# Emissions from Idling Trucks for Extended Time Periods

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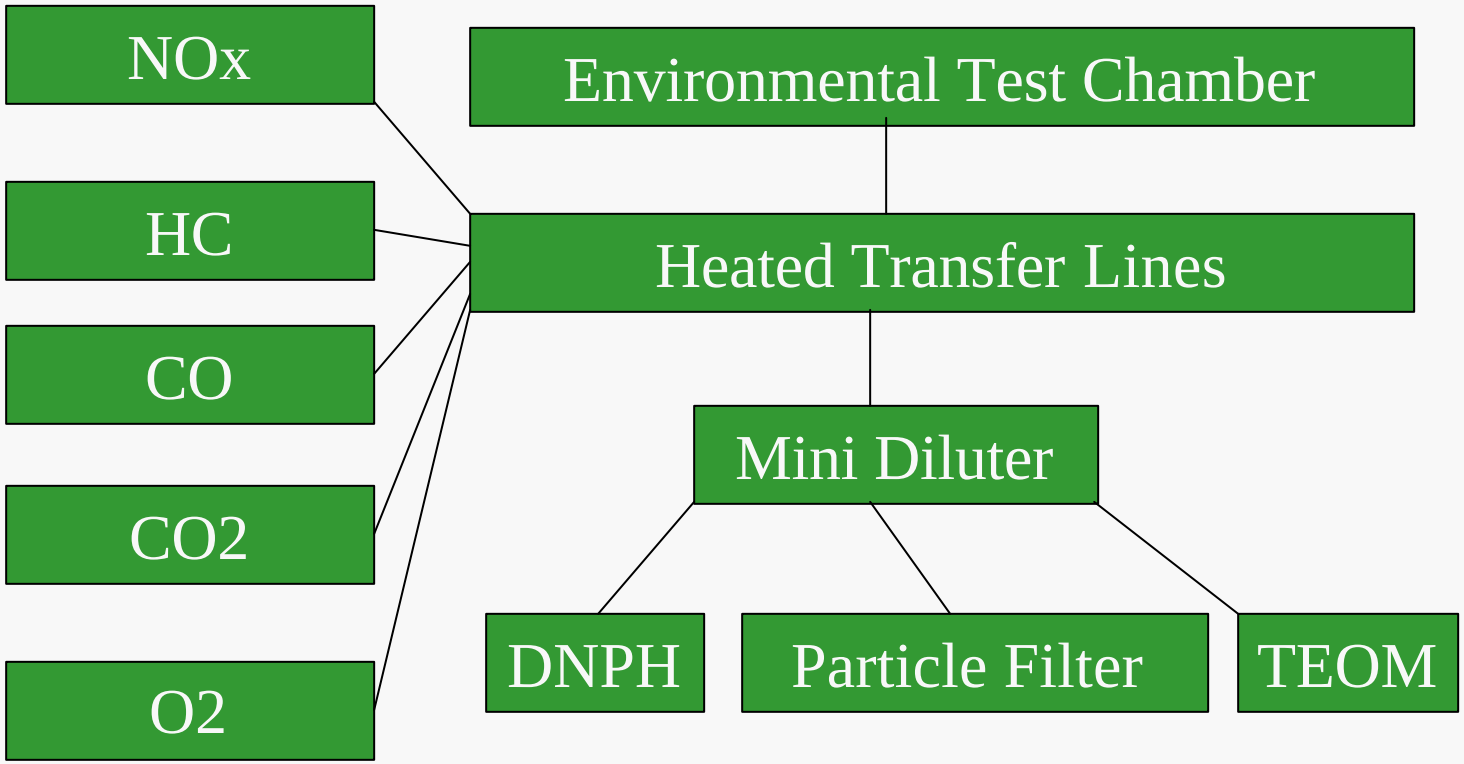
# Project Objective

- Participants: EPA, ATC, NJDOT, DOE-ORNL, ATA
- Focus: Measure truck idle emissions at a hot and a cold condition and for a high and low idle speed, using the large environmental chamber at the Aberdeen Test Center (ATC)
- Objective: Determine fuel use, emissions due to extended idle and compare to idle reducing technologies

