

US EPA ARCHIVE DOCUMENT

# Modeling Deterioration of Running Emissions

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# Modeling Deterioration of Running Emissions

- ◆ Data Sources
- ◆ Models
- ◆ Results

# Data Sources

- ◆ IM240
  - Ohio
  - Arizona
  - Colorado
- ◆ FTP
  - Emission Factors Database
  - Manufacturers
  - API

# Ohio IM 240

- ◆ 240,000 tests, model years 1975-96, from Dayton (no previous IM program)
- ◆ Fast Pass scores used to simulate 240
- ◆ Simulated 240 correlated with Running LA4
- ◆ Conclusions
  - No indication of accelerated deterioration
  - Decision: May use Ohio truck data for model years not adequately represented by FTP data

# Deterioration of Running LA4 Emissions

- ◆ FTP Data (AAMA, EPA, API)

- used for

- ◆ carbureted vs. fuel injected

- ◆ model year groups

- 1981-82

- 1983-85

- 1986-89

- 1990-93

- ◆ cars vs. trucks

# Fitted Models

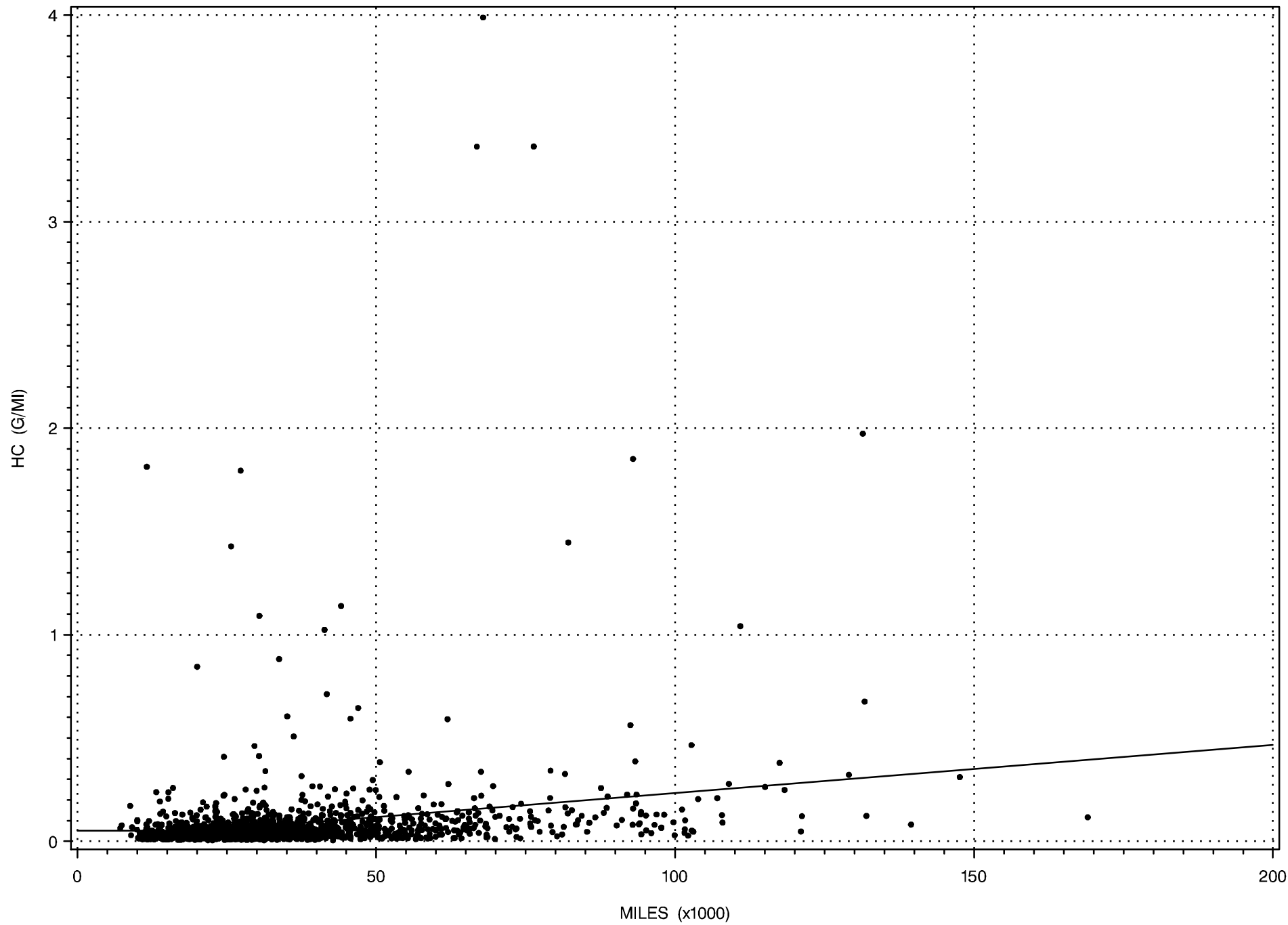
- ◆ Linear
  - Emissions =  $A + B * \text{Miles}$
- ◆ Constrained Linear
  - Emissions =  $ZML + B * \text{Miles}$
- ◆ Constrained Nonlinear
  - Emissions =  $ZML + K * (\text{Miles})^B$

