1: Nautik Nord Statement



Geologie - Geophysik Hydrographische Vermessung Technische Ausrüstung Taucherei und Bergung

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HRB Plön 2602 Geschäftsführer Dr. R. Atzler

Pohnsdorf, den 28.06.2017

Stellungnahme zur Notwendigkeit von seismischen Querprofilen im OWP-Projekt Gennaker

Die Seismik-Profile im Projektgebiet Gennaker verlaufen alle parallel zueinander. Kreuzende Linien liegen nicht vor.

Es gibt 166 Profile. Verglichen mit ähnlichen Windparkprojekten sind das etwa 10mal mehr. Zudem haben die Profile zueinander einen sehr geringen Abstand von nur 70m.

Deshalb ist es in diesem Fall aus unserer Sicht nicht erforderlich noch zusätzliche Querlinien zu messen. Die Untergrundstrukturen lassen sich auch so über nebeneinander liegenden Linien eindeutig verfolgen.

Mit freundlichen Grüßen

R. Atzler