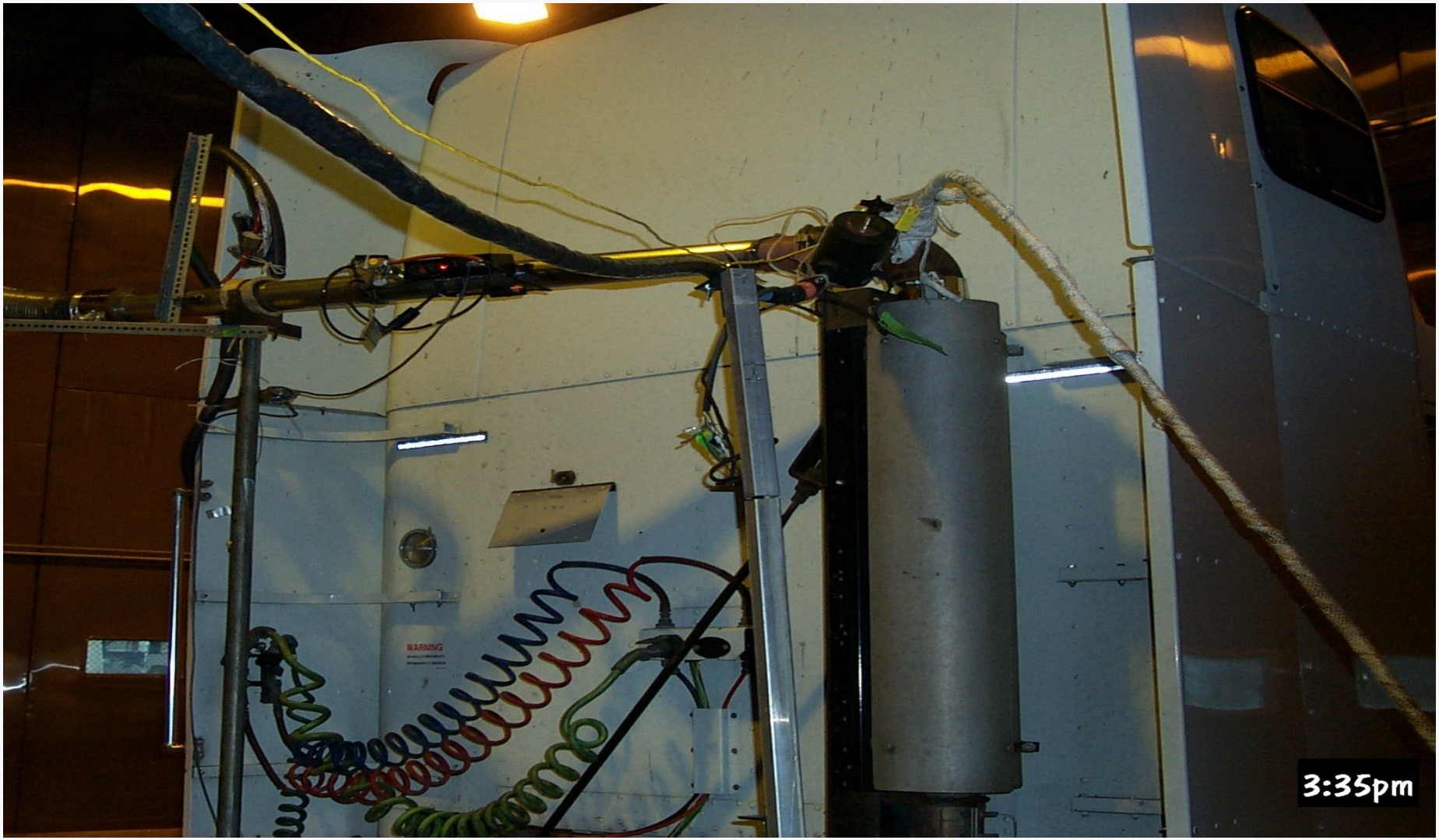
# Experimental Methods

- Five Class 8 Trucks, 1992-2001 All turbo, DI, Electronic controls; also included an APU and direct-fire heater
- Three Temperatures 0°F, 65°F, 90°F
- Cab Temperature 70°F
- Two engine speeds: 600 and 1200 rpm
- Idle truck for 3 hrs to achieve steady state
- EPA ROVER and Conventional Gas Analyzers
- PM Measured by TEOM and Filter, using mini-diluter
- Aldehydes by DNPH Cartridges

