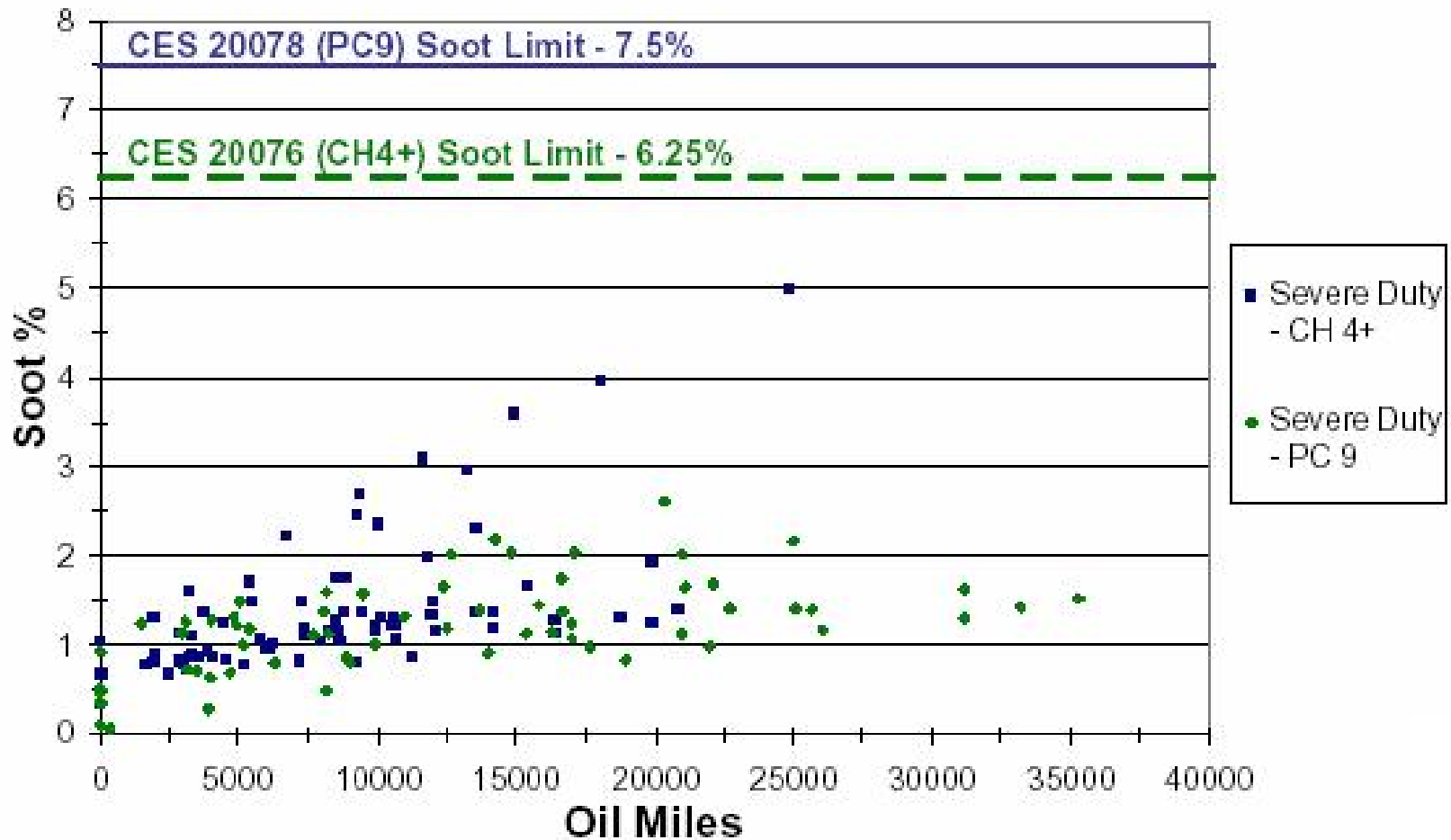


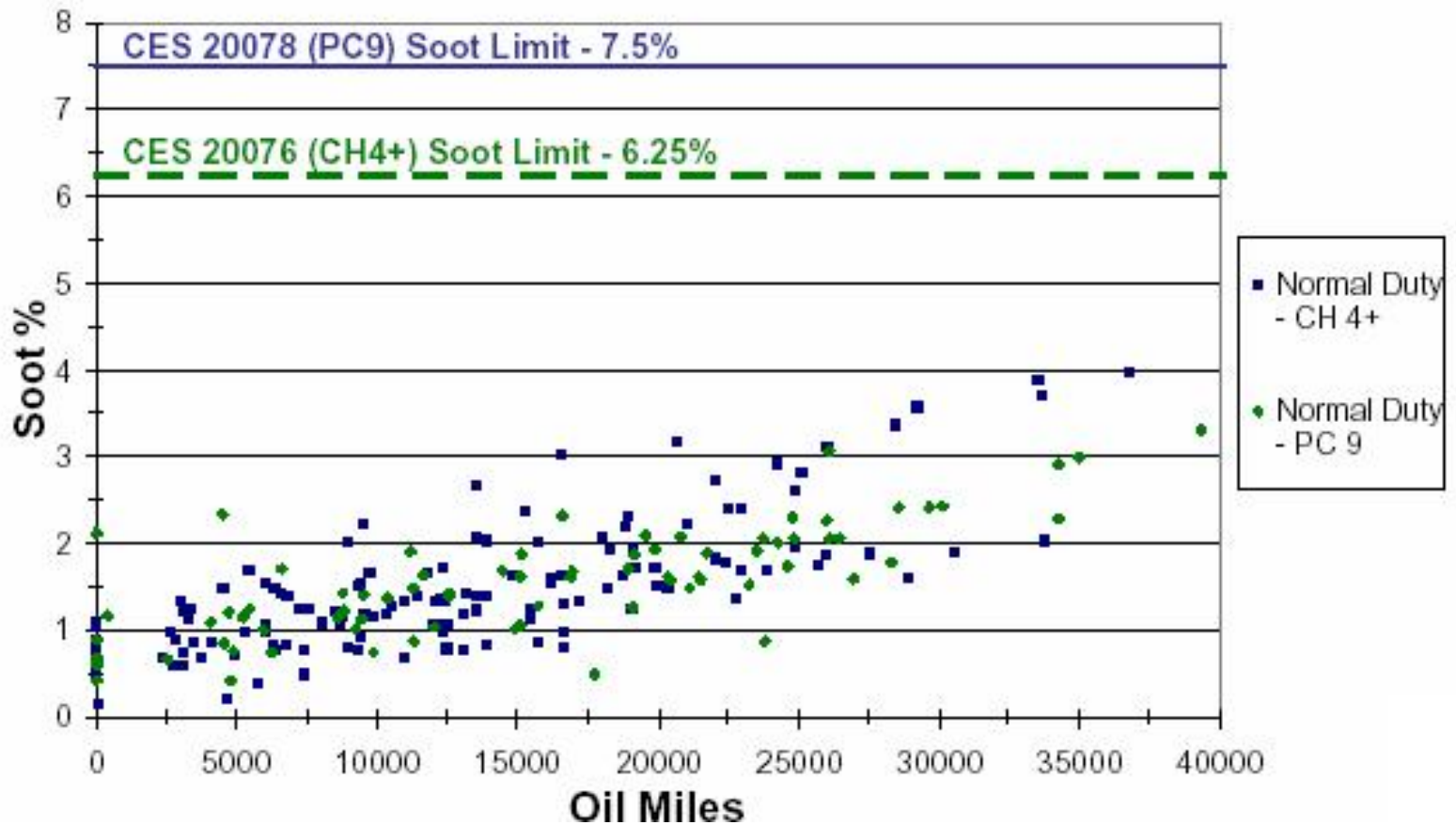
Engine Data Overview

- **EGR Engines are not soot limited**
- **EGR vs non-EGR depletes TBN much faster**
- **Current drain intervals are TBN limited**
- **Reductions in TBN from current levels would threaten ability to maintain drain intervals.**

