

Evaluating Alternative Diesel Fuels & Retrofit Devices in Reducing Emissions



**Presented by
Oreste M. Bevilacqua**



Project funding provided by the
California Energy Commission

Impact of Alternative Fuels and Devices

Focus of Presentation PM and NOx

- Fuels Involved**
- Standard Diesel
 - Lubrizol's Purinox
 - ARCO ECD-1 Diesel
 - Three Fischer Topsch GTLs

- Technologies**
- Diesel Soot Filters
 - Oxidation Catalysts
 - Low NOx Engine
 - Recalibration and Soot Filter

Impact of Alternative Fuels and Devices

- VEHICLES:**
- 1994 Dump Truck with International DT466
 - 1999 Stake Side Dump Truck with International DT 466E
 - 2001 International 4900 Dump Truck with Navistar 8.7 L
 - 1994 International Dump Truck with Navistar 8.7 L
 - 2001 International 4900 Dump Truck with International 530
 - 1997 Freightliner Century Class tractor

Test Protocol

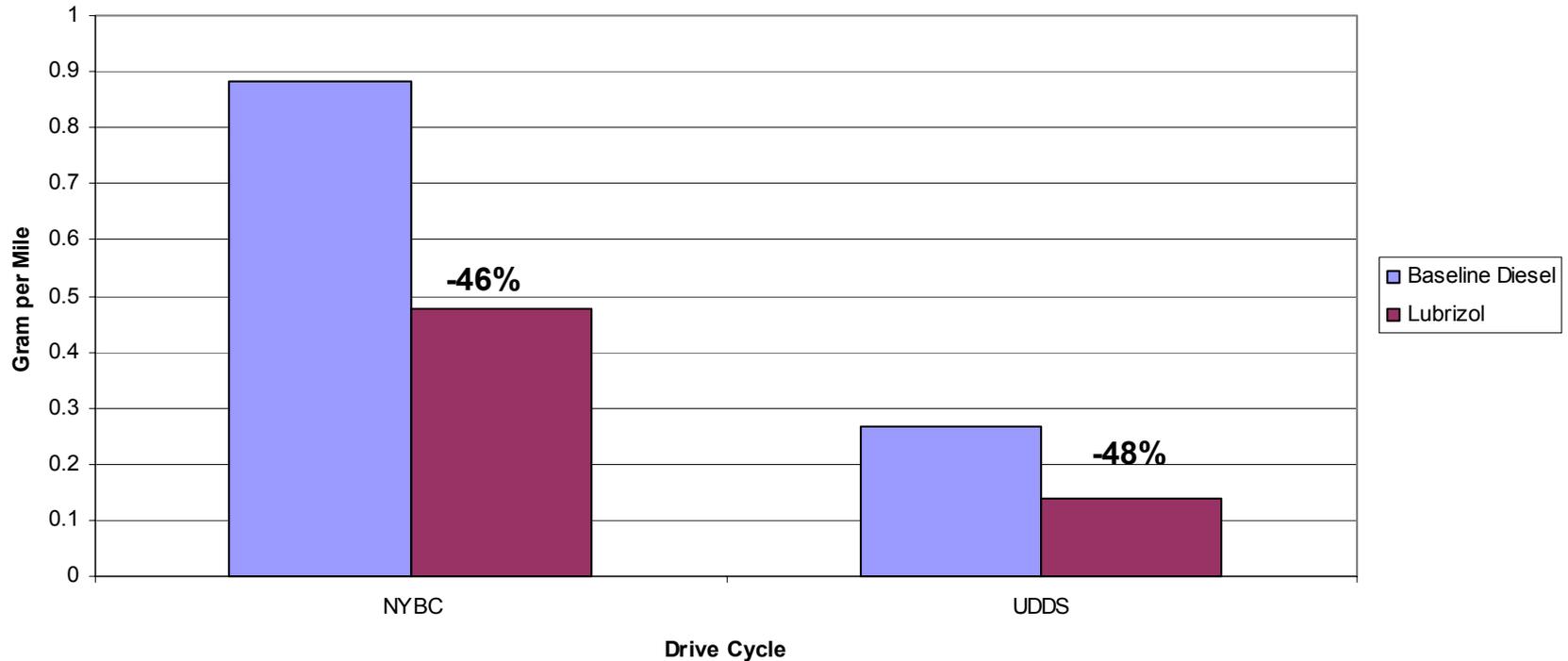
- 1 “Cold-Start” UDDS
- 3 Hot Start UDDS tests
- 3 Hot Start NYBC tests
- 1 Hot Start/Stabilized Idle test
- 2 Hot Start/Stabilized Steady State tests

Test Results

- PM reductions are substantial when alternate fuels & retrofit devices combined
- All retrofit devices equally effective at reducing PM
- Results of NOx effects are less dramatic – some emissions increases recorded
- GTL fuels highly effective in reducing PM