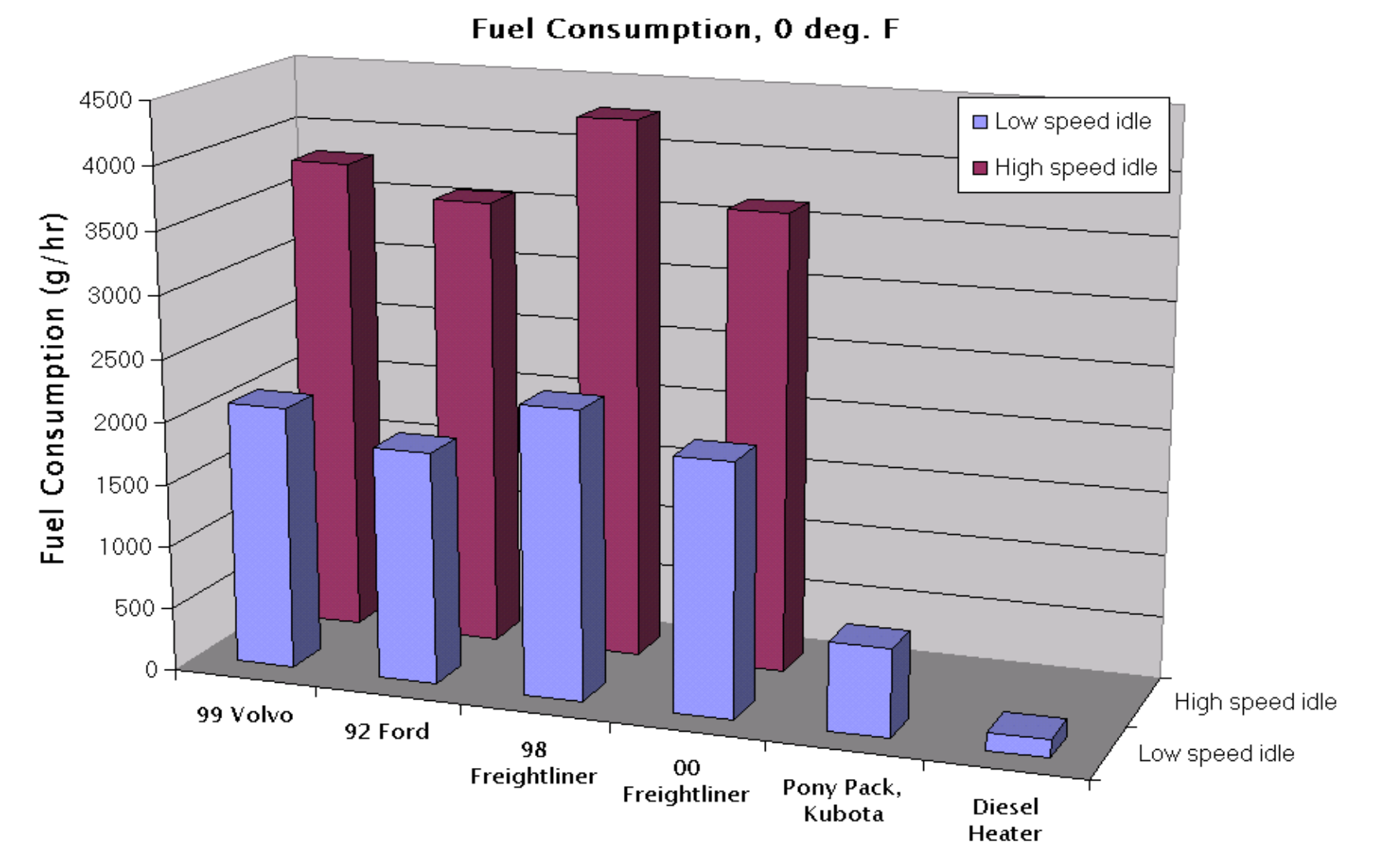
# Experimental Schematic



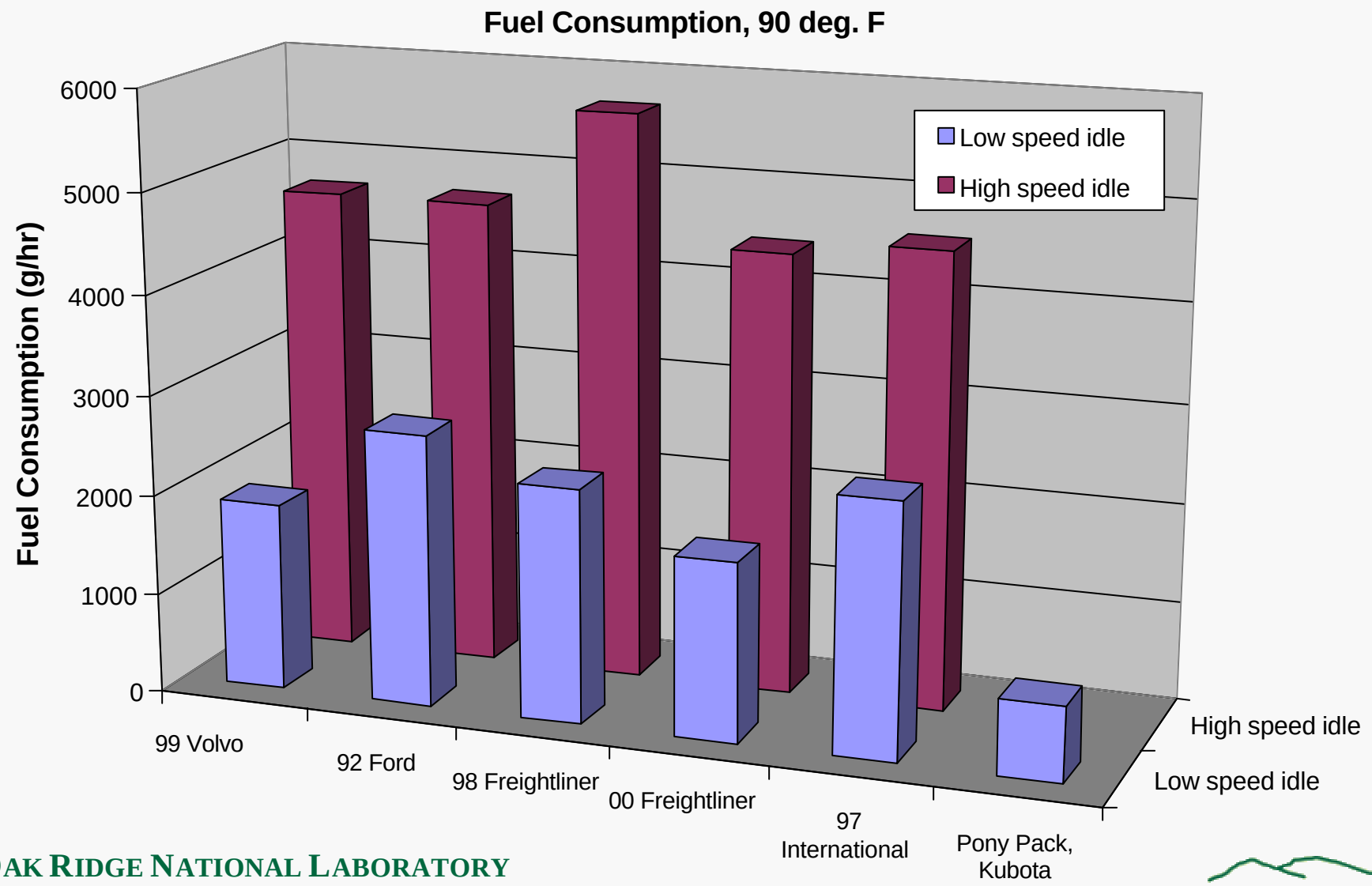
# Typical exhaust sampling for truck in Aberdeen environmental chamber



