Preliminary seismic-stratigraphic interpretation and mapping results for the Paleogene - Neogene succession, Orphan Basin, offshore Newfoundland and Labrador

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The Orphan Basin that formed during Mesozoic rifting and Atlantic Ocean opening is one of the large under-explored basins along the eastern Canadian Margin. The basin has experienced an impressive history of extension and subsidence as indicated by its complex structural architecture and sequence stratigraphy. The sedimentary basin fill consists of Mesozoic and Cenozoic sediments that exceed ten kilometers in thickness in some places. The predominantly post-rift Paleogene-Neogene (Tertiary) interval is superbly imaged in more than 25 000 line kilometers of high-quality, 92-fold 2D seismic data that were recently (2000–2003) acquired by GSI and donated to Memorial University for research. These data provide an opportunity to separate the Tertiary interval into smaller subdivisions and identify regional sedimentation patterns.

Eight seismic horizons, including the seabed, the widespread *Base Tertiary Unconformity* marker, and a number of intra-Tertiary unconformities have been interpreted throughout the seismic grid. These horizons presently divide the Cenozoic succession into seven major seismic-stratigraphic units. Three of the mapped units (Units 2, 4 and 6) exhibit a chaotic, low amplitude internal acoustic character, and external forms that are consistent with mass transport deposits. In profile, these deposits occasionally show evidence of amalgamation of more than one failure event (e.g., Unit 2) and/or possible fluid escape structures at the top (e.g., Unit 4). Another apparent mass transport deposit appears to incorporate rotated blocks at the base (not yet mapped). The remaining seismic units consist mainly of alternating high and low amplitude parallel reflections. Time-structure and isochrone maps reveal surface morphologies and shed light on the distribution

of key seismic horizons and units within the basin. Whenever possible, key sediment pathways (indicated by channels) and possible geohazards are identified. In particular, a number of slope failure deposits are delineated.