ISX Severe Duty Soot



ISX Normal Duty Soot

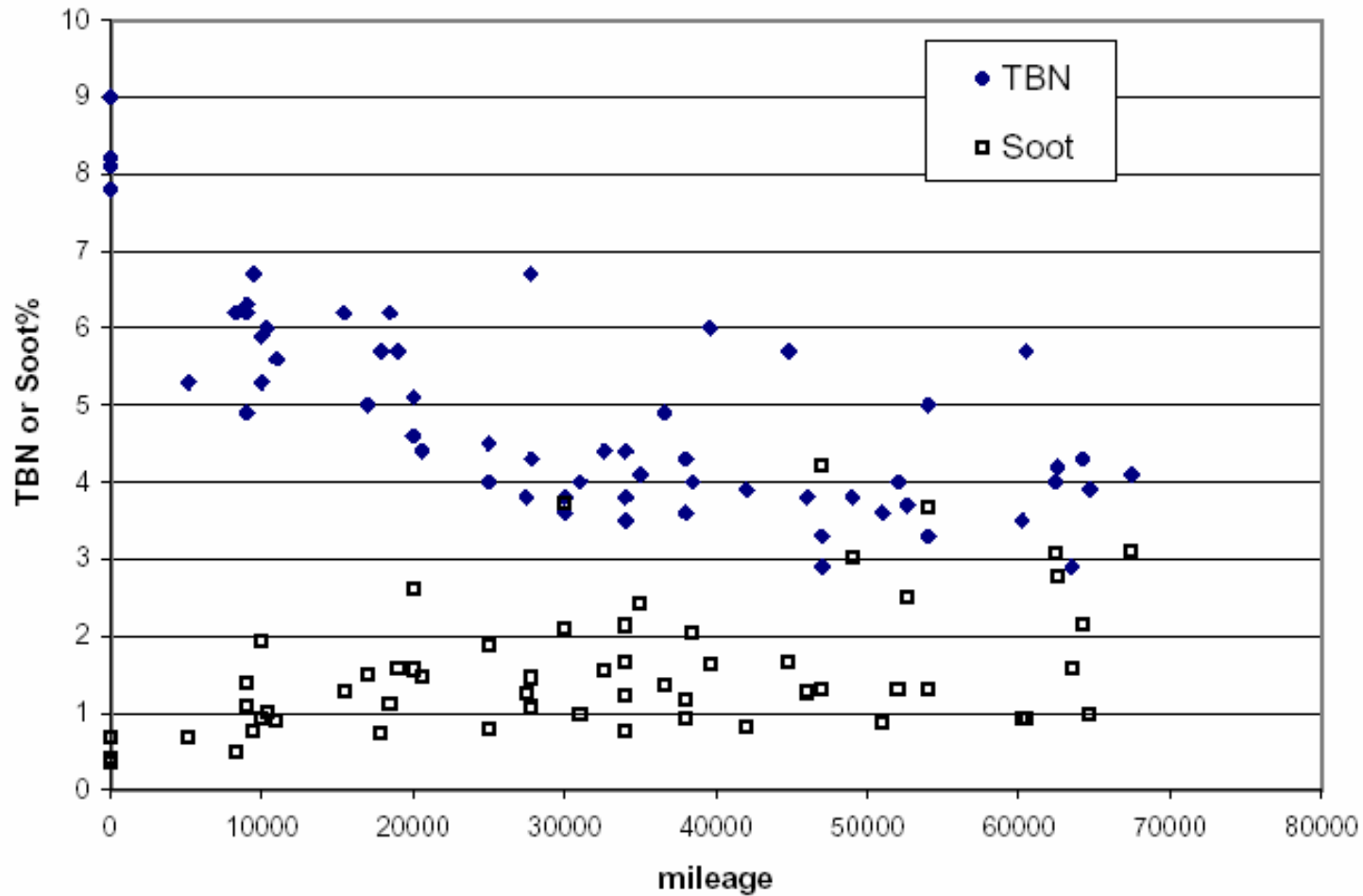