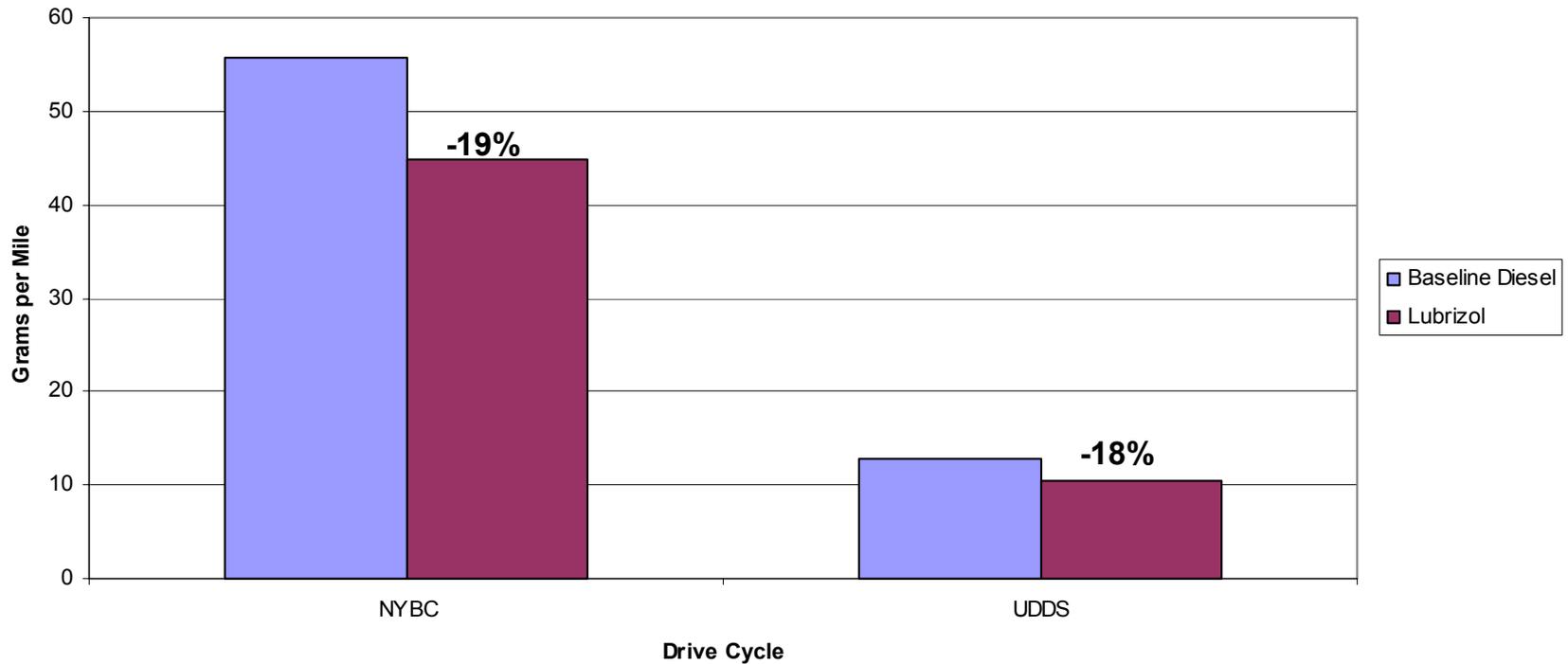
Technology #1 – PM Effects

Technology #1
PM Effects of Purinox vs. Baseline Diesel



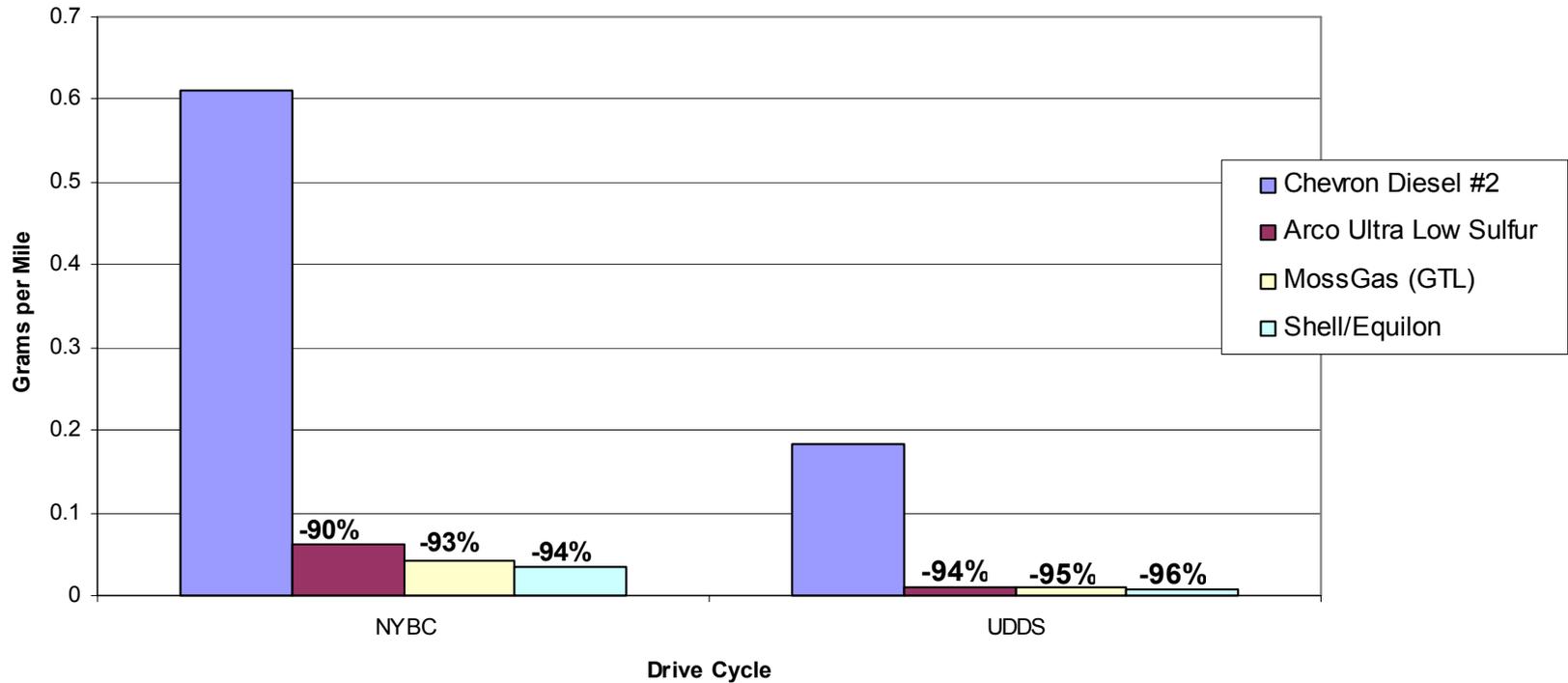
Technology # 1 – NOx Effects

Technology #1