# Proposed Solution

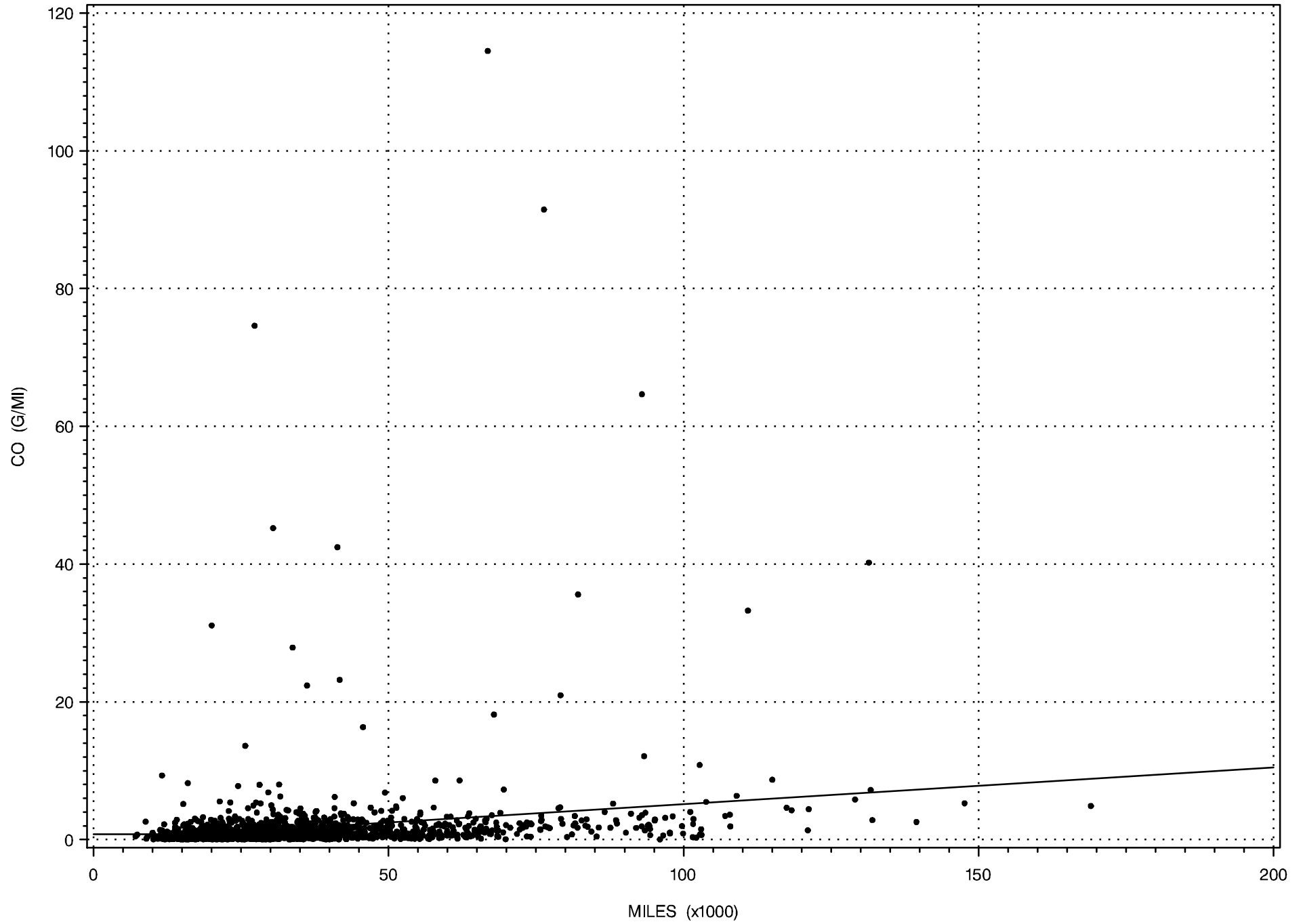
- ◆ Piecewise function
  - Constant emissions at low mileage
  - Constrained linear function through low mileage point, connected to...
  - Unconstrained linear function for high mileage