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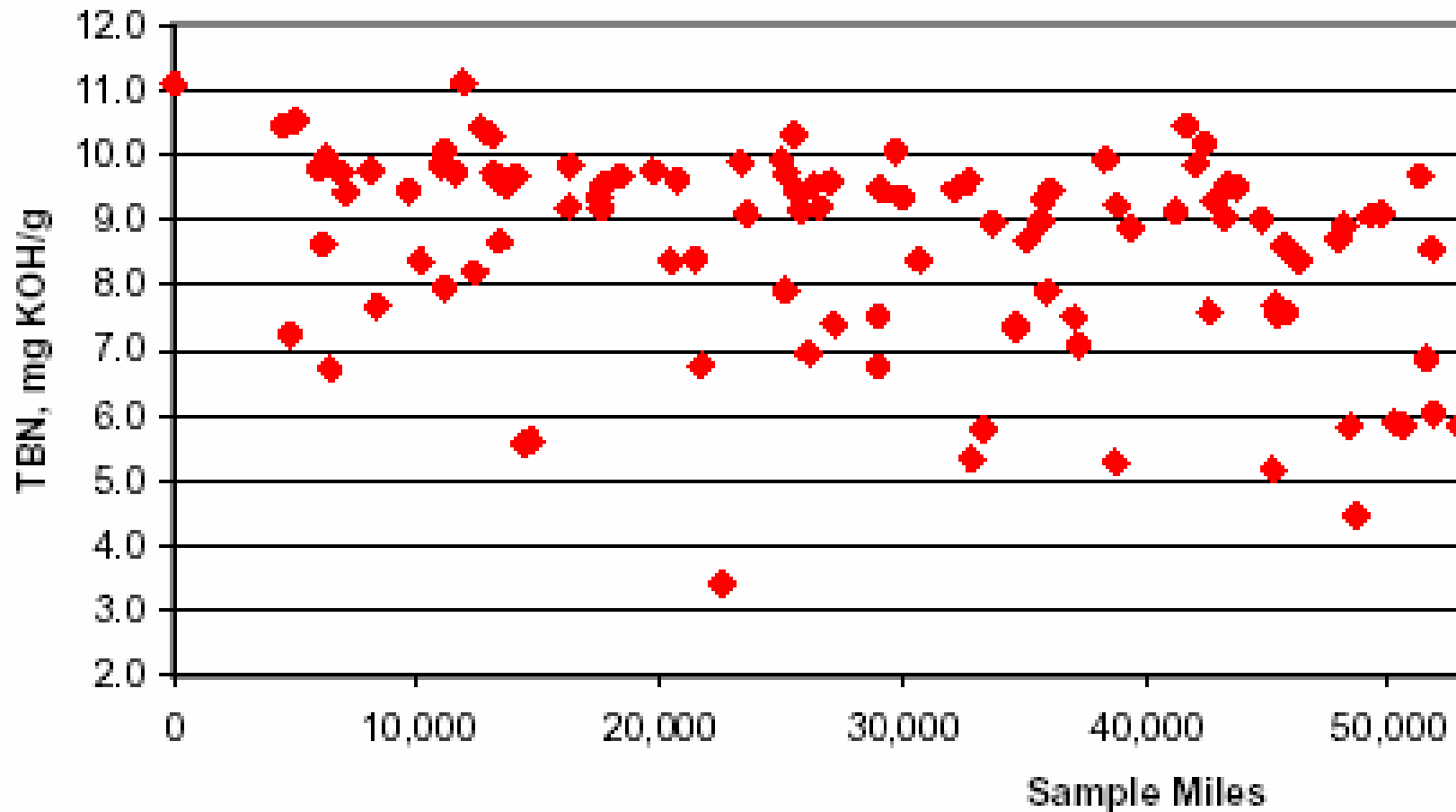
Pre-EGR HD Normal Duty