NOx Effects of Purinox vs. Baseline Diesel



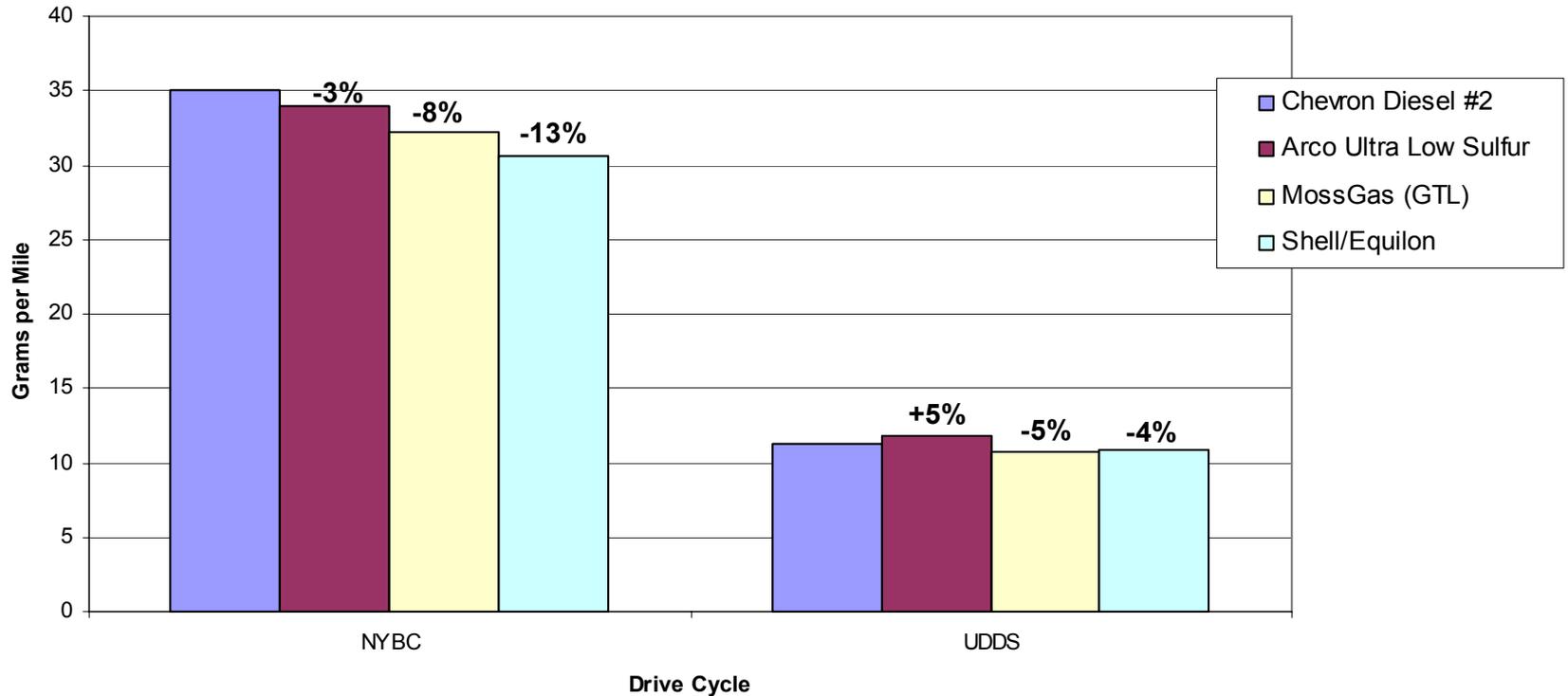
Technology # 2 – PM Effects

Technology #2
PM Effects of Johnson Matthey DPF and Alternative Fuels



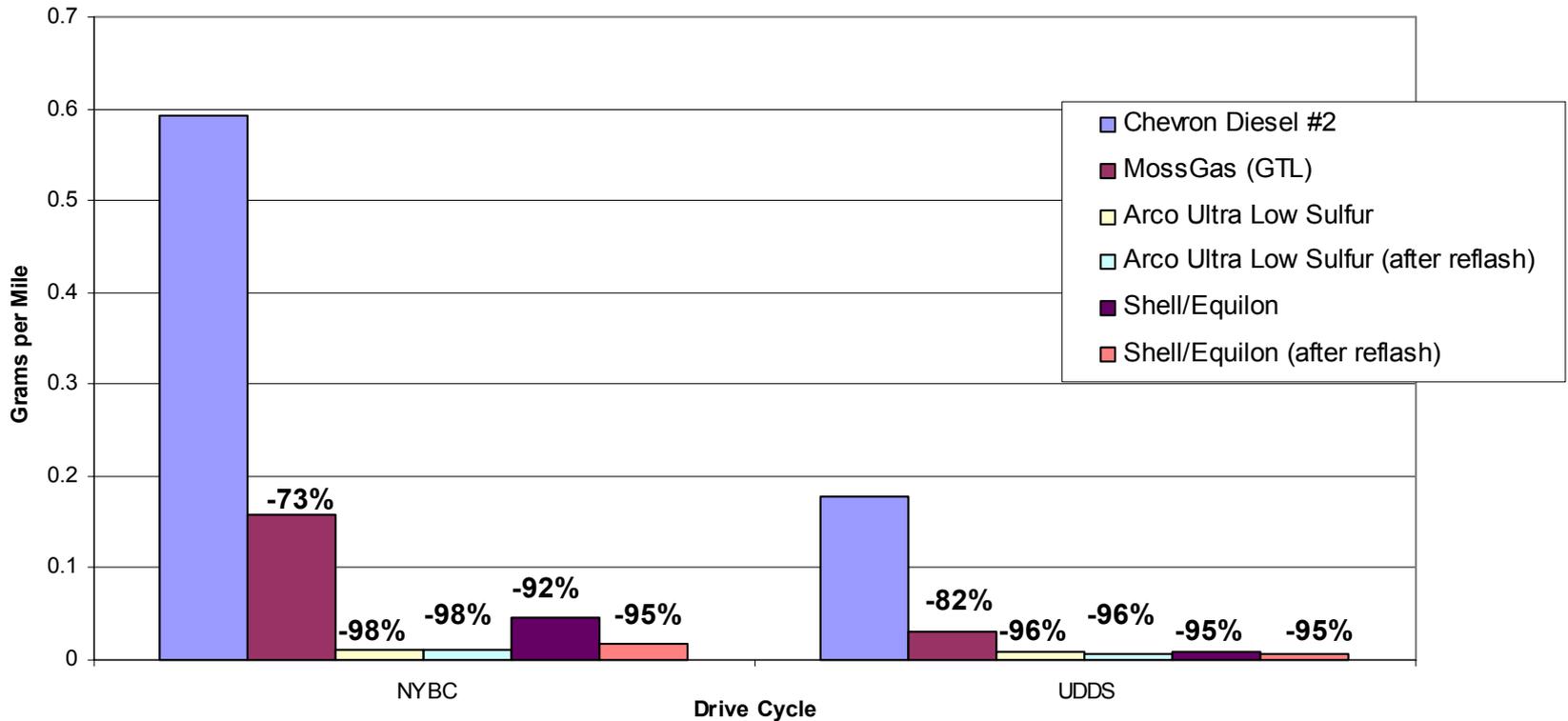
