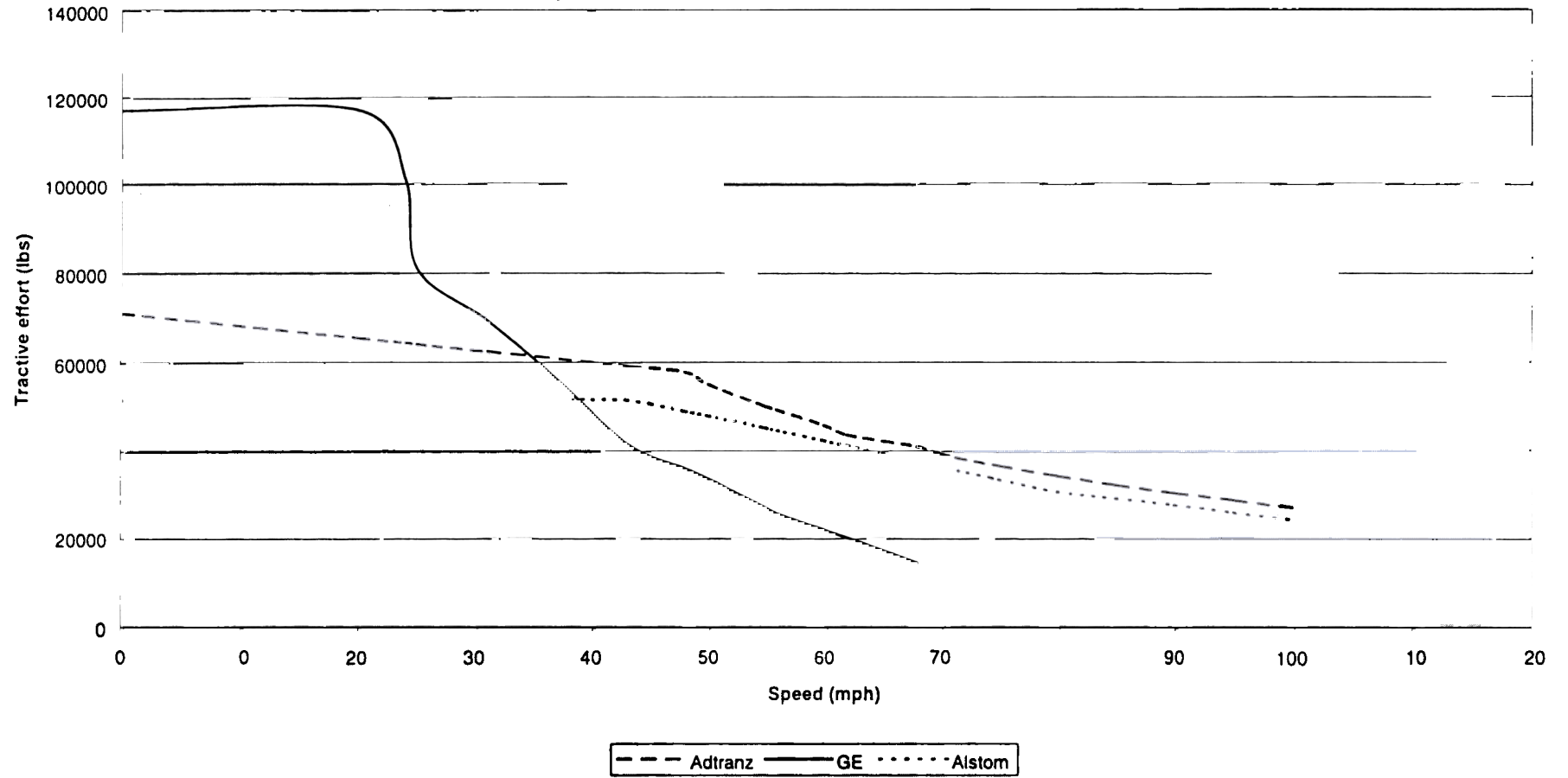


***APPENDIX 7***

***Locomotives  
Comparison of Technical Data***

Tractive effort vs. speed  
(for various manufacturer's locomotives)