ISX98/99

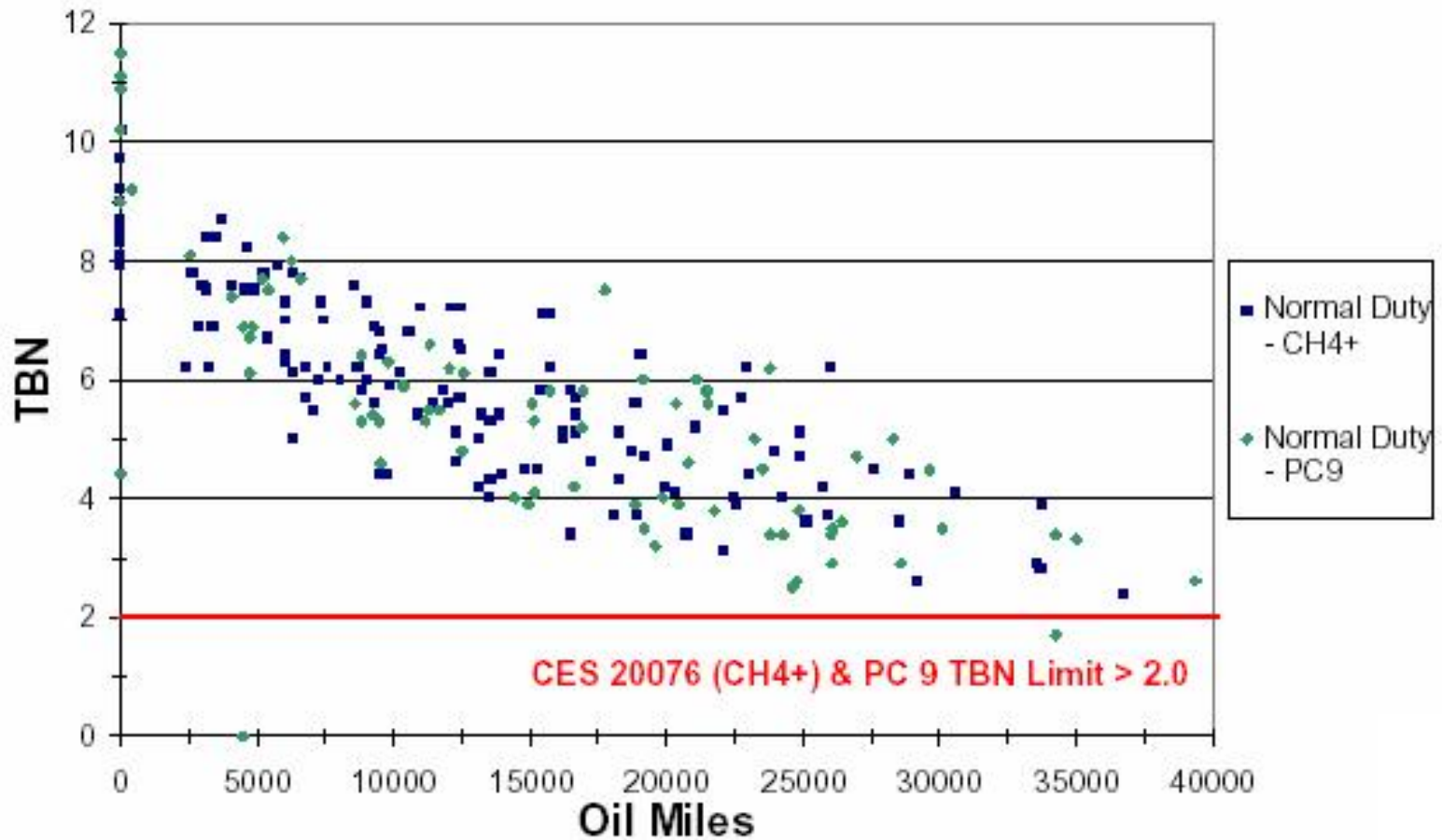


Pre-EGR HD Normal Duty

ISX98/99

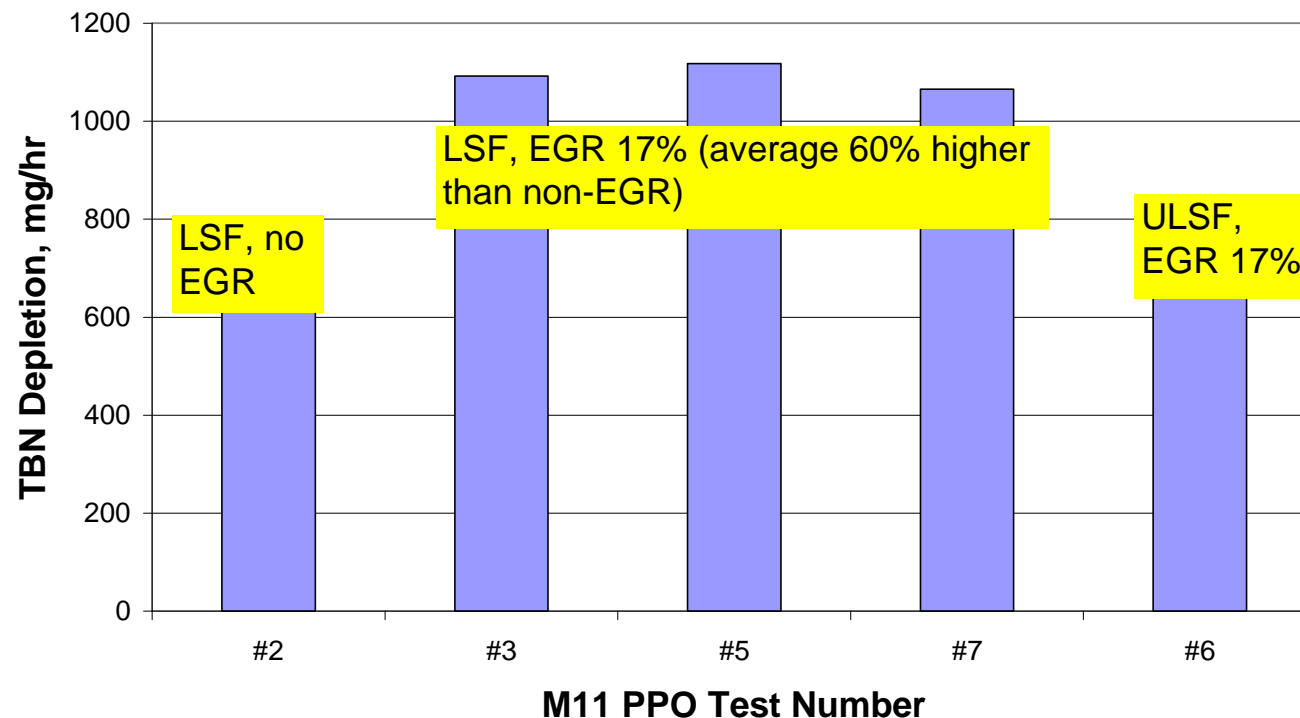


ISX Normal duty TBN



EGR Effect on TBN Depletion

Fuel Sulfur and EGR Effect on TBN Depletion
based on 1995 M11 PPO study ctr 0752-96037