Technology #2 – NOx Effects

Technology #2
NOx Effects of Johnson Matthey DPF and Alternative Fuels



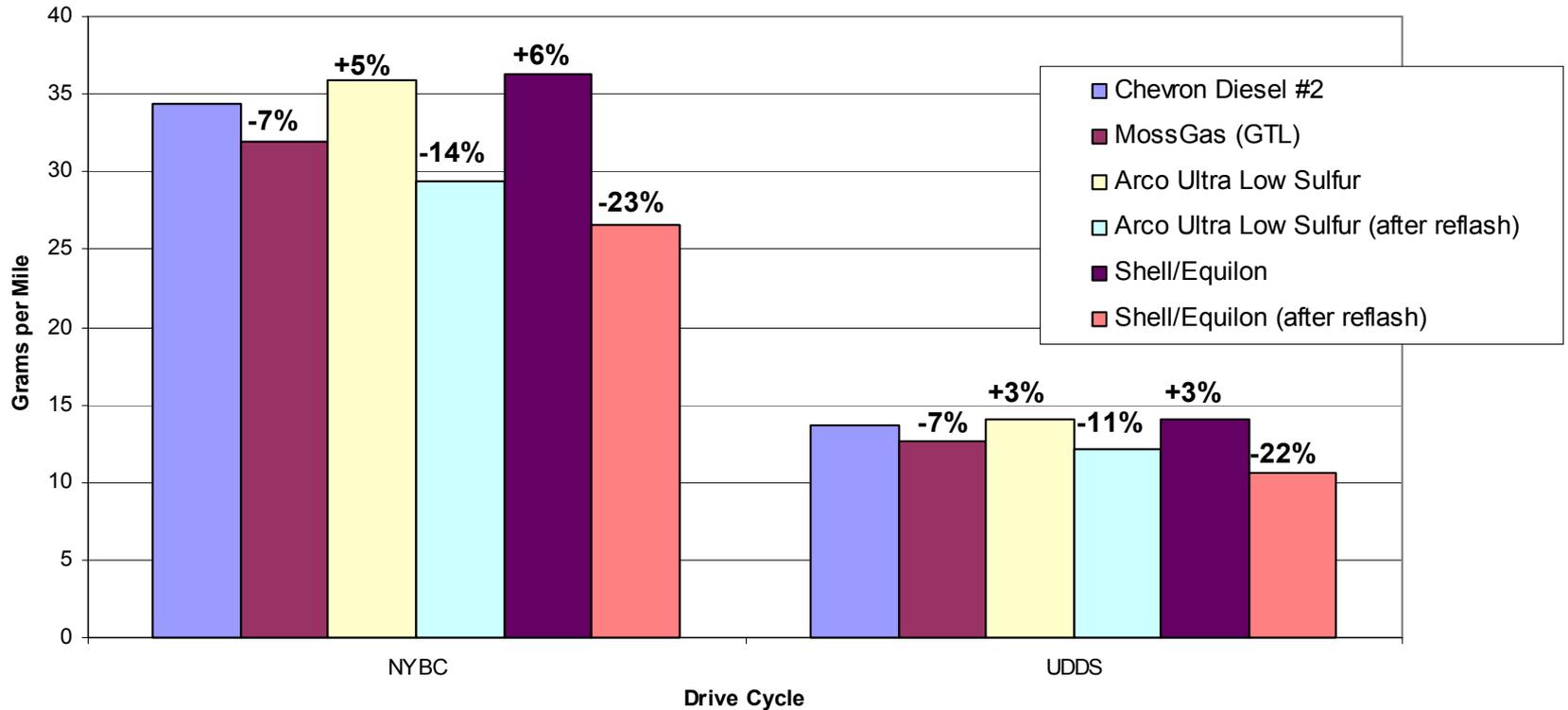
Technology #3 – PM Effects

Technology #3