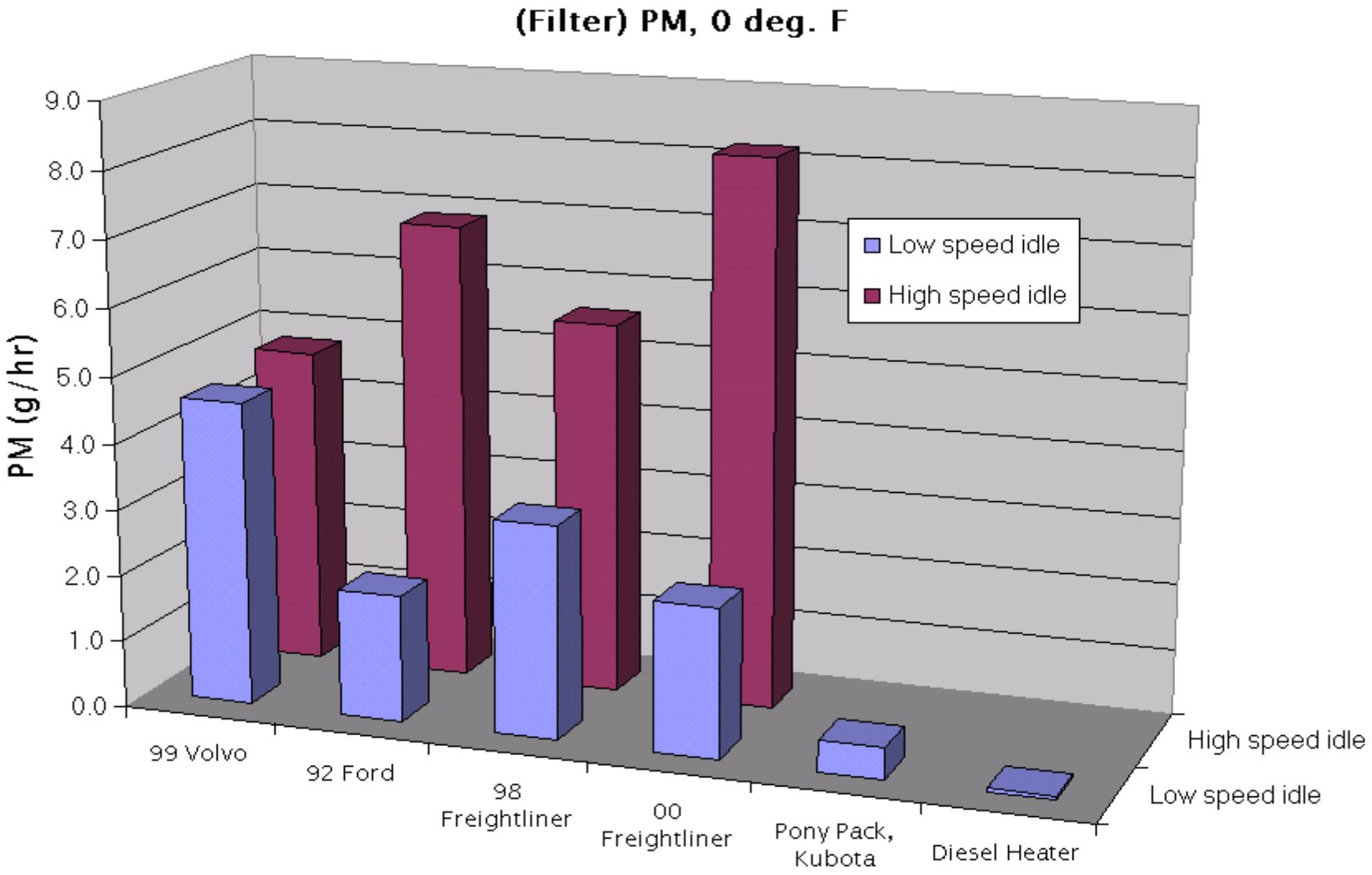
# Fuel Use, Cold Condition



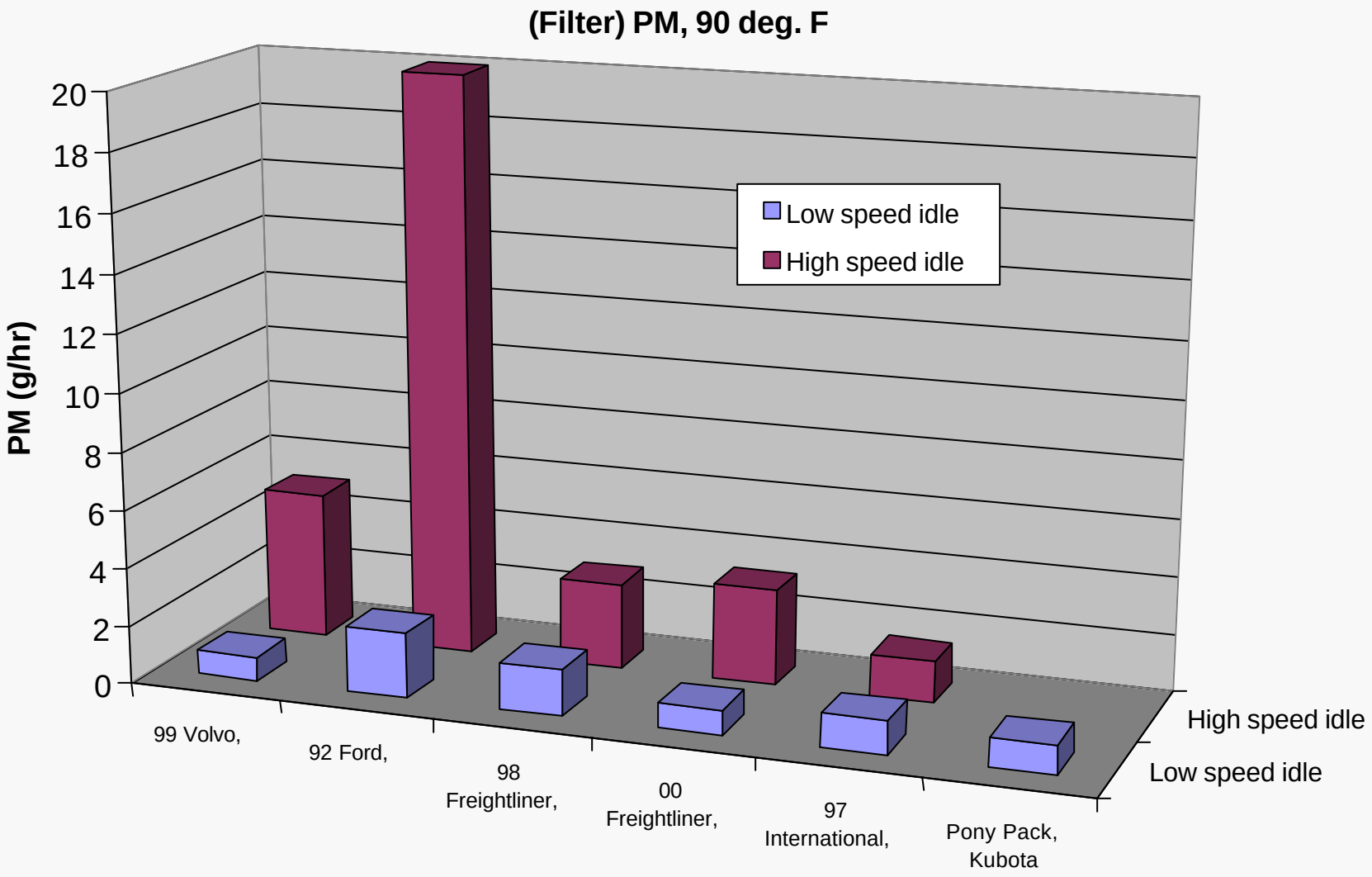