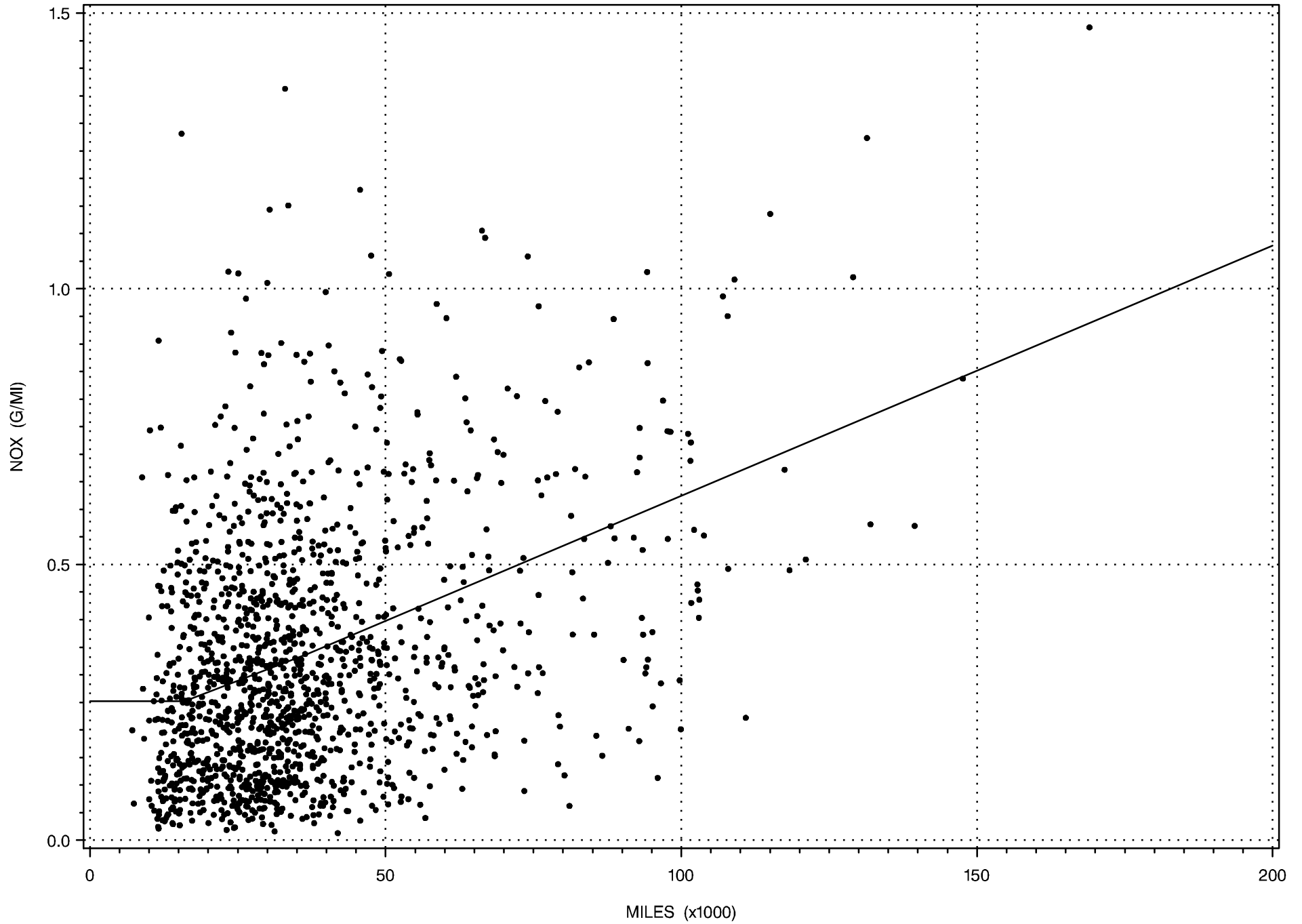
RUNNING LA4 HC: 1990-93 PFI CARS with PROJECTED MOBILE6



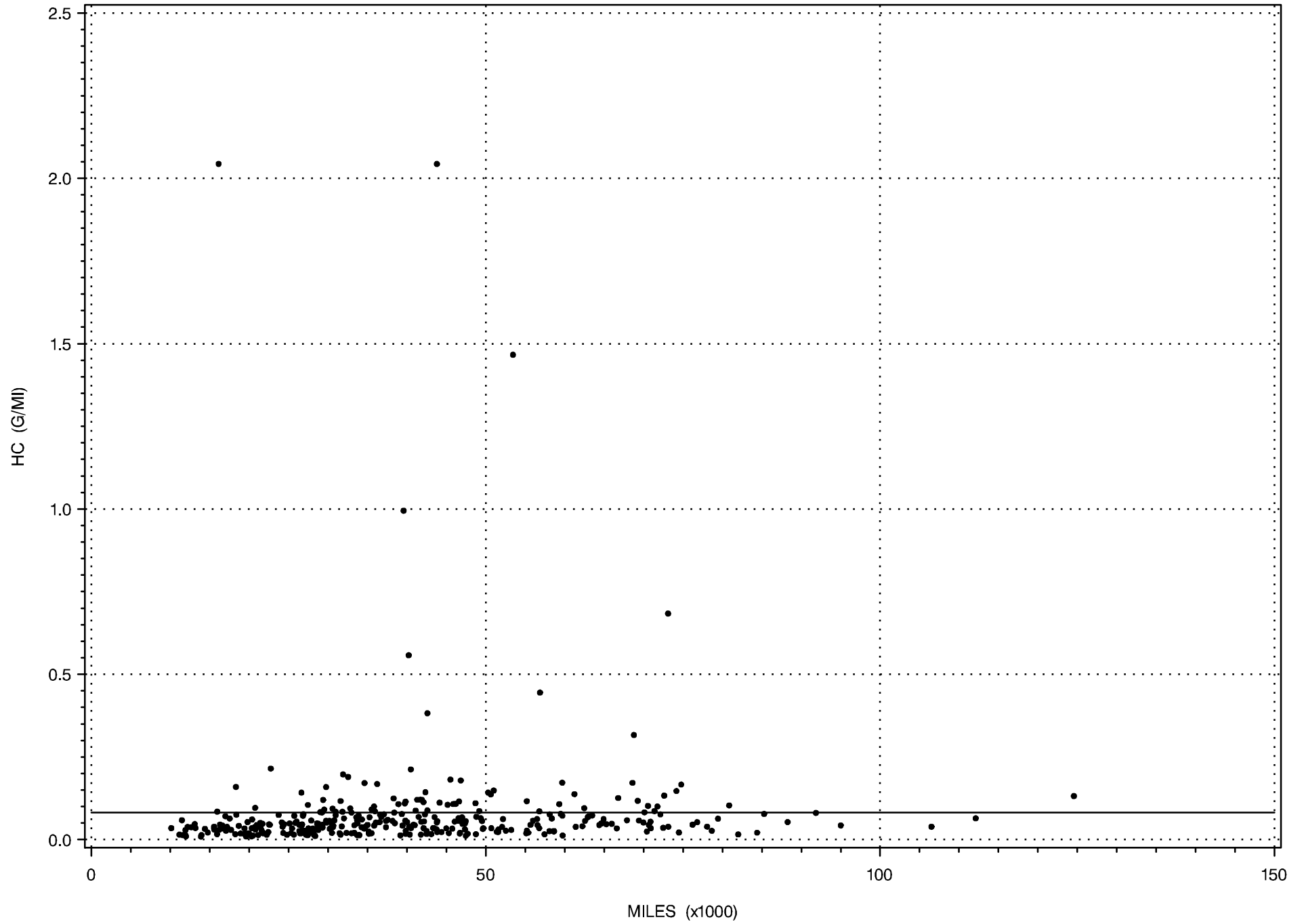
RUNNING LA4 CO: 1990-93 PFI CARS with PROJECTED MOBILE6



