A.4 Technical Explanation for 110 MPH Sustained Speed

The FRA has requested this section be added to the Appendix, to provide a technical explanation for the 110 MPH sustained speed vs. the 125 MPH maximum speed.

The position of New York State is that a sustained speed of 110 MPH for the Dual Mode (DC 3rd Rail) Passenger Locomotive is sufficient to provide intercity passenger service into Amtrak's New York Penn Station from the north (i.e., Vermont and Upstate New York). The position of New York State also is that the addition of the 3rd rail pick-up shoes, cabling, and associated electrical equipment, as well as the on-board energy storage system, will result in a larger, heavier locomotive which likely could not meet the P2 forces at the 125 MPH speed requirement of the PRIIA Diesel-Electric Locomotive. In addition, under the Tier I Draft Environmental Impact Statement for the Empire Corridor in New York State, for which the Federal Railroad Administration is the lead agency, only speeds up to 110 MPH would be operated in diesel mode. The 125 MPH alternative would be on a new right-of-way between Albany and Buffalo, grade-separated, and operated under AC Catenary.

Metro North Railroad, a subsidiary of the Metropolitan Transportation Authority of New York State, currently provides commuter passenger service into Metro North Railroad's Grand Central Terminal using dual mode (DC 3rd Rail) locomotives from non-electrified locations in New York State and Connecticut. The Long Island Rail Road, a sister subsidiary of the Metropolitan Transportation Authority, provides commuter passenger service into Amtrak's Penn Station using dual mode (DC 3rd Rail) locomotives from non-electrified locations on Long Island. Metro North Railroad, in conjunction with New York State and Connecticut, plans to provide commuter passenger service into Amtrak's Penn Station in the near future. NYSDOT, ConnDOT, and MNR intend that the PRIIA Dual Mode (DC 3rd Rail) Passenger Locomotive be a "common platform" which can be acquired and used by the States for intercity passenger service and by MNR (and eventually by LIRR) to provide commuter passenger service. The current maximum speed for passenger locomotives in diesel mode on MNR and LIRR is 90 MPH; the sustained speed of 110 MPH for the PRIIA Dual Mode (DC 3rd Rail) Passenger Locomotive will be more than sufficient to meet the needs of commuter passenger service.

Four locomotive manufacturers are on the NGEC Technical Subcommittee's Locomotive Working Group. Those four manufacturers responded to Metro North Railroad's July 2013 Request for Information (RFI) concerning the development of a new MNR Dual Mode (DC 3rd Rail) Passenger Locomotive. Those manufacturers have provided input to this Section of the Appendix.

Siemens is the manufacturer selected to construct the PRIIA Diesel-Electric Passenger Locomotive, named the Charger, which has a maximum speed of 125 MPH. Siemens advised that, using the PRIIA Charger locomotive as a base (at 272,000 pounds), the addition of the DC 3rd rail gear and electrical equipment would result in a DM locomotive which would be heavier (at 291,500 pounds) and 3 feet longer. The DM locomotive would not exceed the P2 force of 82,000 pounds on the rail at 110 MPH; however, at 125 MPH the P2 force limit would be exceeded. The addition of a notable and useful on-board energy storage would add an additional 15,000 pounds. The Siemens Charger locomotive meets EPA Tier 4 emissions standards.

Bombardier is the manufacturer of the ALP-45DP Dual Mode (AC Catenary) Passenger Locomotive, which has a maximum speed of 125 MPH in AC-Catenary electric mode, but only a maximum of 100 MPH in diesel mode. The ALP-45DP is in service with New Jersey Transit (NJT) for operation into New York Penn Station from non-electrified territory in the State of New Jersey, and with Montreal's Agence metropolitaine de transport (AMT) for operation into Montreal Central Station from non-electrified territory in the Provence of Quebec. Bombardier advised, that using their ALP-45DP locomotive as a base (at 288,000 pounds) they could remove the AC Catenary equipment and replace it with the DC 3rd Rail equipment, as well as add the on-board energy storage, and still remain at the 288,000 pound weight. Bombardier also advises that the resulting DM DC 3rd Rail locomotive will not exceed the P2 force of 82,000 pounds on the rail at 110 MPH or at 125 MPH. The Bombardier ALP-45DP locomotive, however, only meets EPA Tier 3 emissions standards. New York State is concerned that an increase in diesel engine power and weight will be needed to reach 110 MPH and 125 MPH respectively, and that there would be an increase in weight for after-treatment to achieve EPA Tier 4 emission standards. These two issues may cause the Bombardier locomotive to exceed the P2 force limit at 125 MPH in diesel mode.

EMD/Progress Rail is constructing the F125 Spirit locomotive for Metrolink (Southern California Regional Rail Authority, SCRRA). The F125 has a maximum speed of 125 MPH. EMD/Progress Rail advised that, using the F125 unit as a base, the addition of the DC 3rd Rail equipment would result in a DM locomotive of approximately 282,000 pounds. This DM DC 3rd Rail locomotive would not exceed the P2 forces at either 110 MPH or at 125 MPH. This maximum weight, however, does not include a weight estimate for the on-board energy storage system. The F125 unit meets EPA Tier 4 emissions standards.

GE/MPI has not specifically provided information for this document. In their response to the MNR RFI of last summer, however, GE/MPI indicated that the DM DC 3rd Rail locomotive they proposed would weight 326,000 pounds, have three axle trucks, and would meet EPA Tier 4 emissions requirements. The engine on the locomotive would be based on the GE Tier 4 EVO engine, with "no after-treatment". Although no explicit statement concerning meeting the P2 force limit of 82,000 pounds was made, GE/MPI noted that the P2 forces up to 125 MPH would be "low". New York State is concerned that even if the P2 forces are met, the weight of the locomotive at 326,000 pounds would exceed the capacity of the legacy infrastructure to support it into Penn Station and Grand Central Terminal, the target range for which is 286,000 pounds.

In conclusion, based upon the information provided for this document from Siemens, Bombardier and EMD/Progress Rail, the Locomotive Working Group is satisfied that is feasible for a Dual Mode (DC 3rd Rail) Locomotive, with on-board energy storage, to meet the P2 force limit of 82,000 pounds at a sustained speed of 110 MPH; however, at a maximum speed of 125 MPH, the P2 force limit would be likely exceeded.