



**System Impact Study Report
Report GIP-IR542-SIS-R0**

**Generator Interconnection Request #542
5.58 MW Tidal Generating Facility
Cumberland County, NS**

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Executive Summary

This report presents the results of a System Impact Study (SIS) for a proposed 5.58 MW tidal turbine generating facility interconnected to the NSPI transmission system. The study analysed the impact the proposed development would have on the NSPI power grid. System studies, including short circuit, power factor, voltage flicker, steady state, stability, Bulk Power System analysis, under-frequency operation, low voltage ride through and loss factor were performed. NSPI and NPCC planning criteria were applied.

This tidal facility will be interconnected to the 69kV substation 37N-Parrsboro. Transmission line L-5550 serves to transmit power from the 30N-Maccan substation to the 37N-Parrsboro substation and is designed to 138kV specifications but it is presently operated at 69kV. Therefore, transmission facility upgrades associated with the generator interconnection must also be built to 138kV standards to accommodate future system upgrades to 138kV in this area. One new 69kV circuit breaker will be required at 37N-Parrsboro substation complete with associated switches and protection. These facilities must be designed to be capable of future 138kV operation.

The increase in short circuit levels are within the capability of the associated breakers in the vicinity of 37N-Parrsboro. IR#542 provides adequate reactive power to meet the Generator Interconnection Procedure (GIP) requirement. Voltage flicker was not calculated due to insufficient generator data. However, the IC is expected to meet NSPI's requirement for voltage flicker and harmonic distortion.

Increased generation from this newly proposed generation facility will not have any significant adverse impact on the local transmission. No thermal loading violations were found under normal states and single contingency conditions.

IR#542 was not found to cause issues with the stability of the interconnected system. IR#542 was found to comply with the Low Voltage Ride Through requirements, and remained on-line through simulated under frequency islanding events. Interconnecting substation 37N-Parrsboro is not classified as part of the Bulk Power System. The system loss factor for this facility is 5%. This SIS identifies a risk of this generating facility being islanded with NSPI customers for certain contingencies. Hence, an anti-islanding scheme needs to be installed.

The total high level estimated cost for Transmission Provider's Interconnection Facilities and Network Upgrades is \$1,650,000. Two other higher queued tidal generating facilities (IR #516 and IR #517) are also located in the same area as IR #542 and the required Transmission Providers Interconnection Facilities identified in this report will be utilized by all three projects. All three IC's will share these costs equally (\$550,000 each). All costs of associated facilities required at the Interconnection Customer's Interconnection Facilities and generating facility are in addition to this estimate.