APPENDIX 5

Design Data
High Horsepower Electric Locomotive
(for Amtrak, MARC)
High Horsepower Electric Locomotive

**GENERAL DATA**
- **Type of vehicle**
  - high horsepower electric locomotive
  - multipurpose with dual cab
  - fully FRA & AAR compliant
- **Train consist**
  - up to 14 cars at maximum speed
  - up to 18 cars at reduced performance
- **Catenary voltages**
  - 12.0 kV, 25 Hz
  - 12.5 kV, 60 Hz
  - 25 kV, 60 Hz

**TECHNICAL CHARACTERISTICS**
- Stainless steel carbody incorporating crash management (total of 6 MJ of energy)
- Fabricated steel frame outboard trucks
- Coil springs primary and secondary suspension
- Two access doors per side (behind cab bulkhead)
- Dual lateral aisle layout
- Dual pantograph
- One toilet room complete with washbasin
- One HVAC unit per cab, based on R-134a
- Ergonomic cab console arrangement
- Cab signal and speed control system
- ACSES
- EMI limit detector
- Integrated alerter and event recorder

**LOCOMOTIVE PERFORMANCE**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 kN</td>
<td>71,200 lb</td>
</tr>
<tr>
<td>250 kN</td>
<td>56,600 lb</td>
</tr>
<tr>
<td>6000 kW</td>
<td>2000 lb</td>
</tr>
<tr>
<td>200 km/h</td>
<td>125 mph</td>
</tr>
<tr>
<td>217 km/h</td>
<td>135 mph</td>
</tr>
</tbody>
</table>

- **Starting traction effort**
- **Tractive effort at continuous rating**
- **Continuous power rating**
- **Maximum operating speed**
- **Maximum design speed**
- **Acceleration rates:**
  - 1 locomotive and 8 cars
  - 5 miles in 5 minutes
  - 10 miles in 7-1/2 minutes
- **Minimum horizontal curve radius**
- **Minimum vertical curve radius (main line)**

**BOMBARDIER TRANSPORTATION**
MAJOR SYSTEMS DESCRIPTION

Propulsion system
- Four 3-phase AC asynchronous traction motors, 1,500 kW each
- Solid state power electronic using GTO's
- One inverter control system per motor
- Built-in slip/slide system

Braking system
- Electric and friction brakes
- Control and blending done on a per-truck basis and priority to electric braking first
  - Electric:
    - regenerative and rehostatic
  - Friction:
    - two wheel check discs per axle and thread brakes on all wheels
    - compatible with 26 L brake equipment
    - parking brake spring applied and air released

Train Monitoring System (TMS) and Data Management System (DMS)
- State-of-the-art and monitors most locomotive subsystems
- Provides human interface through 3 Cab Display Units (CDU)
- Interfaces with Data Management System
- DMS enables two-way communication with remote site through radio links
- Fully redundant Locomotive Network (LNET) using LonWorks network
- Provides direct compatibility with existing cars by using conventional 27 pins trainline

- Operating mode Cab Display Units used for:
  - operation critical information such as actual speed, speed limits and overspeed limitations
  - critical subsystem information such as pneumatic pressures, traction effort, motor currents, abnormal states and alarms
- Maintenance mode capabilities:
  - detailed information on subsystem health
  - maintenance event logs
  - detailed time-history record
- Data download capability:
  - through portable test equipment
  - through radio link to remote station

DIMENSIONS AND WEIGHT

<table>
<thead>
<tr>
<th></th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length over couplers</td>
<td>20,447 mm</td>
<td>67' 1&quot;</td>
</tr>
<tr>
<td>Width over side sheets</td>
<td>1,150 mm</td>
<td>10' 4&quot;</td>
</tr>
<tr>
<td>Height rail to top of roof</td>
<td>4,318 mm</td>
<td>14' 2&quot;</td>
</tr>
<tr>
<td>Height rail to lock down pantograph</td>
<td>4,420 mm</td>
<td>14' 6&quot;</td>
</tr>
<tr>
<td>Pantograph reach</td>
<td>7,468 mm</td>
<td>24' 6&quot;</td>
</tr>
<tr>
<td>Coupler height above rail</td>
<td>876 mm</td>
<td>34-1/2&quot;</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>1,016 mm</td>
<td>34&quot;</td>
</tr>
<tr>
<td>Truck wheelbase</td>
<td>2,845 mm</td>
<td>94'</td>
</tr>
<tr>
<td>Truck centre distance</td>
<td>10,744 mm</td>
<td>35' 3&quot;</td>
</tr>
<tr>
<td>Track gauge</td>
<td>1,016 mm</td>
<td>4' 8-1/2&quot;</td>
</tr>
<tr>
<td>Locomotive weight (ready-to-run)</td>
<td>99,790 kg</td>
<td>220,000 lb</td>
</tr>
</tbody>
</table>

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