

Regulatory Options Sub- Workgroup and MECA's Perspective on Regulating NO₂ Emissions

IDRAC Meeting

October 5, 2004

Manufacturers of Emission Controls Association

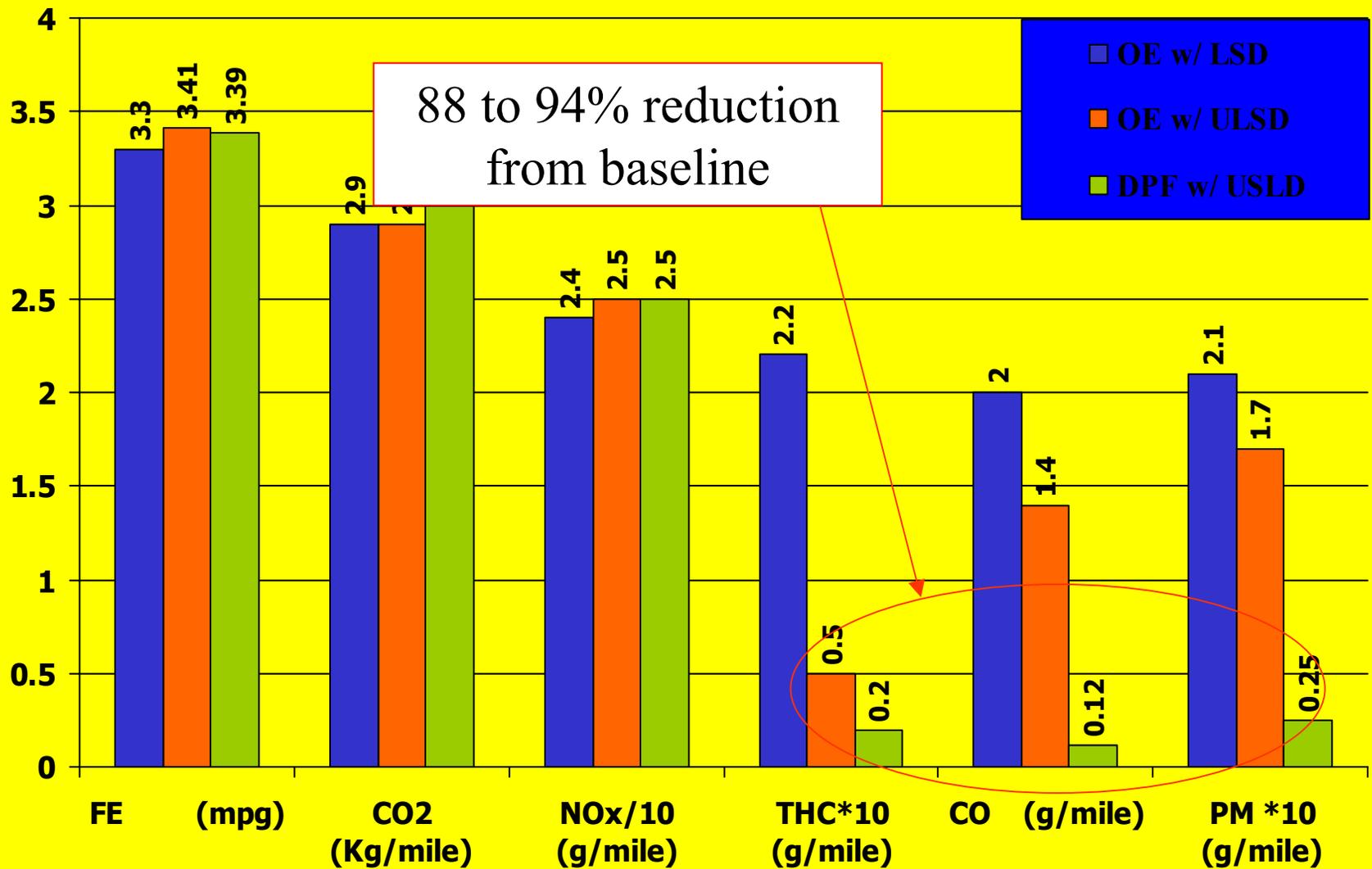
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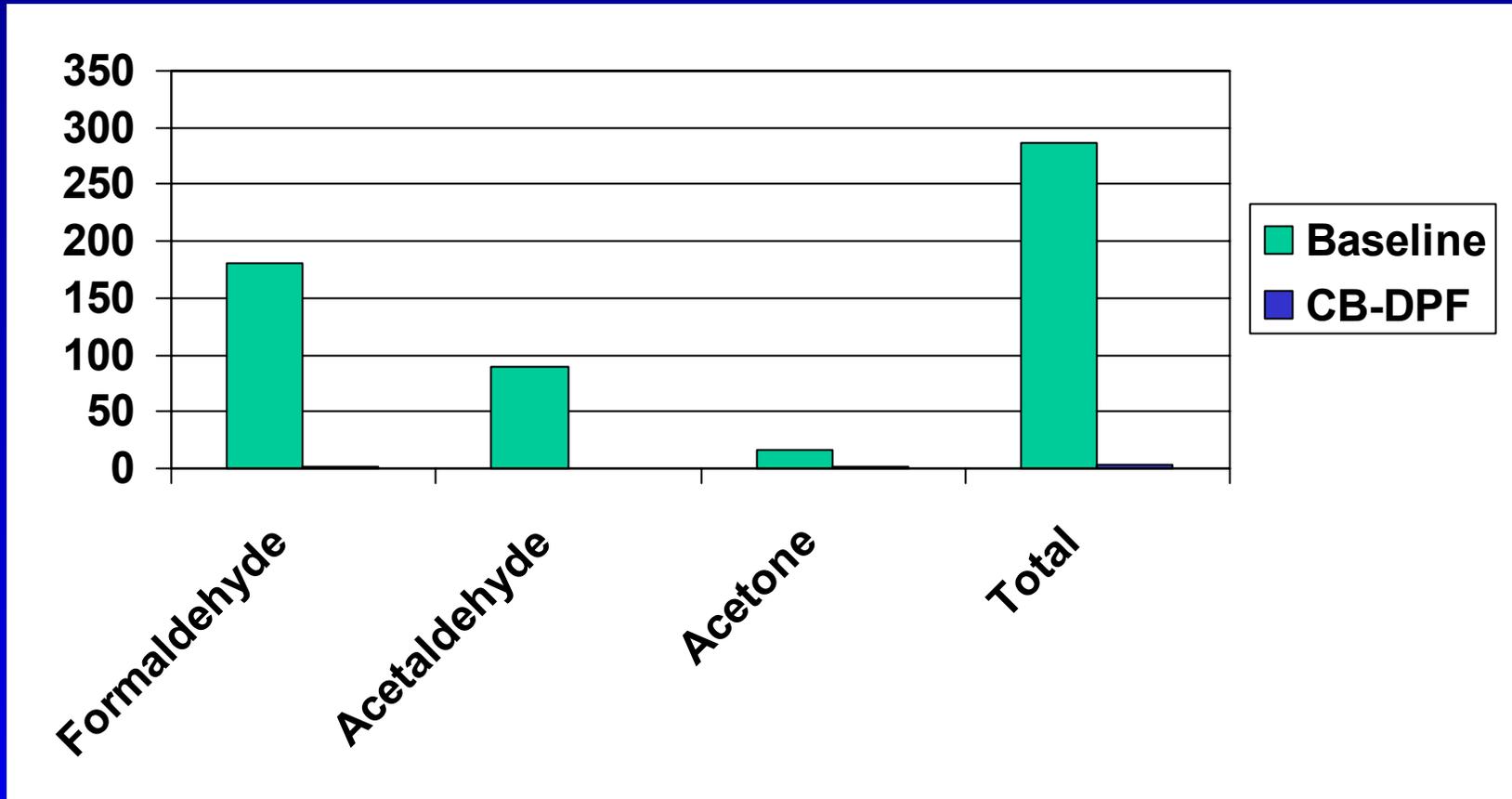
Presentation Outline

