TL 214 CONDITION ASSESSMENT AND RECOMMENDATIONS FOR UPGRADING

September 9, 2002

TRO – Engineering

SUMMARY

Transmission Line TL 214 is a 138 kV transmission line, which runs from Bottom Brook to Doyle's, a distance of 118 km. The line was constructed in 1968 and is a radial line serving Newfoundland Power Customers from Doyles to Port aux Basques and surrounding areas.

For the last number of years concerns have been expressed regarding the reliability of TL 214. The performance of a transmission line can be measured and compared by two statistics (1) delivery point and (2) equipment performance. Since this is the only line serving the area it is important to review both statistics.

Delivery point indices, System Average Interruption Duration Index and System Average Interruption Frequency Index (SAIDI and SAIFI), to Doyles and Port Aux Basques are a measure of the continuity and reliability of service to the customers. These statistics for this line are high. When compared to equivalent CEA indices, Doyles SAIFI and SAIDI of 4 and 5.34 hours is over double the CEA SAIFI of 1.7 and almost double the CEA SAIDI of 2.38 hours. TL 214 contributes a major portion of these statistics; therefore, improvements on TL 214 will improve these performance indices.

TL 214 performance is low when compared to other lines and contributes to reduced performance in the Doyles and Port Aux Basques areas served. The line has a very high transient trip out rate of 8.31 outages per 100 km/yr compared to a typical Hydro rate of 2.75 outages per 100 km/yr and the typical CEA rate of 1.15 outages per 100 km/yr for this class of line. The sustained trip out rate of 1.9 outages per 100 km/yr is better but still high compared to a typical Hydro rate of 1.08 outages per 100 km/yr and the CEA rate of 1.25 outages per 100 km/yr. The major causes of the transient trips were high winds (5.85 per 100 km/yr) and lightning (2.47 per 100 km/yr).

A condition assessment and analysis of the line recommended that four (4) areas of concerns be addressed to ensure the reliability of the line.

The four areas of concern are as follows:

1. There are four (4) locations where the combination of spans in excess of 500 m, conductor size and phase spacing create conditions that could cause conductor slapping. One of these locations has shown signs of conductor contact. The addition of structures is recommended to correct this problem.

2. There are 21 locations that have been identified with excessive wind/weight ratios. Installation of counterweights has been recommended at these locations.

3. In areas that have been identified as historically experiencing high wind, additional structures will be installed to reduce the span and to increase the wind/weight ratios. A total of 15 additional structures have been recommended.

4. The major portion of insulators on TL 214 are pre-1974 insulators manufactured by the Canadian Ohio Brass Company commonly referred to as COB. These insulators are part of the pre-1974 group that has experienced industry wide failures due to cement growth causing radial cracks in the porcelain. Complete replacement is recommended for the COB insulators on the line.

In order to carry out the above work, an alternative source of generation is required to preclude extended customer outages. Co-ordination will be made with Newfoundland Power to minimize the alternative generation requirements.

A capital budget proposal for $2,946,900.00 has been submitted for 2003-2004 to carry out the work. The planning and design will be undertaken in 2003, with the actual construction scheduled for 2004.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 Introduction

The condition assessment of transmission line TL 214 was carried out to address the issue of the number of outages that have been sustained and to review problem areas that historically have caused trouble on TL 214. Since this is the only line serving the area it is important to review its performance.

TL 214 is a 138 kV line, which was constructed in 1968, and runs from Bottom Brook to Doyles (See Figure 1.1), a distance of 118 km. TL 214 is a radial line serving the southwest coast and consequently any line outages will have a direct negative effect on the Newfoundland Power domestic and general service customers that the line services. It is also important to note that Newfoundland Power does have generation in the area at Rose Blanche and an emergency power supply from diesel and gas turbines, also serving the area.

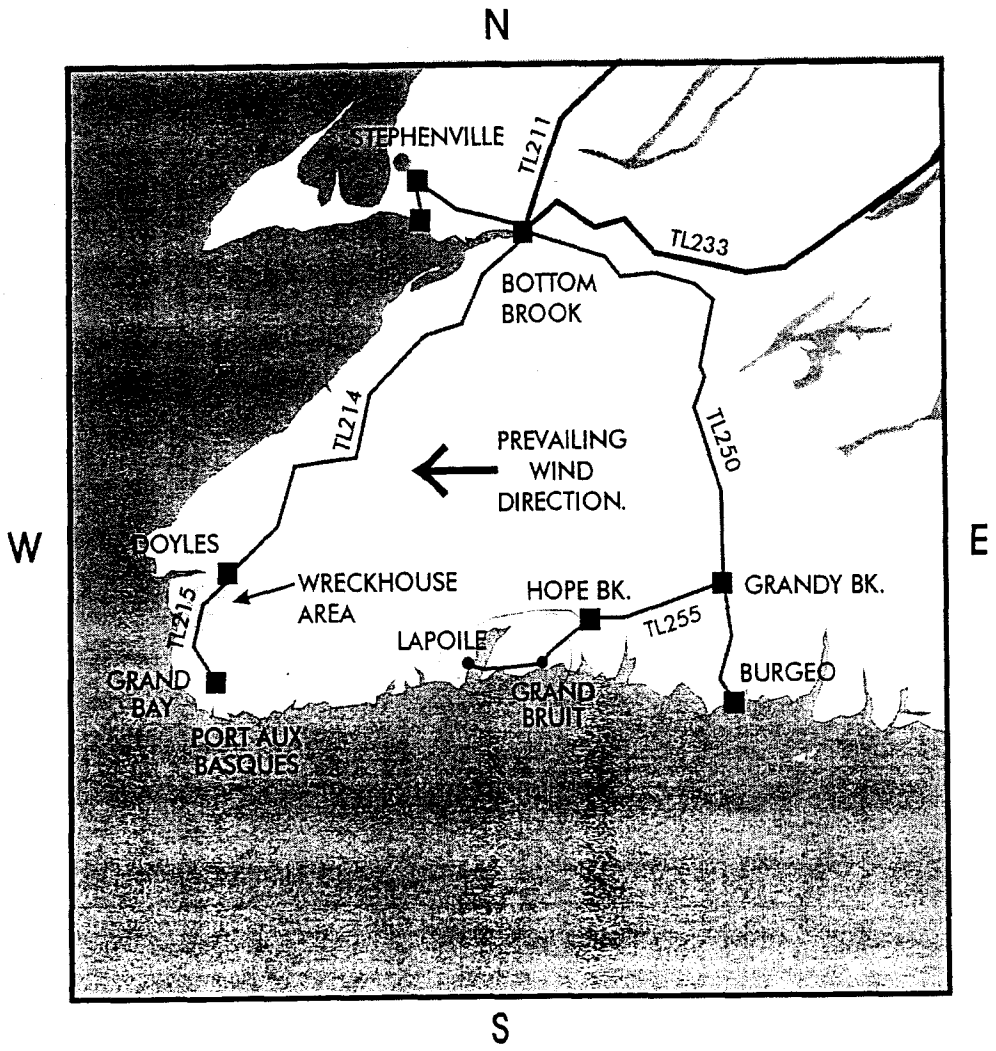

Figure 1.1: TL 214 Location