 PM Effects of Englehard DPX, Alternative Fuels, and Selected Reflash



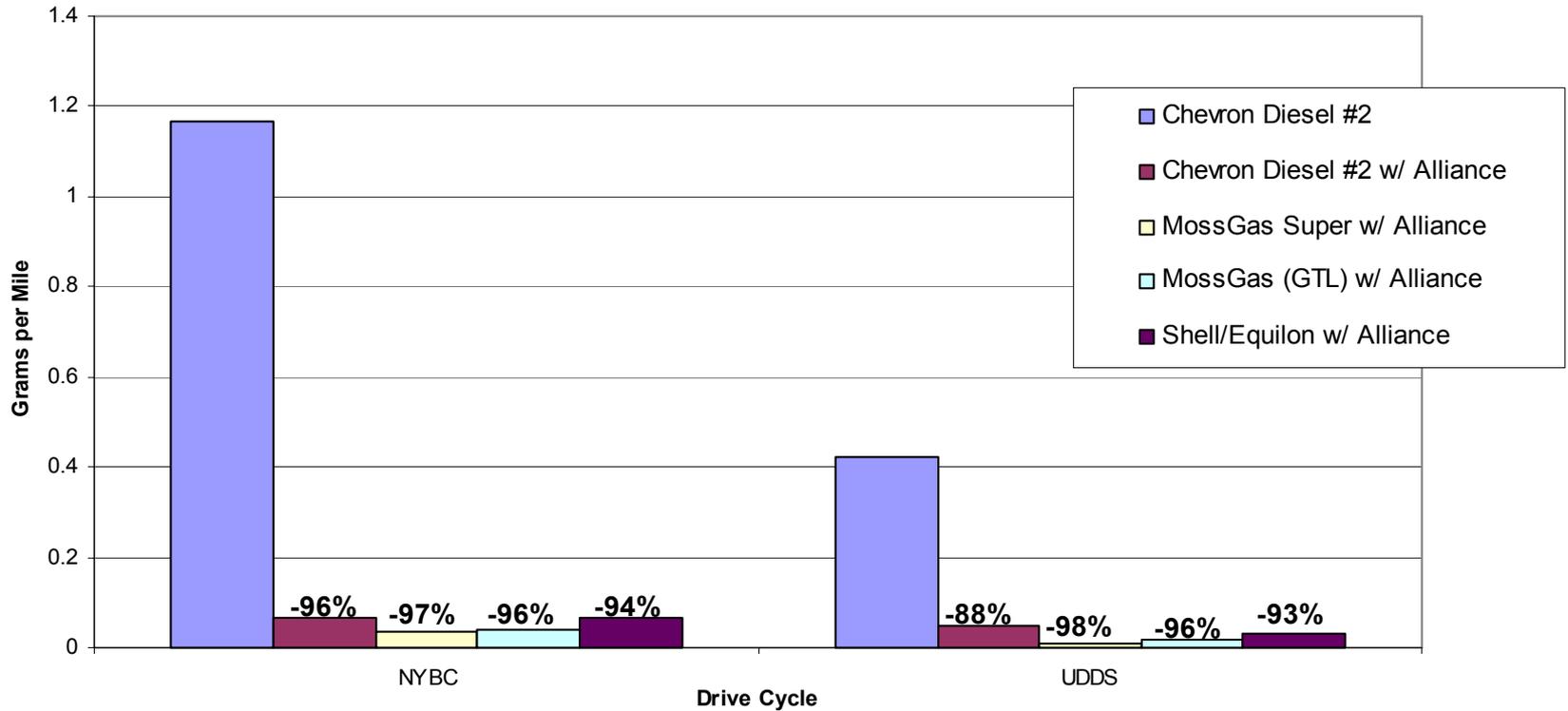
Technology #3 – NOx Effects

Technology #3
NOx Effects of Englehard DPX, Alternative Fuels, and Selected Reflash