# Fuel Use, Hot Condition



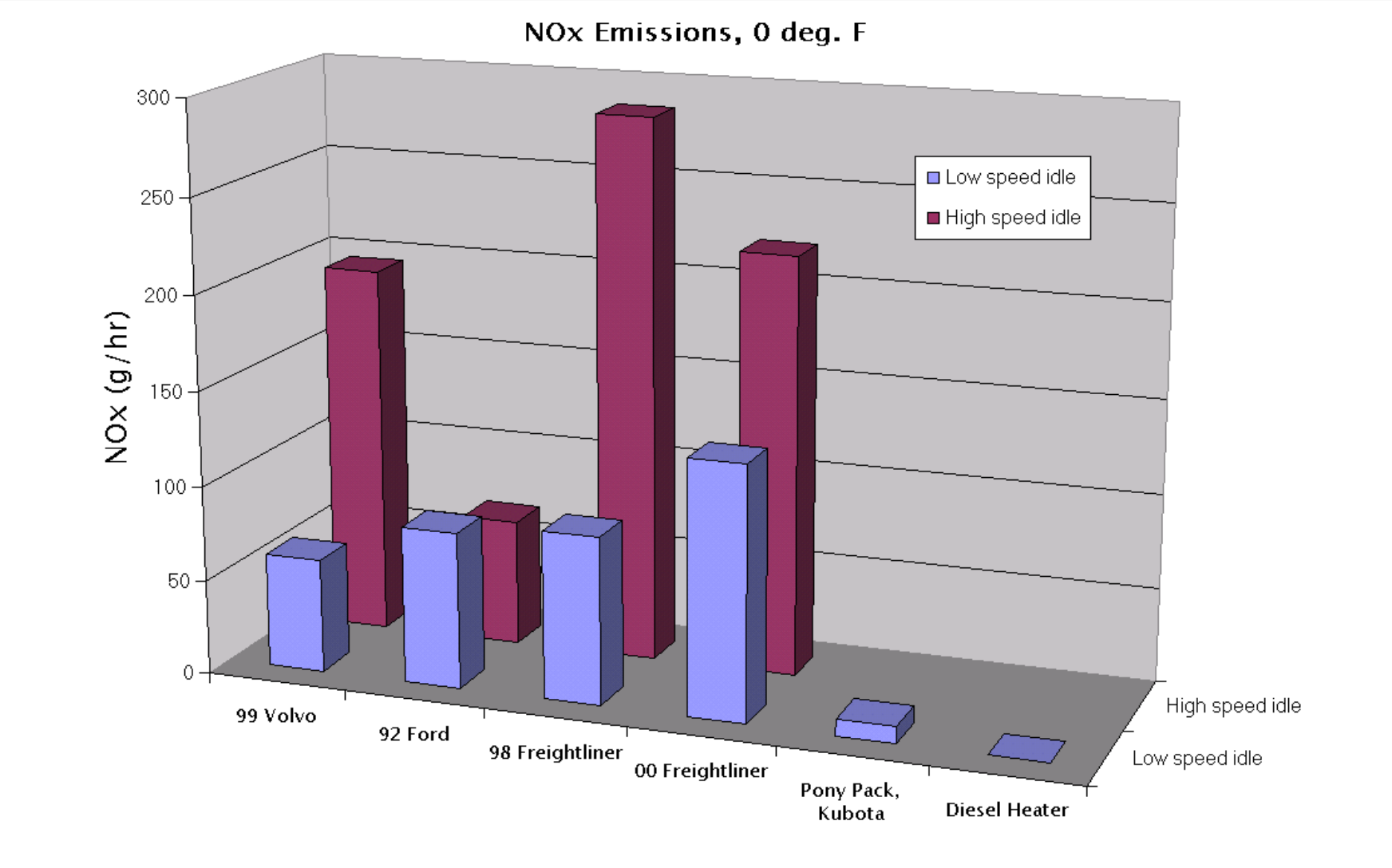
# PM, Cold Condition



# PM, Hot Condition



# NOx, Cold Condition