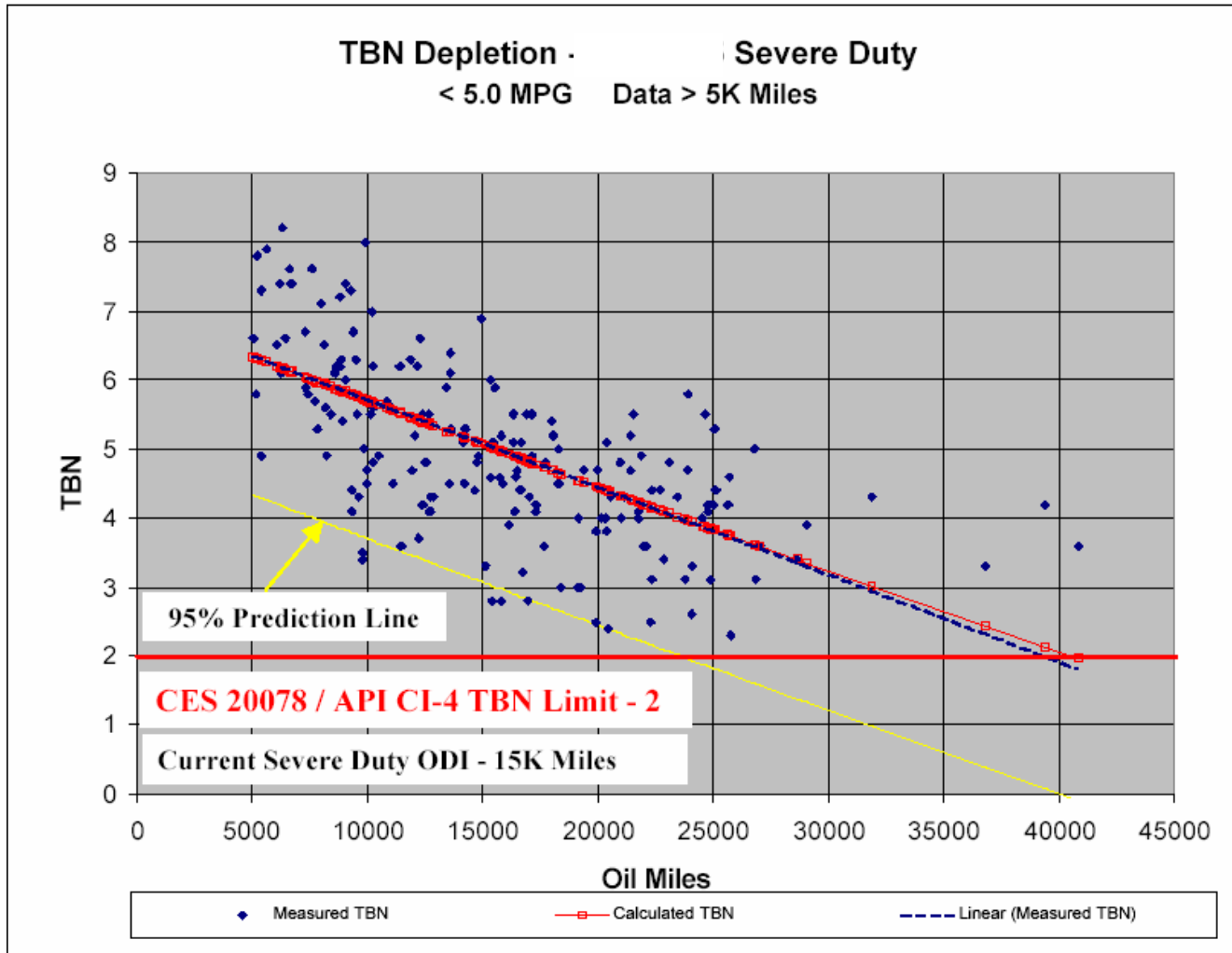


TBN depletion rate is determined by correcting for oil consumption, oil volatility, and time. Data produced in 1996 using CG-4 Premium Blue