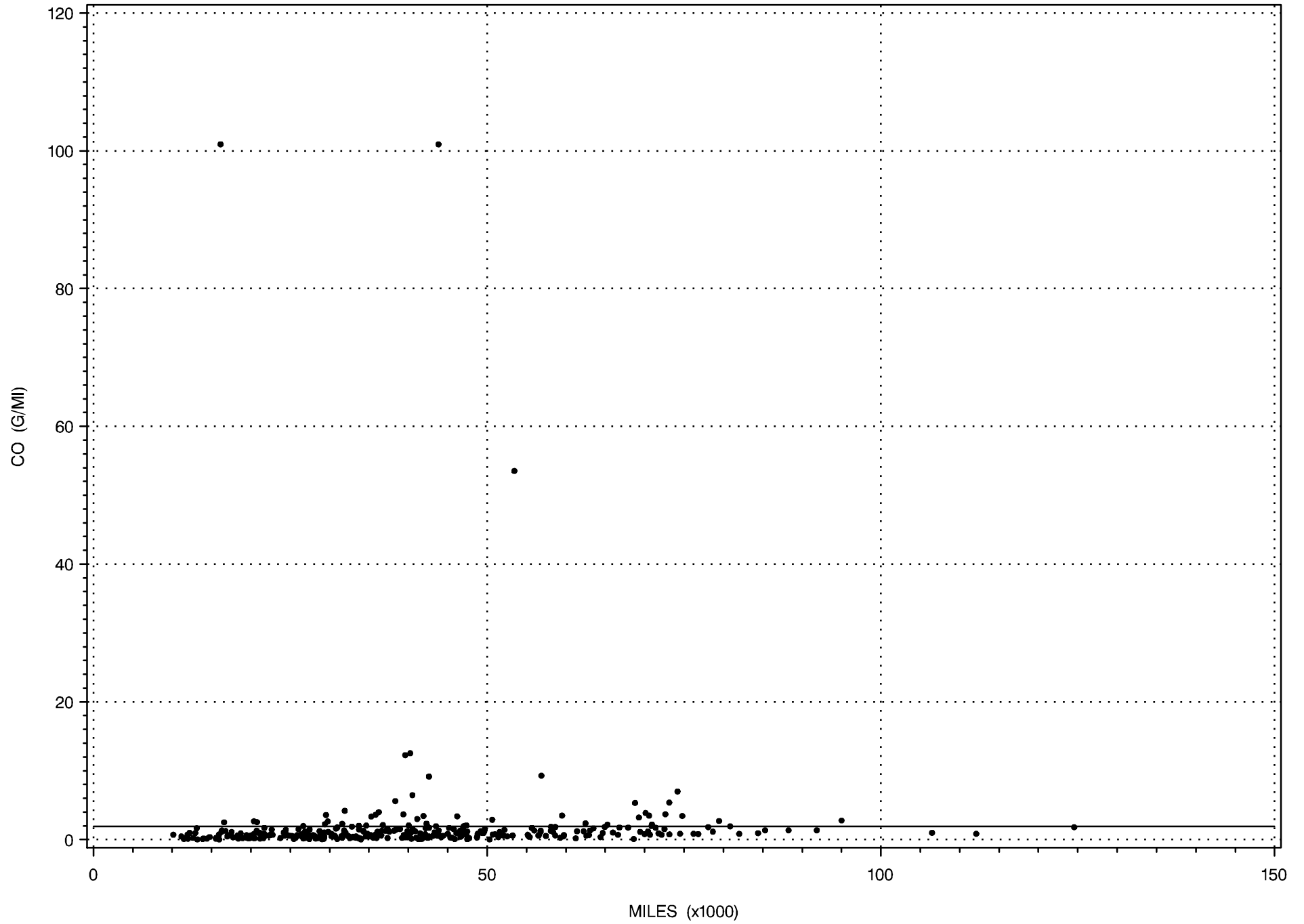
RUNNING LA4 NOX: 1990-93 PFI CARS with PROJECTED MOBILE6