| Speed | Adtranz | GE       | Alstom   |
|-------|---------|----------|----------|
| 0     | 71150   | 117000   | 51700    |
| 20    | 65604   | 117000   | 51700    |
| 24    | 64495   | 101000   | 51700    |
| 25    | 64218   | 81000    | 51700    |
| 31    | 62554   | 69500    | 51700    |
| 37    | 60890   | 56250    | 51700    |
| 43    | 59226   | 41600    | 51700    |
| 48    | 57840   | 35992.86 | 49235.71 |
| 50    | 55180   | 33750    | 48250    |
| 55    | 50160   | 27083.33 | 45375    |
| 56    | 49324   | 25750    | 44800    |
| 60    | 45980   | 22083.33 | 42500    |
| 62    | 43772   | 20250    | 41300    |
| 65    | 42450   | 17450    | 39500    |
| 68    | 41208   | 14650    | 37700    |
| 70    | 39420   |          | 36500    |
| 75    | 36790   |          | 33750    |
| 80    | 34490   |          | 31000    |
| 85    | 32460   |          | 29500    |
| 90    | 30660   |          | 28000    |
| 95    | 29040   |          | 26250    |
| 100   | 27210   |          | 24500    |

### Average and peak catenary line current estimates

| scenario                                 | power<br>(rail hp) | energy<br>(kW hrs) | time (sec) | average line<br>current (amps) | peak line current<br>(amps) |
|--|--------------------|--------------------|------------|--------------------------------|-----------------------------|
| 1. acceleration 0 - 90 mph @ full power  | 7450               | 287                | 164        | 252                            | 292                         |
| 2. acceleration 0 - 65 mph @ full power  | 7450               | 135                | 89         | 218                            | 292                         |
| 3. acceleration 0 - 50 mph @ full power  | 7450               | 75                 | 59         | 183                            | 270                         |
| 4. acceleration 50 - 90 mph @ full power | 7450               | 209                | 103        | 292                            | 292                         |
| 5. cruising @ 90 mph                     | 1950               |                    |            | 97                             | 97                          |
| 6. cruising @ 65 mph                     | 1058               |                    |            | 66                             | 66                          |
| 7. cruising @ 50 mph                     | 675                |                    |            | 53                             | 53                          |

**Consist:** 1 locomotive at 6000 kW (propulsion inverter output), 105 tons  
 71,000 lbs tractive effort max (36% adhesion)  
 10 trailing cars at 85 tons each & 75 kW HEP load each  
 Assuming linear and constant electrical losses  
 25 kV overhead catenary

Note 1 - average line current calculated from energy used to accelerate train (kW hrs) times duration of acceleration (seconds).

Note 2 - these figures are based on typical electric locomotive components and include estimates and approximations for transformer, GTO inverter, auxiliary, traction motor, gear, and wheel rim losses. They are presented for budgetary purposes only.

Locomotive option comparison

|                         | GE E60  | Alstom AEM-7AC   | Adtranz ALP46  | Bombardier   |
|-------------------------|---|--|--|--|
| Propulsion system       | DC SCR  | AC - IGBT  | AC - GTO   | AC - GTO   |
| Overall length          | 69' 3"  | 53'  | 64'  | 67'  |
| Overall height          | 16'   | 14' 10"  | 14' 8"   | 14' 6"   |
| Overall width           | 9' 11"  | 10'  | 9' 8"  | 10' 4"   |
| Weight                  | 198 tons  | 100 tons   | 97 tons  | 110 tons   |
| Nominal power rating    | 4500 kW   | 5000 kW  | 6000 kW  | 6000 kW  |
| Maximum tractive effort | 117,000 lbs   | 51,700 lbs   | 71,000 lbs   | unkown   |
| Advantages              | Low purchase cost, available, high tractive effort due to heavy weight, simple to maintain      | Proven and reliable mechanical design, state of the art propulsion system, low conducted EMI | Proven GTO propulsion system, builder has strong US experience, high performance                             | Proven GTO propulsion system, builder has strong US experience, high performance                                       |
| Disadvantages           | High operating cost, outdated DC electrical system, no HEP, dated appearance, heavy, less power | Lack of remanufacture candidates, IGBT system at peak of proven power level                  | Propulsion technology not the latest and more complicated, mechanical design not yet proven in North America | Propulsion technology not the latest and more complicated, locomotive designed more for intercity vs. commuter service |