The Groningen gas field in the Netherlands is one of the largest in the world and has produced over 2000 billion m$^3$ of natural gas since the start of production in 1963. The first earthquakes linked to the gas production in the Groningen field occurred in 1991, with the largest event to date being an M$_{L}$3.6. In response to concerns about the induced earthquakes, the field operator is leading an effort to quantify the seismic hazard and risk resulting from the gas production operations, to include the assessment of the liquefaction hazard. However, due to the unique characteristics of both the seismic hazard and the geologic profiles/soil deposits in Groningen, direct application of existing liquefaction evaluation procedures was deemed inappropriate. Accordingly, efforts were first focused on developing Groningen-specific relationships for evaluating liquefaction potential of the region. The probabilistic liquefaction hazard is being calculated using a Monte Carlo method, wherein for each event scenario, the Groningen-specific relationships are being used to compute the factor of safety (FS) against liquefaction as a function of depth and corresponding Ishihara Inspired Liquefaction Potential Index (LPI$_{ish}$) hazard curves are being computed. The results from this study are forming the basis on which decisions will be made regarding the need for implementing mitigation measures. The overall approach being used in this pilot study can be adopted to assess the probabilistic liquefaction hazard worldwide.

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