

Appendix 13.2: Maritime Risk Marine Geohazards

Overview

Geohazards are known to exist in the Black Sea region.

As described in **Chapter 5 Project Description**, design hazards have been identified and assessed using internationally recognized tools throughout the FEED process. This has included undertaking detailed route selection studies, as described in **Chapter 4 Analysis of Alternatives**, to select the pipeline route taking into account geohazards.

As described in **Chapter 4 Analysis of Alternatives** and **Chapter 5 Project Description**, the pipeline route, design and the proposed construction methodology have taken into consideration the potential geohazards, mitigating the risks as far as is practicable.

As described in **Chapter 5 Project Description**, regular monitoring and inspection of the pipeline will be undertaken throughout the Operational Phase. This will enable any changes to the local environment, particularly those relating to seismic and geomorphological processes, to be identified and managed.

Geohazards

Geohazards associated with the Project Area include seismic activity, soft sediments, gas seeps and gas hydrates.

As described in **Chapter 4 Analysis of Alternatives**, the pipeline route alignment was selected on the basis of geophysical and environmental surveys. The entire corridor was mapped and the geological, bathymetric and cultural features were recorded for further analysis. However, there were no significant engineering constraints on the choice of route.

The presence of very low strength clay and silt as is found on the abyssal plain may cause pipeline burial. Very low strength sediments may also cause bearing capacity failure leading to pipeline tension. This has been taken into account in the design of the pipeline (**Chapter 5 Project Description**).

Active faults were not observed on any of the sub-bottom profiles conducted along the pipeline routes. Surface rupture from an active fault is not considered to be a significant geohazard along the pipeline route in the Project Area.

Possible active pockmarks were identified on a number of ROV videos from the Study Area. These features are typically shallow depressions a few metres across with evidence for disrupted sediment layers around their margins. No large scale features were observed in the Study Area.

Potential freespan issues may arise above gas escape structures such as pockmarks or plumes. Conversely, doming due to gas build-up may occur prior to gas release causing pipeline stress if the pipeline were located over the feature. No existing dome features have been identified along the pipeline route (**Chapter 7 Physical and Geophysical Environment**). Other potential impacts associated with gas include the lowering of bearing potential, the release of toxic gases, explosions or loss of vessel buoyancy. Gas hydrates are a hazard owing to the potential for phase changes from solid to fluid.

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