- Background
- The Role of NO₂ in Catalyst-Based Diesel Particulate Filters
- Summary of the Regulatory Options Sub-Workgroup Discussions
- MECA's Recommendations for Regulating NO₂ Emissions

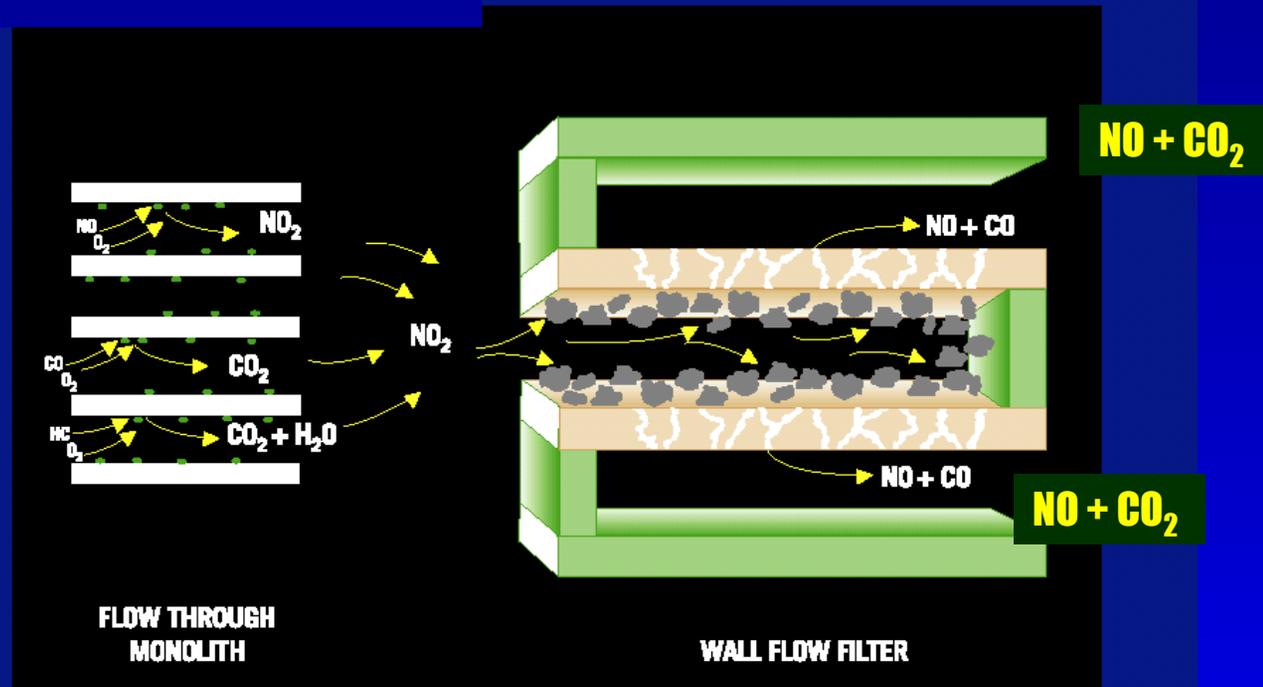
Regulated Emissions S50 - CBD Cycle



CB-DPF Carbonyl Analysis - NY Bus Cycle



One Type of Regeneration Technique



Factors Influencing NO₂ Emissions

- Catalyst age – fresh catalysts may produce artificially high levels of NO₂ initially until they become properly degreened and behave as designed
- Engine-out PM emissions – higher PM emissions will consume more NO₂ in the regeneration process
- Catalyst formulation – catalysts can be formulated to convert less NO to NO₂ for regeneration purposes
- Catalyst and/or filter size – control technologies can be optimally sized to consume the maximum quantity of NO₂ produced during regeneration

Regulatory Options Sub-Workgroup: Summary

- Members:
 - ARB, CTA, EMA, EPA, MECA, NY DEP, SCAQMD, and SwRI
- Three Separate Conference Calls to Discuss Possible Regulatory Options
 - June 25, 2004; July 21, 2004, and August 10, 2004
- MECA Asked to Present a “Strawman” Proposal

Regulatory Options Sub-Workgroup: Discussion on Structure of the Limit

1. NO₂ limit includes engine-out NO₂
(present case)
2. Limit the incremental increase in NO₂ only
(exclude engine-out)
3. Apply “X – B” increment limit to all test engines

X: Maximum % NO₂ based on a health-based assessment.

B: Average engine-out %NO₂ based on a variety of engines

Regulatory Options Sub-Workgroup: Discussion on Structure of the Limit (cont'd)

4. Comply with either the limit “X” or the increment limit “X-B”
5. Include NO₂ data from “degreened” and aged systems when determining compliance

Regulatory Options Sub-Workgroup: Discussion on Test Procedure

1. Use NO₂ data from testing prescribed in ARB Verification Procedure
2. Perform NO₂ testing on one engine, at one laboratory
3. Perform NO₂ testing on one engine model

Regulatory Options Sub-Workgroup: Discussion on Test Procedure (cont'd)

4. Use multi-mode test cycle, apply limit to each mode
5. Use transient test cycles
6. Specify the condition a filter must be in prior to testing

MECA Recommendation

- Form of Limit: X-B
 - X: health and technology based
 - B: must account implementation of new engines as used for the determination of X
- Test New (“Degreened”) and Aged ECT
 - Weighted average based on data supplied by applicant (default 50/50)
- Precondition With at Least 3 Test Cycles



MECA Recommendation

- Test Cycles:
 - Onroad – FTP or Chassis-Based
 - Nonroad – Nonroad Transient
 - Stationary – Steady-State Stationary Test Cycle
- Appropriate Weighted Average Result
- Account for Engine-Out Total NOx Reductions