Series capacitors for increase of power export capacity

Four ABB series capacitors, each rated at 192 Mvar, were installed in 1987 in Hydro-Québec’s 315 kV network at Kamouraska in the south-eastern part of the province of Québec in Canada. With the series capacitors in operation, Hydro-Québec can increase its export of electric power to neighboring New Brunswick and Maine by several hundred megawatts.

The series capacitors are installed on four 315 kV transmission lines running in parallel between Lévis and Rivière du Loup, one series capacitor for each line. The transient stability of the system has thereby been increased, enabling additional power to be transmitted under stable conditions. By these means, the power demand of this part of the country can be satisfied all around the year, and still leave substantial amounts of power available for export (about 1.000 MW at present).

Without the series capacitors, an additional 315 kV line would have had to be built, with longer lead times as well as a considerably higher investment cost as compared to the series capacitor alternative.

The series capacitors yield a degree of compensation equal to 60%. They are equipped with ZnO protection for immediate re-insertion of the series capacitors after clearing of line faults.

The platform to ground signal transmission system is based on current transformer technology, and does not require any auxiliary power equipment or relay equipment on the 315 kV platforms. Equipment for control, monitoring, alarm and indications is housed in ground mounted control cubicles. The control cubicles are installed in a local control building located just outside the fence, surrounding the platforms.
Layout
(of one installation)

Technical data
(valid for one installation)

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>System voltage</td>
<td>315 kV</td>
</tr>
<tr>
<td>Rated reactive power</td>
<td>192 Mvar</td>
</tr>
<tr>
<td>Degree of compensation</td>
<td>60 %</td>
</tr>
<tr>
<td>ZnO varistor bank rating</td>
<td>120 MJ</td>
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<tr>
<td>Protective level setting</td>
<td>2.1 p.u</td>
</tr>
</tbody>
</table>

For more information please contact:

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