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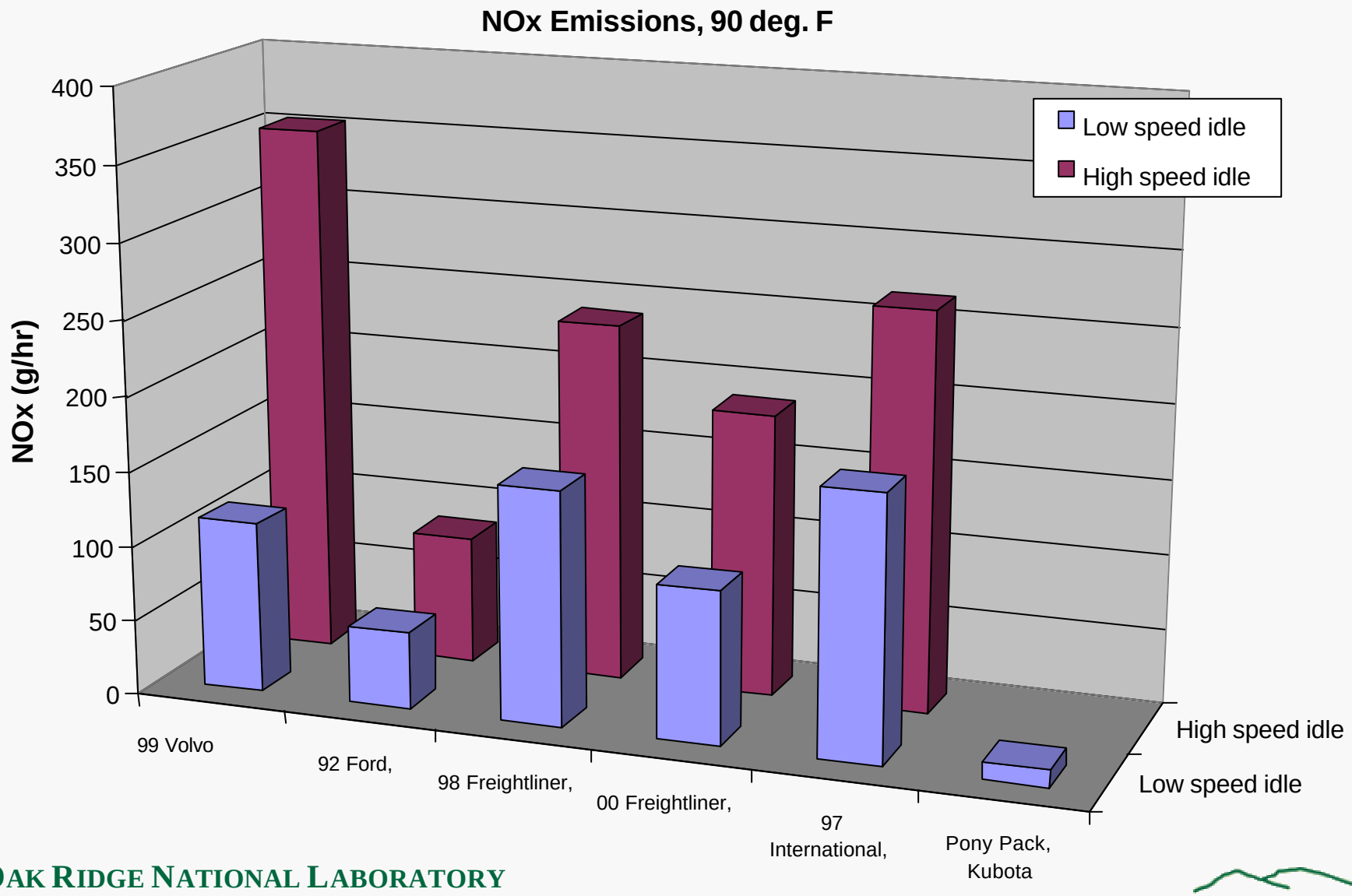
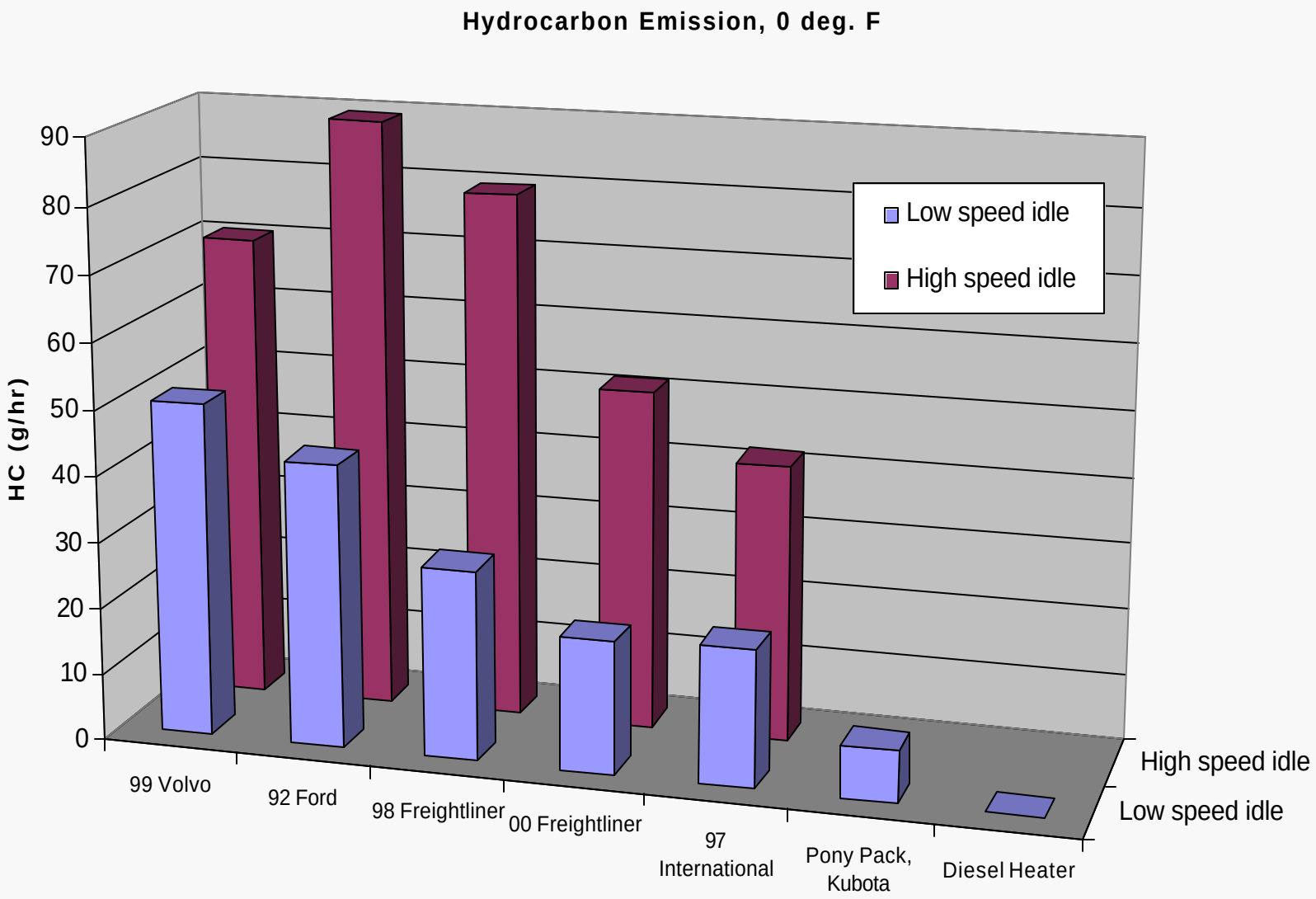