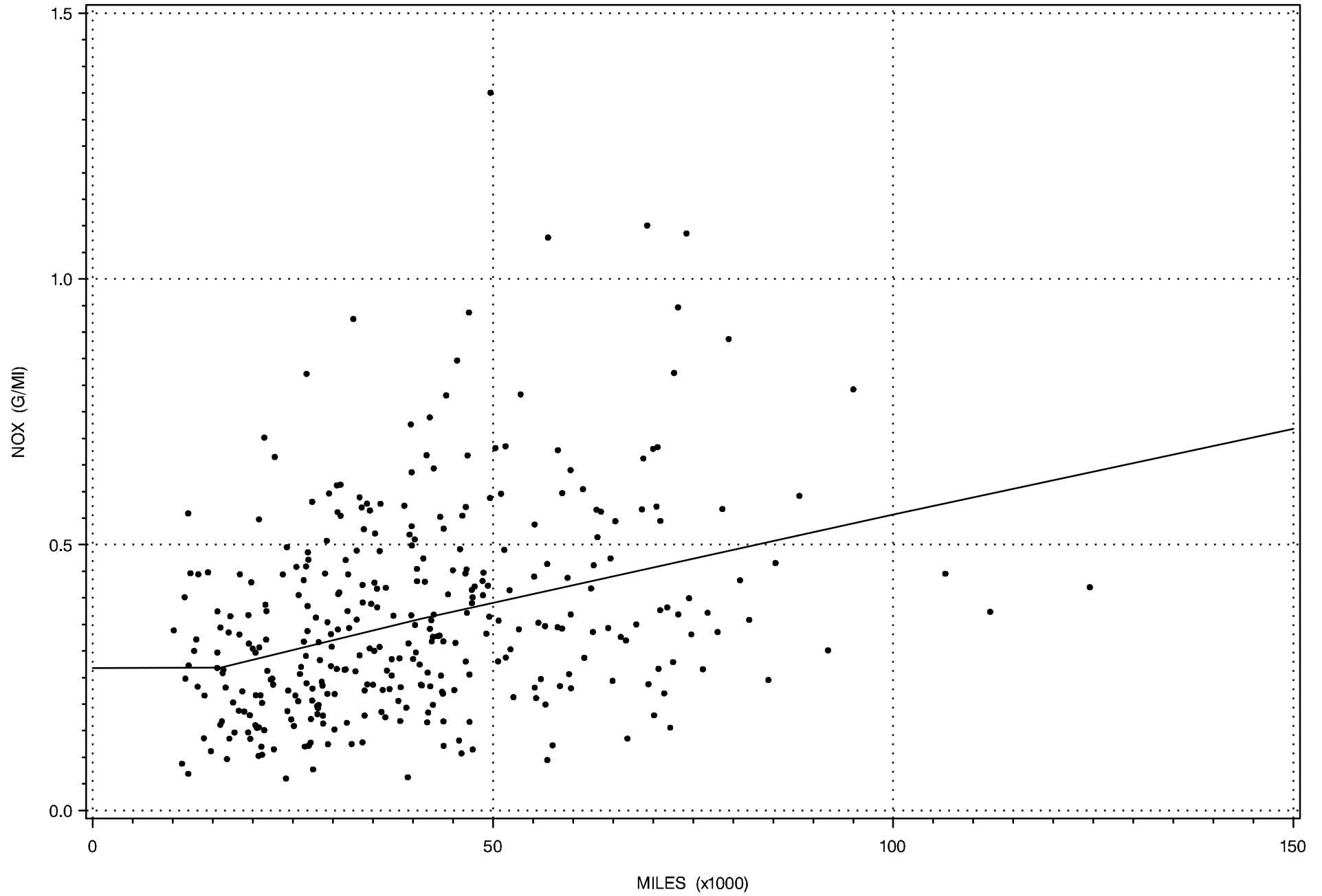
RUNNING LA4 HC: 1990-93 TBI CARS with PROJECTED MOBILE6



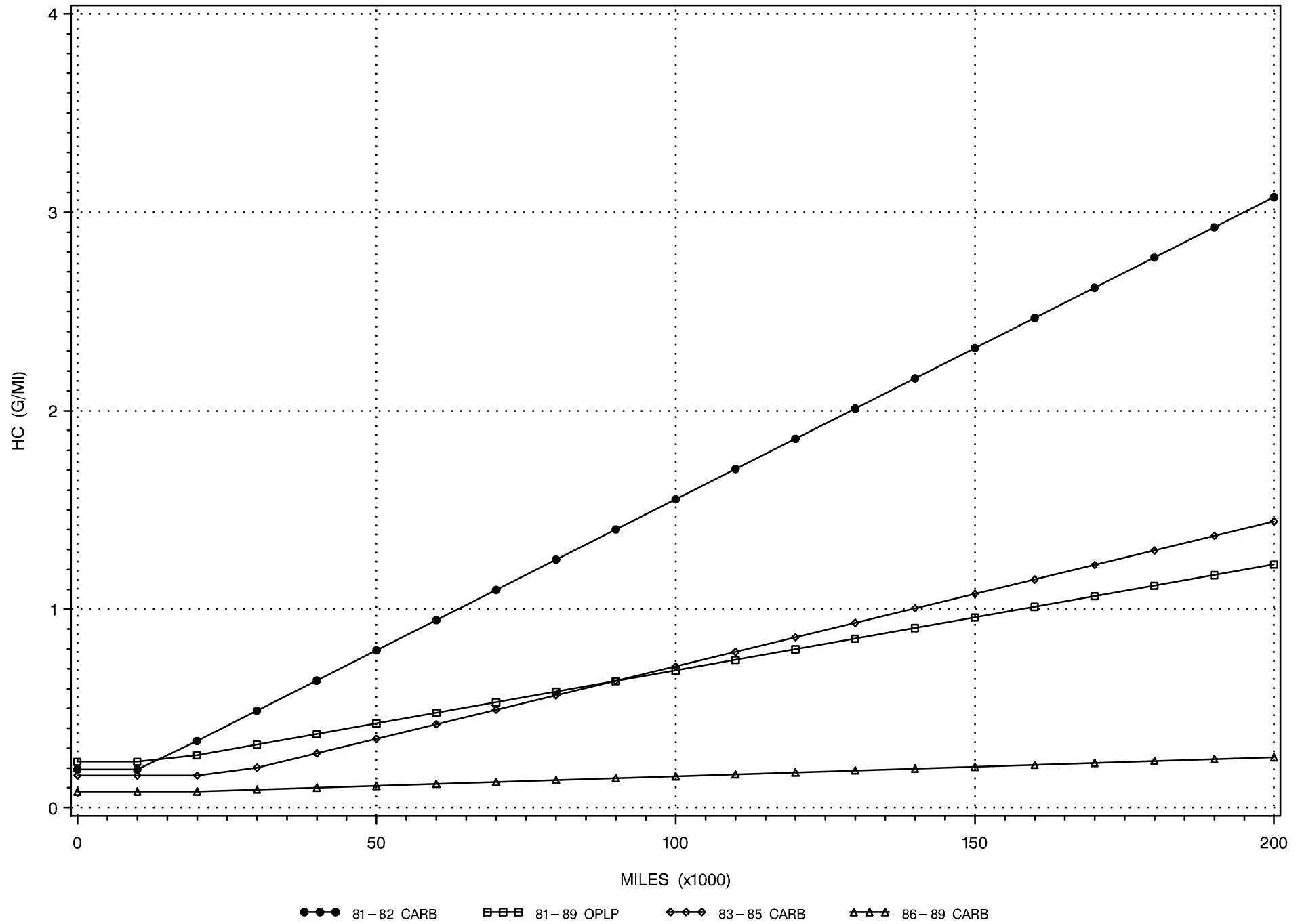
RUNNING LA4 CO: 1990-93 TBI CARS with PROJECTED MOBILE6