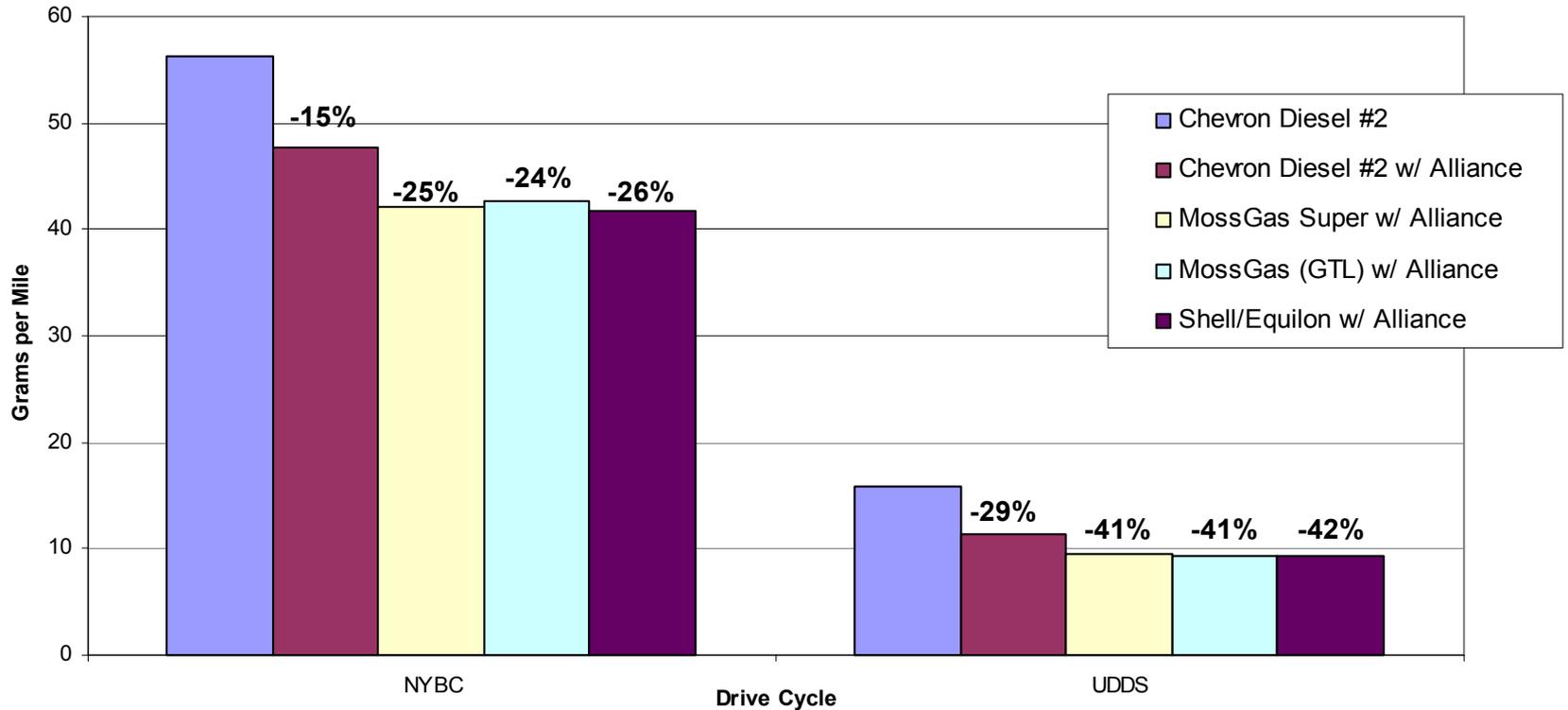
Technology #4 – PM Effects

Technology #4
PM Effects of Cleaire Alliance Longview Catalyst and Alternative Fuels