# Hydrocarbon, Cold Condition



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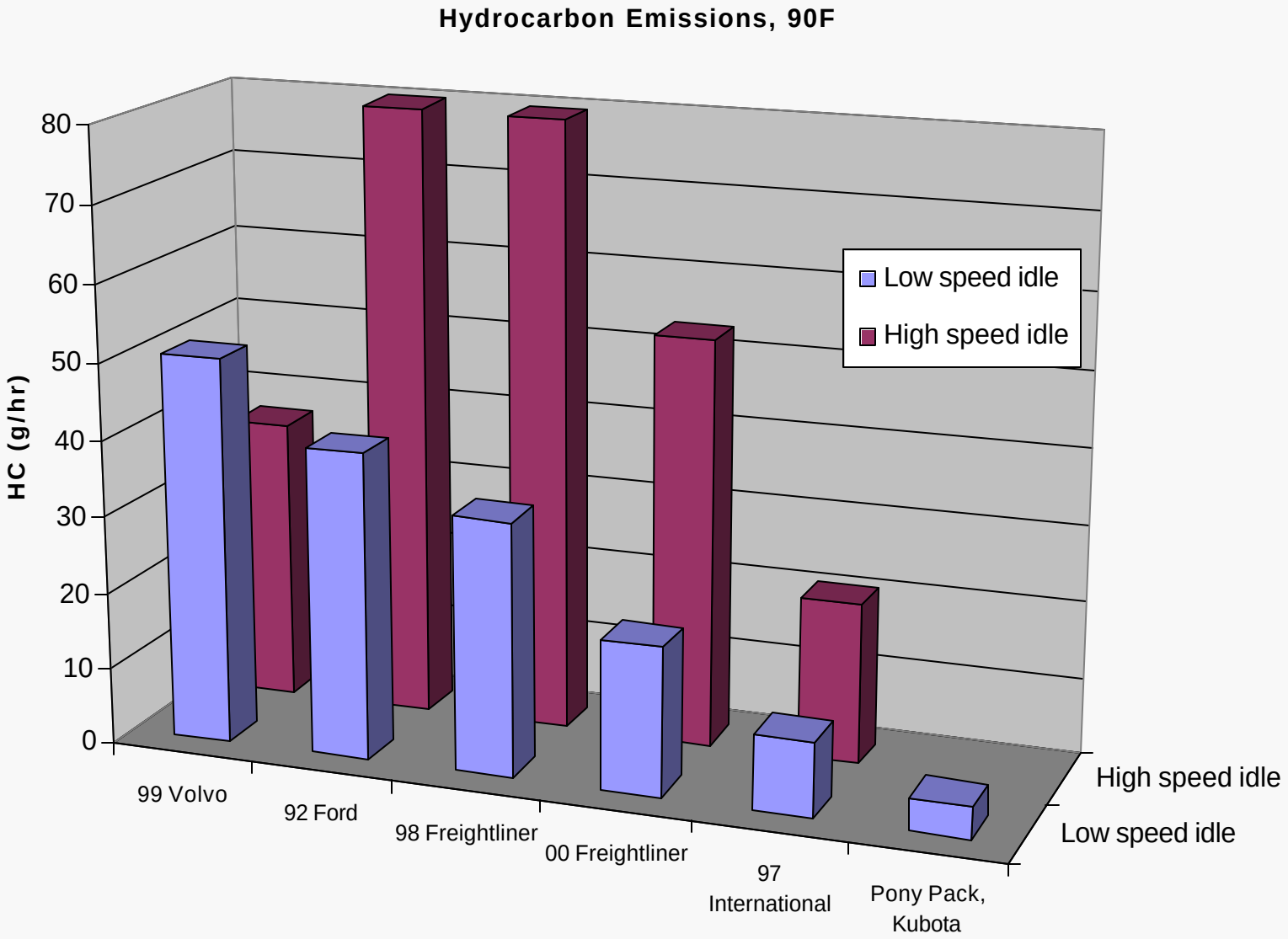
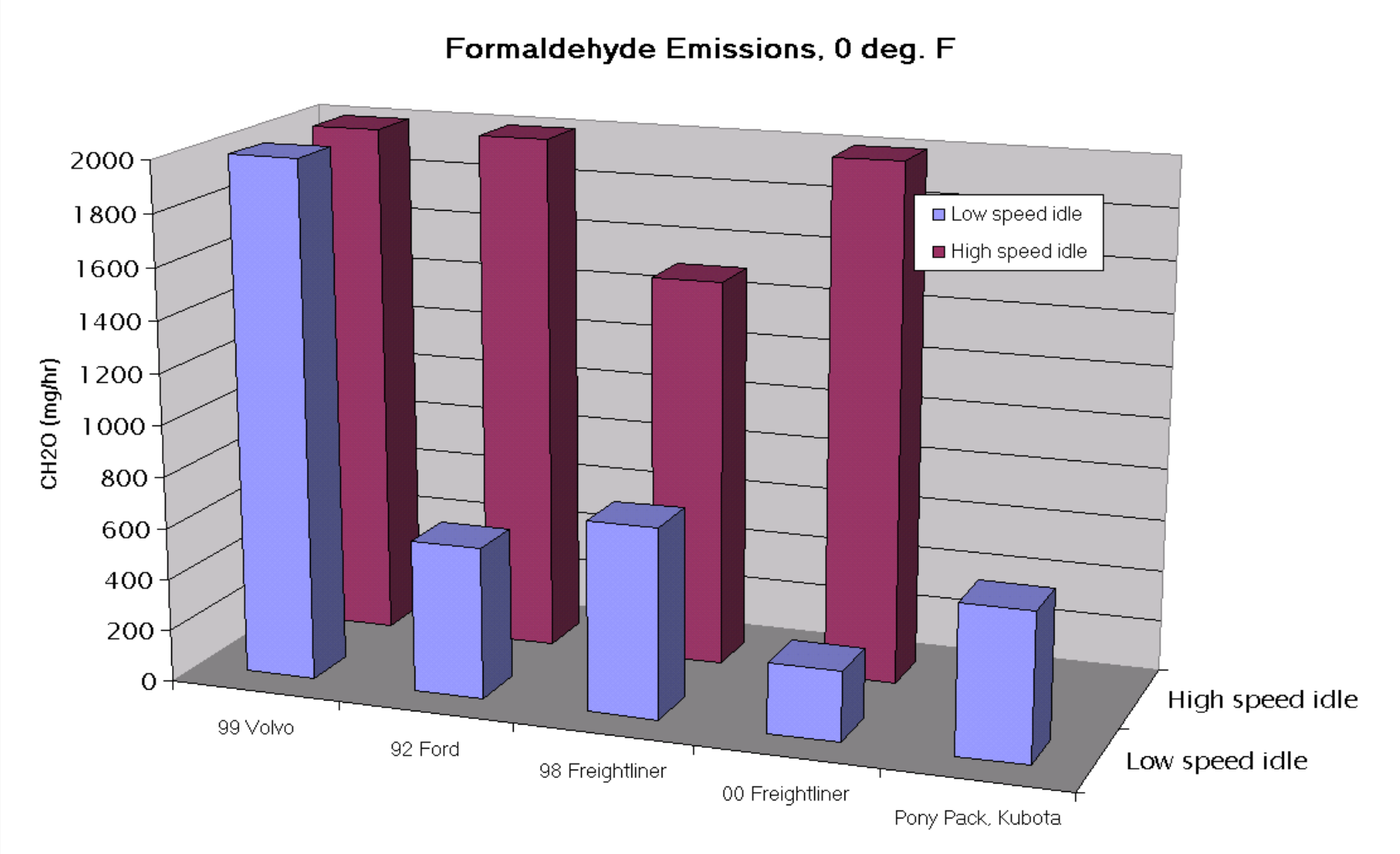
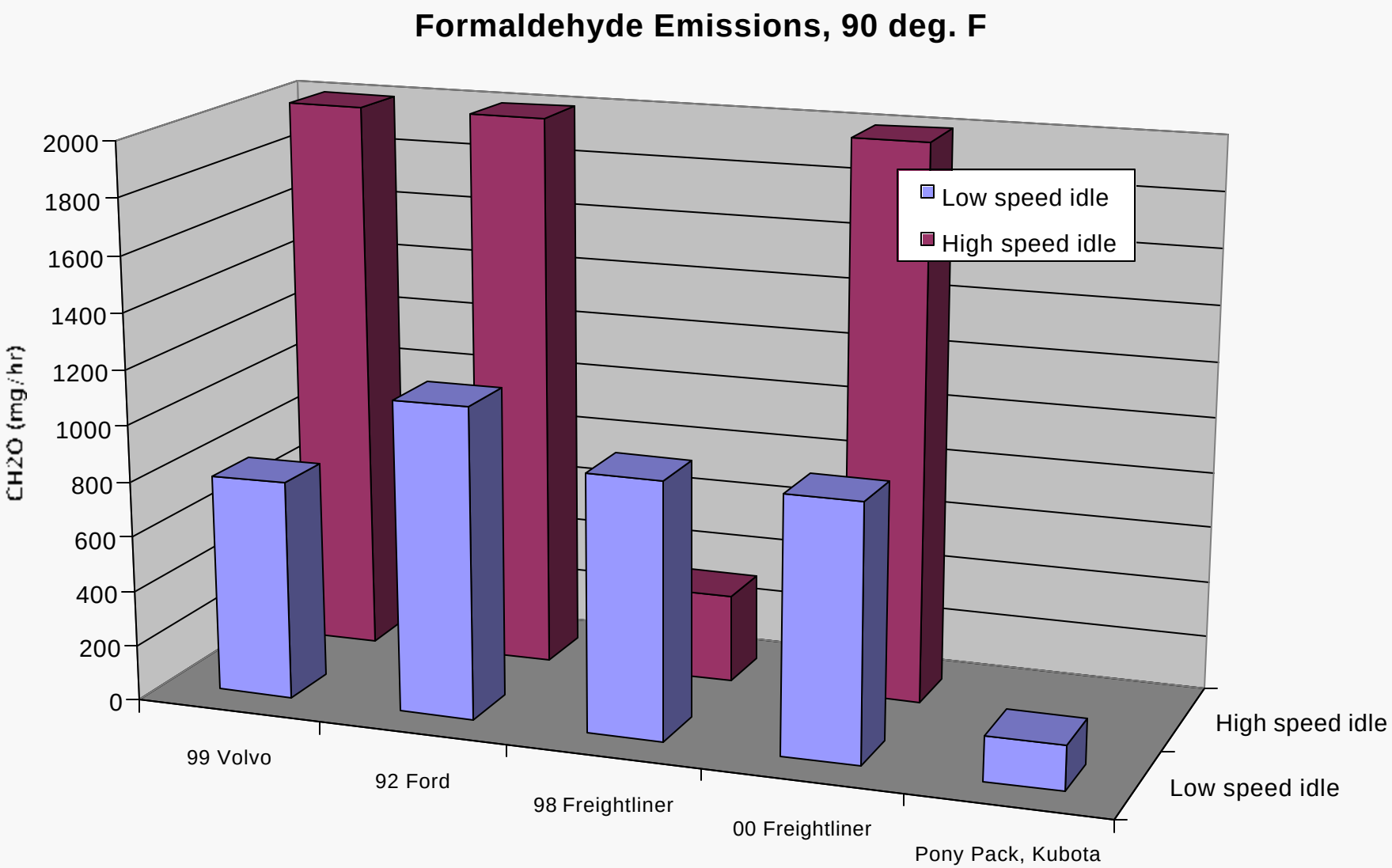