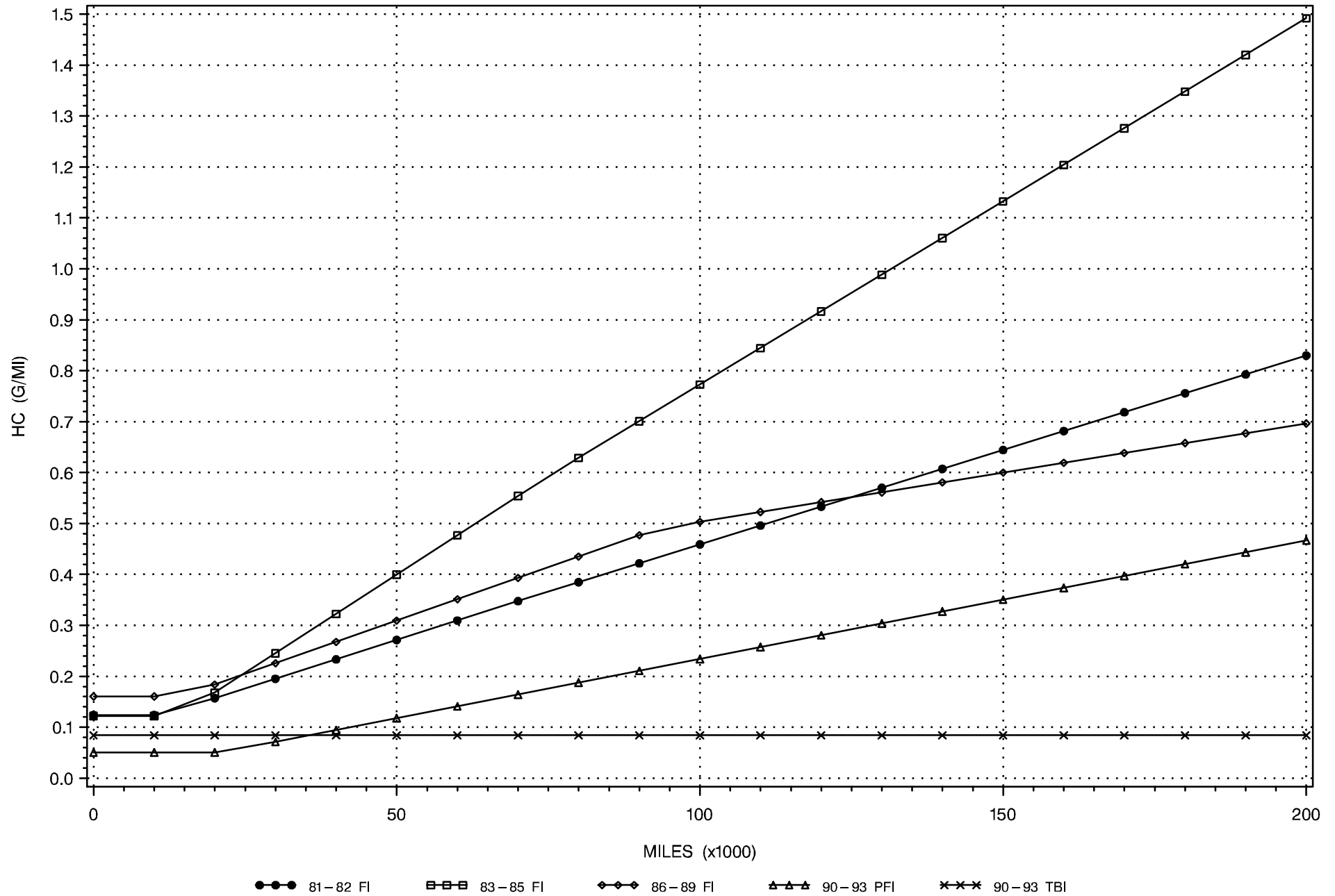
RUNNING LA4 NOX: 1990-93 TBI CARS with PROJECTED MOBILE6



