Site selection for in-stream tidal power devices in Minas Passage – New insight into the marine geology of the Bay of Fundy

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The recent round of tidal power development in the Bay of Fundy began over three years ago and has progressed to the present stage involving deployment of tidal in-stream devices (TISEC), connection to the power grid, and environmental and engineering monitoring. The political, social and scientific undertaking that led to the current situation involved government commitment to the delivery of sustainable energy, strategic environmental assessment, project tendering, marine and terrestrial site selection studies, public consultation, environmental assessment and finally government environmental approval for the test facility in Minas Passage. Minas Basin Pulp and Power Co. Ltd. (MBPP) won the right to design and establish the test facility that includes a Crown Lease area, selection of specific sites for installation of devices, marine power cable design and installation, construction of onshore infrastructure

Atlantic Geology, 2010, Volume 46, Number 1

and grid connection. The first device in the water was the Open Hydro/Nova Scotia Power Inc. system installed in November of 2009. Over the next few years, Marine Current Turbines/MBPP and Clean Current/Alstom, and possibly other providers, will deploy their systems while marine electrical cables will be laid. The project is now being managed by the Fundy Ocean Research Centre for Energy (FORCE), a not for profit corporation composed of the turbine developers, Nova Scotia Energy and academia.

The information collected for site selection has revealed much about the seabed of the inner Bay of Fundy in Minas Passage and Minas Channel, and processes that are acting on it. Areas of highest currents are scoured depressions cut into glaciomarine stratified sediments. Till is rare and a few linear till ridges that may represent former moraines have been exhumed through seabed erosion. Instabilities exist along the northern shore of Minas Passage and slumping at the seabed has been identified. Large regional scoured depressions of the inner Bay appear to be presently eroding and increasing in size. Fine-grained sediment from this process is transported either out of the area to the outer Bay of Fundy or to Minas Basin for deposition. Important questions include the rate of this erosion and whether the placement of additional turbines will affect this process. Turbulent water flow and local eddy generation in Minas Passage needs to be understood through detailed oceanographic measurements.

The inner Bay of Fundy offers the promise of sustainable and predictable energy development. The research community is encouraged to address the applied science issues associated with seabed stability, sediment transport, and the apparent increasing energy within the Fundy system.