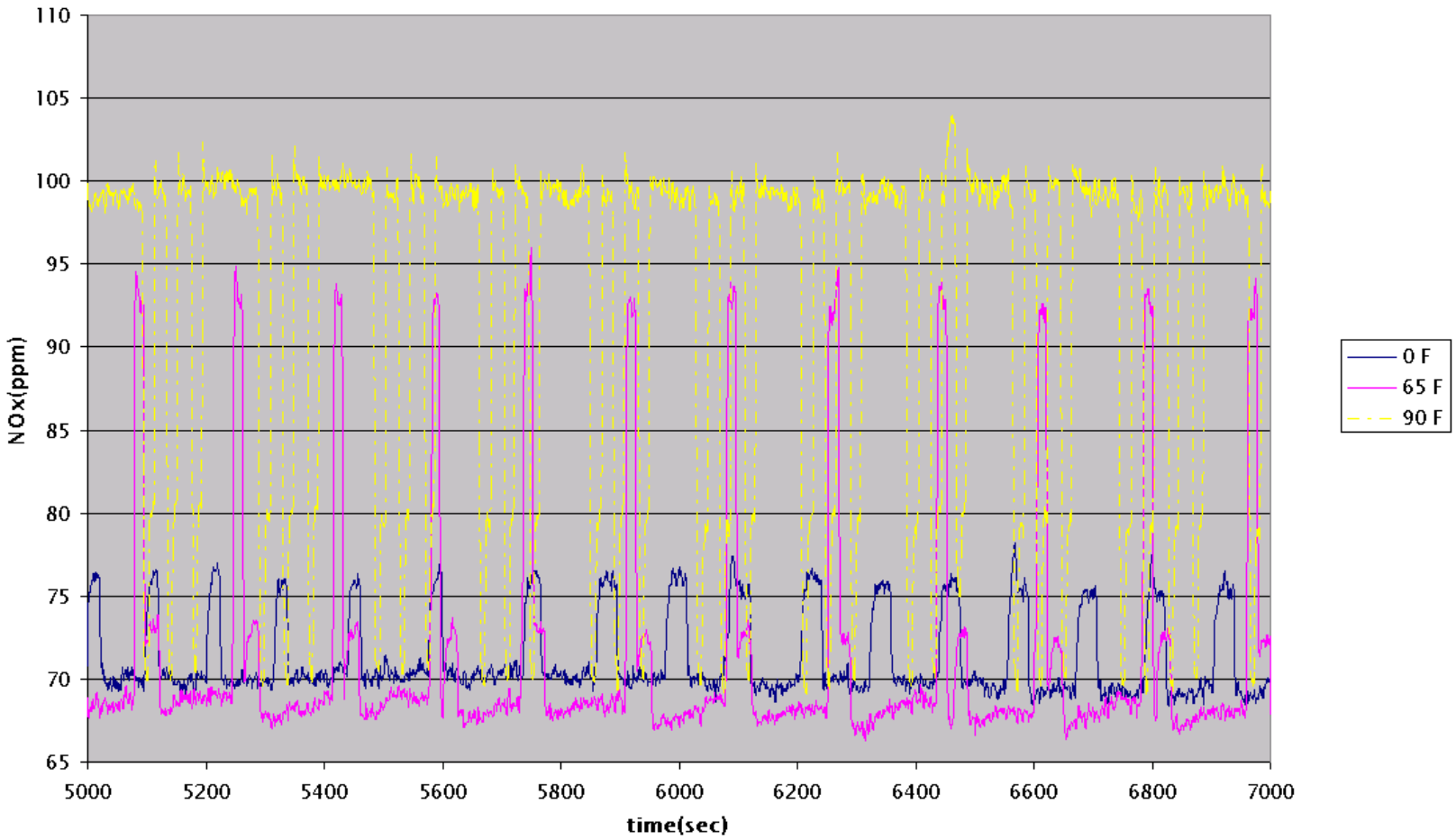
# Formaldehyde, Cold Condition



# Formaldehyde, Hot Condition



# Accessories Load Effects



# Potential Net Savings from APU Idling Reduction Technology

- Average of all trucks at 1200 rpm minus APU results

| | | |
|---|---|---|
| Number of trucks | 1 | |
| Hours of avoided idling per day | 10 | |
| Days of avoided idling/yr | 150 | |
| NOx reduction | 225 | kg/yr |
| PM reduction | 3.75 | kg/yr |
| Fuel use reduction | 1171 | gallons/yr |

# Conclusions

- High rpm (1200) idle uses significantly more fuel and produces more emissions
- Fuel cost savings alone likely won’t offset cost of APU
- Cooling fan and compressor loads cause large swings in all emissions

# Future Work

- Study aftertreatment devices under different environmental conditions
- Engine controls for reduction of idle emissions
- System integration of APU

# Acknowledgements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- NJ DOT – Henry Schweber supported ATC
- ATA – helped arrange truck participation