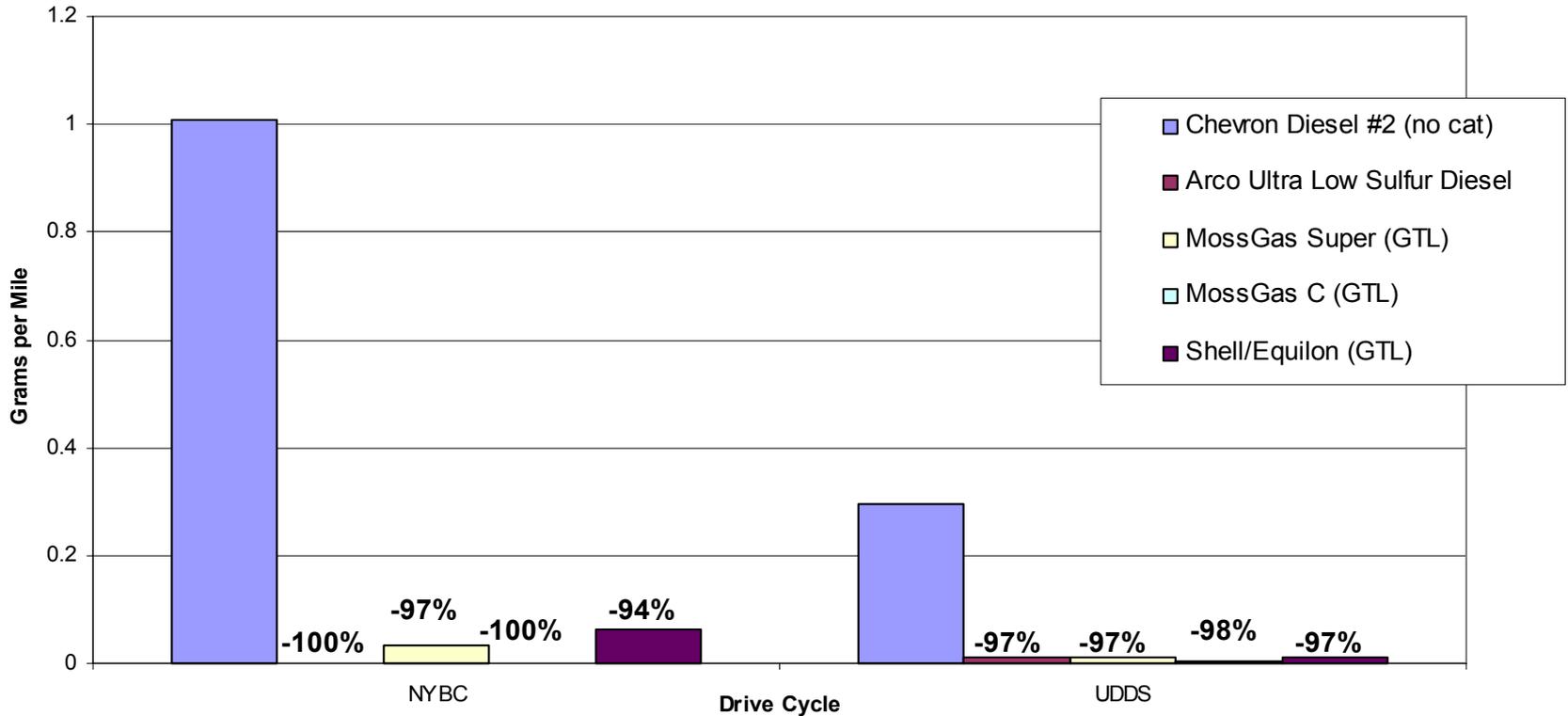
Technology #4 – NOx Effects

Technology #4
NOx Effects of Cleaire Alliance Longview and Alternative Fuels



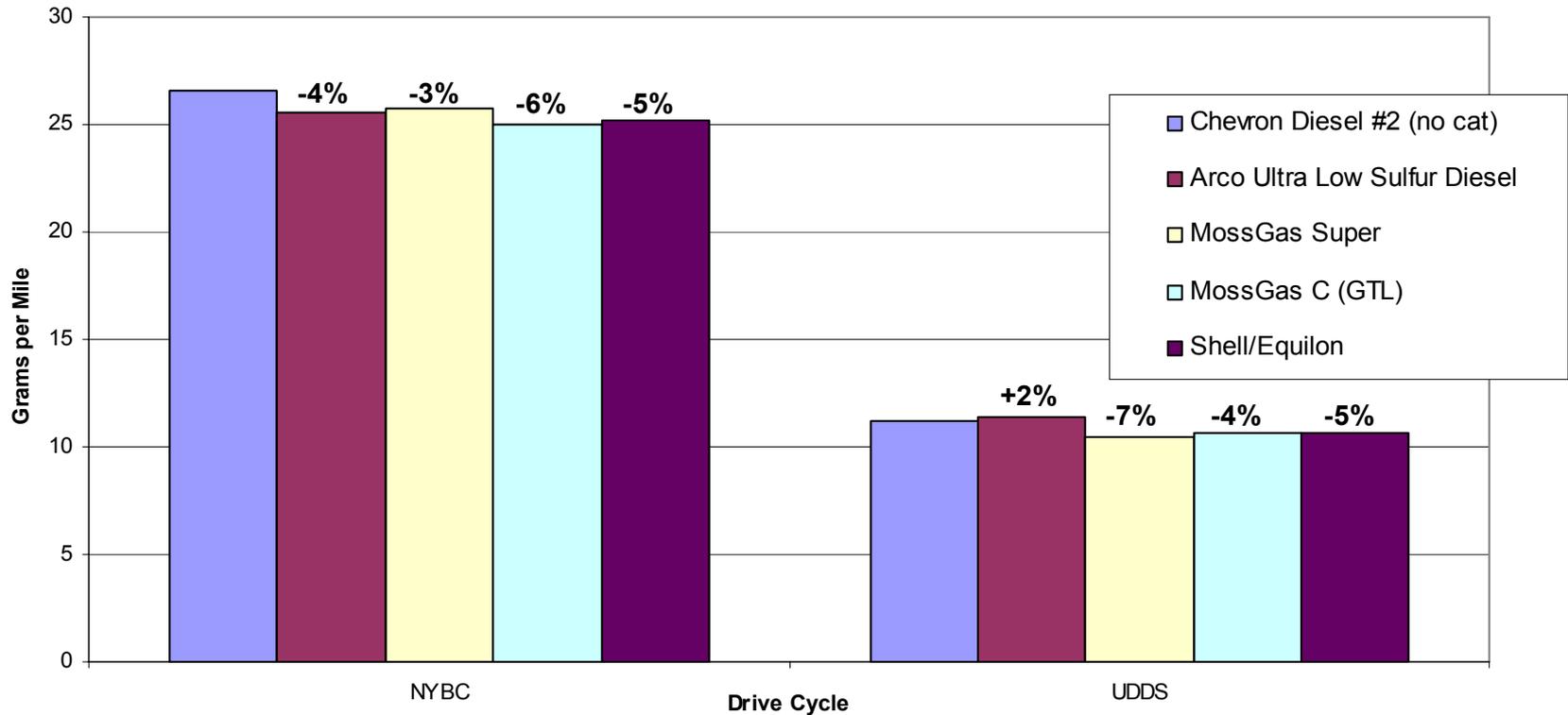
Technology #5 – PM Effects

Technology #5
 PM Effects of Englehard Particulate Filter (DPX)/Catalyst and Alternative Fuels



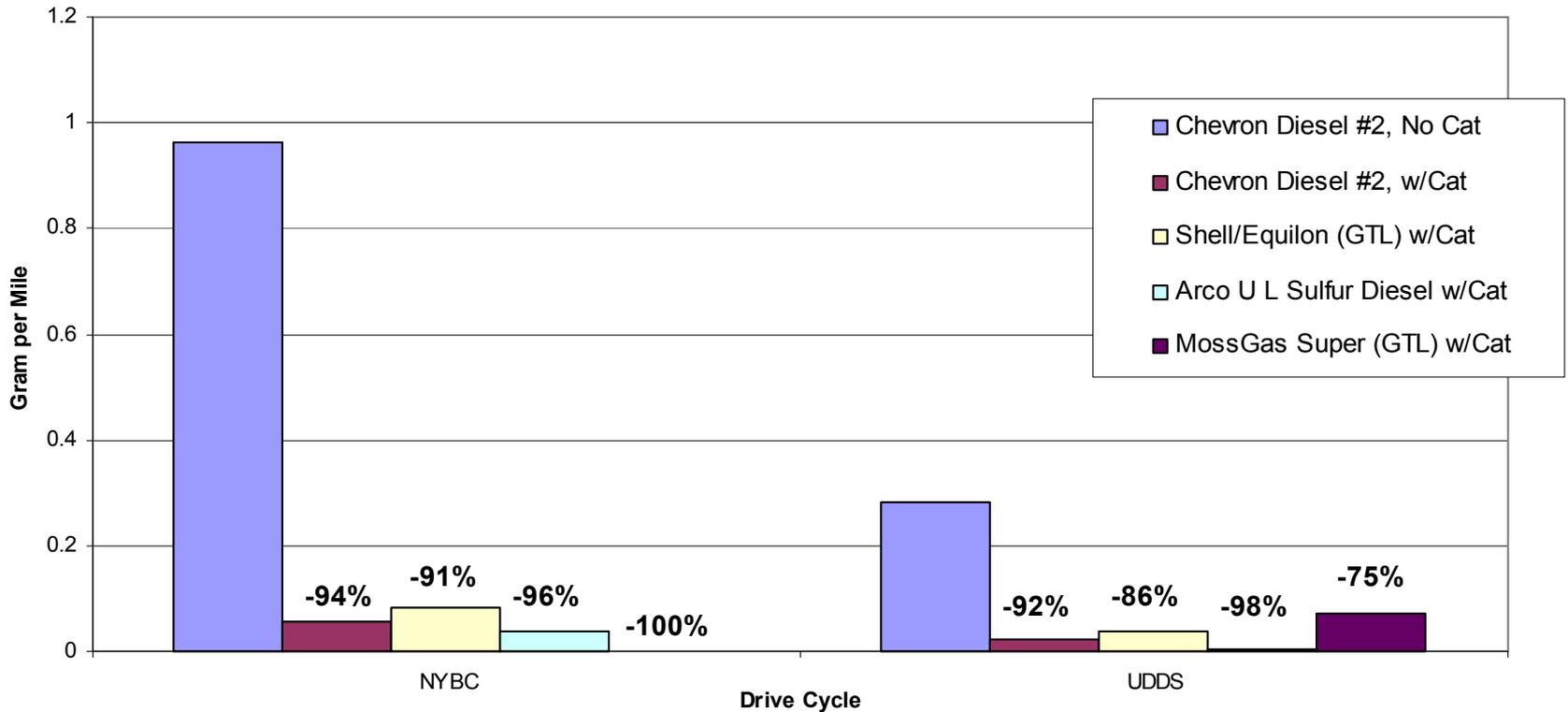
Technology #5 – NOx Effects

Technology #5
NOx Effects of Englehard Diesel Particulate Filter (DPX)/Catalyst and Alternative Fuels



Technology #6 – PM Effects

Technology #6
PM Effect of Cleaire Alliance Longview Catalyst and Alternative Fuels



Technology #6 – NOx Effects

Technology #6
NOx Effects of Cleaire Alliance Longview Catalyst and Alternative Fuels

