Seabed geology and processes of the Hibernia and surrounding area, northeastern Grand Bank

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Petroleum discoveries in the Jeanne d'Arc Basin and proposed seabed production facilities for the Grand Bank have heightened the demand for a detailed understanding of the sedimentary and physical properties of near-surface seabed materials, and an understanding of processes affecting seabed stability such as sediment transport and seafloor ice scouring.

Single-channel seismic reflection profiles and borehole investigations show the near-surface to be dominated by a sequence of shallow, seaward-dipping, parallel reflections which are interpreted to have resulted from progradation and aggradation of the continental shelf. At least locally at the Hibernia site, the upper parallel reflection sequence has complex internal reflections arising from dense interbedded sands, silty-clayey sands and minor gravel and cobbles. Zones of clinoform reflections are interbedded within the sequence. The largest zone overlies the Hibernia oilfield and is composed of medium to coarse sand with silt and clay inter-

beds. It is interpreted as a shallow marine progradational sequence, which may have resulted from meltwater deposition of glacially-eroded sediment. Sediment composition and stability within the progradational sequence varies locally and regionally.

A regional unconformity near the seabed truncates the progradational and parallel reflection units and underlies thin surficial sands and gravels that are periodically transported and reworked by bottom currents, waves and scouring icebergs. Four potential seabed constraints to offshore development are described: (1) sediment transport around seabed installations; (2) sediment liquefaction due to seismic loading; (3) seafloor iceberg scouring, and (4) local and regional variability of foundation sediments and their associated physical properties.