# RUNNING LA4 HC: OPEN LOOP AND CARBURETED CARS

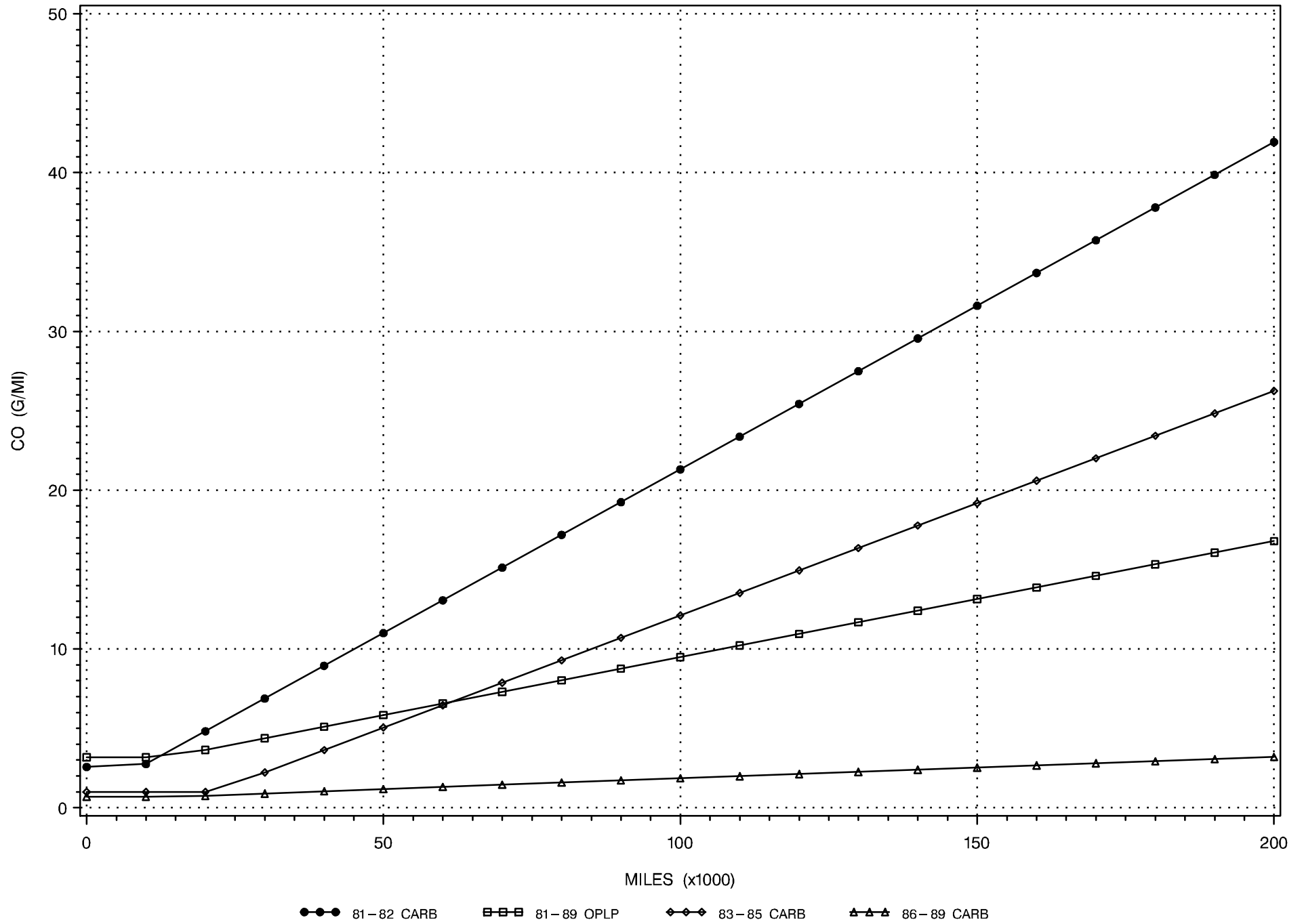


# RUNNING LA4 HC: FUEL INJECTED CARS

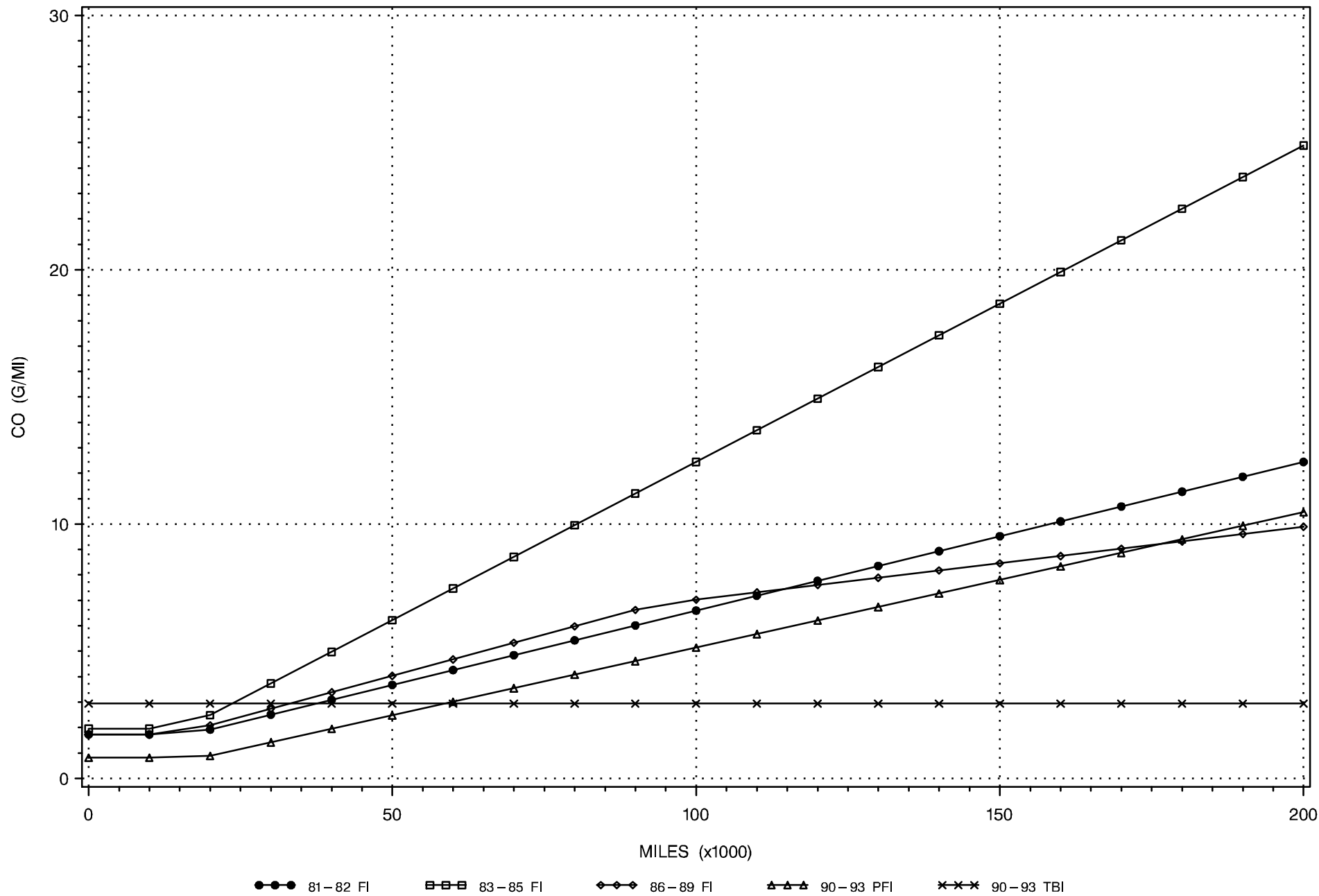




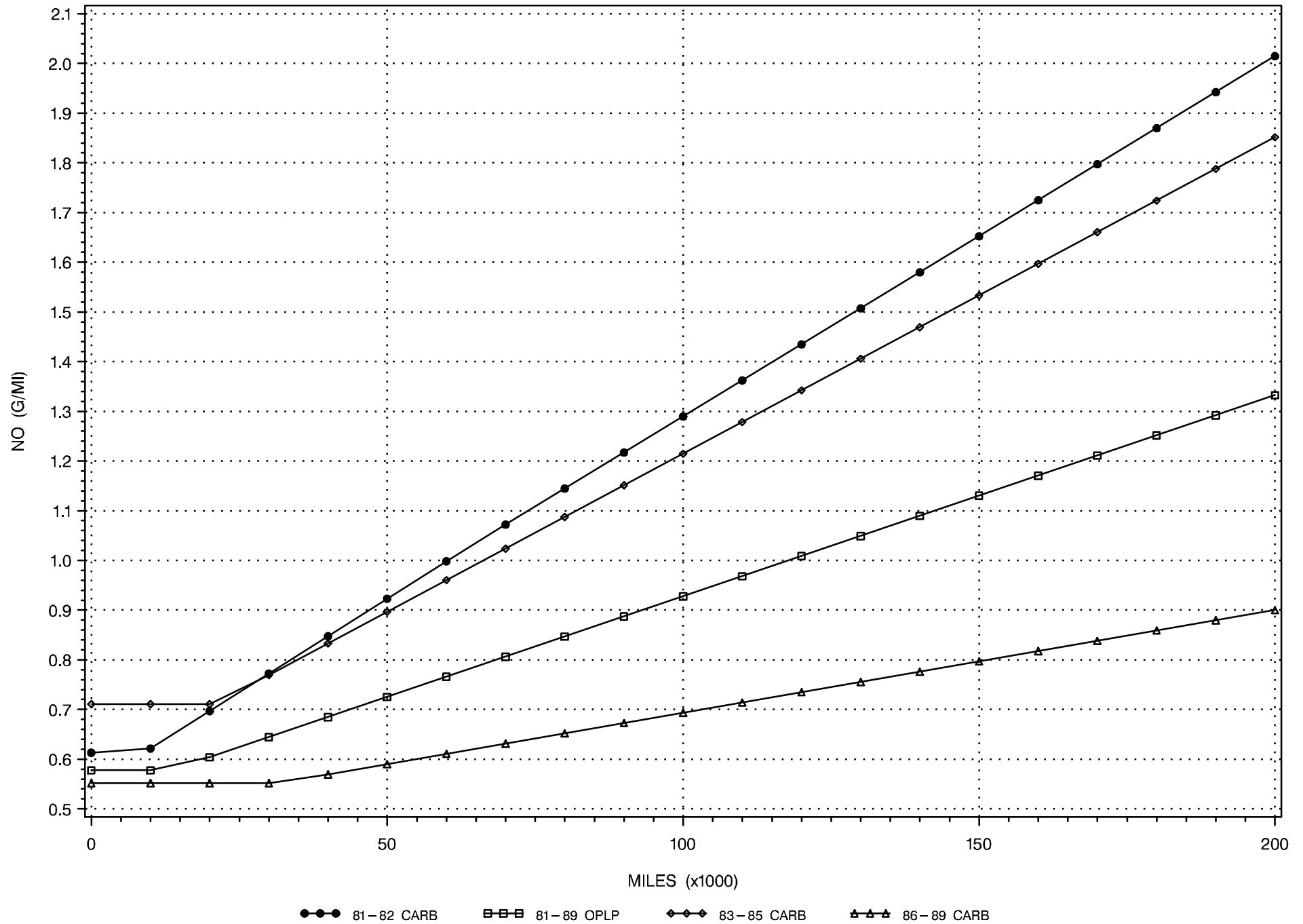
RUNNING LA4 CO: OPEN LOOP AND CARBURETED CARS



# RUNNING LA4 CO: FUEL INJECTED CARS



# RUNNING LA4 NOX: OPEN LOOP AND CARBURETED CARS



# RUNNING LA4 NOX: FUEL INJECTED CARS