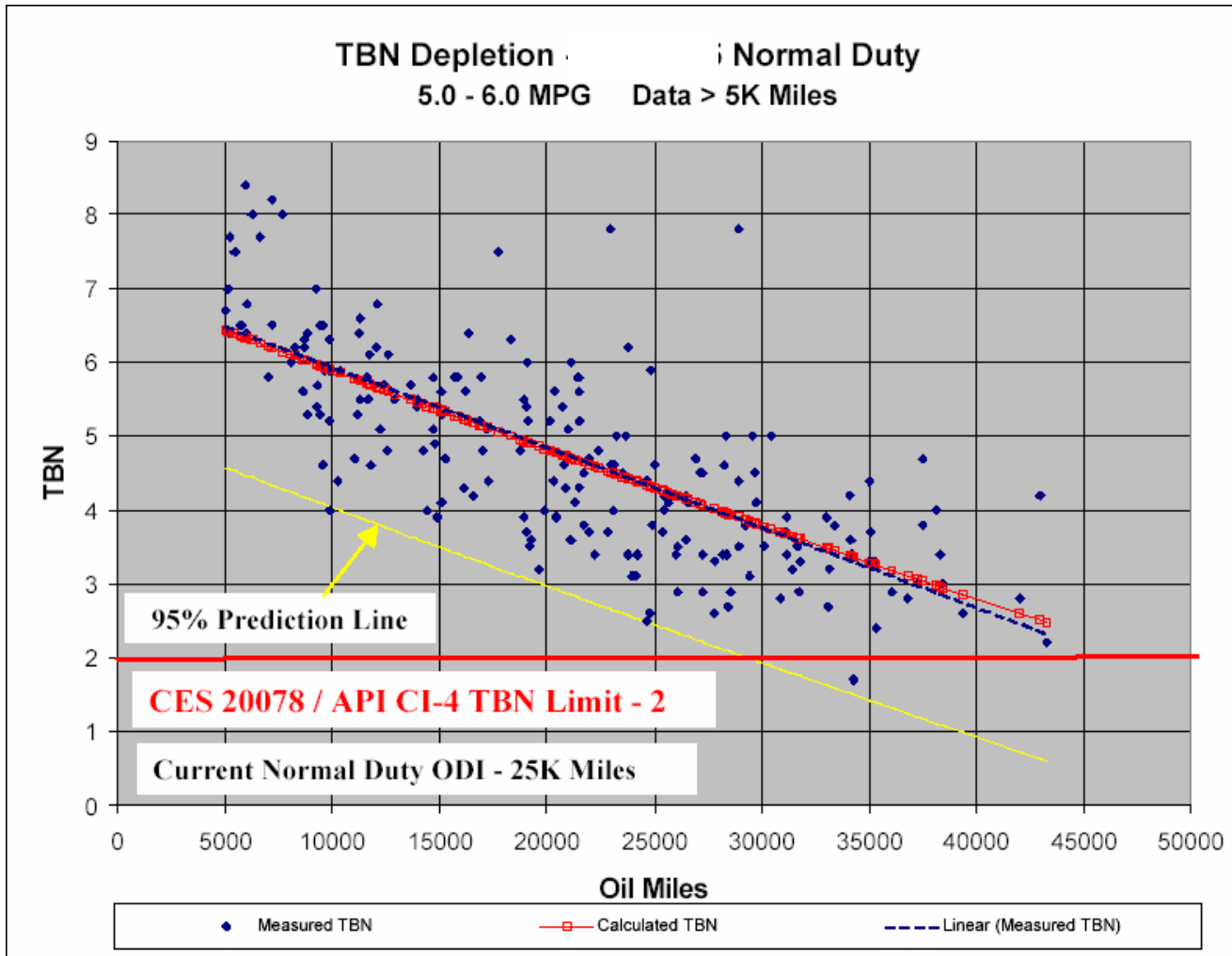
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TBN Depletion for Severe Duty



TBN Depletion for Normal Duty



Engine Data Overview

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Low TBN Causes Bearing Distress

Summary for all duty cycles

