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Comments of Donaldson Company, Inc.
on the Air Resources Board Consideration of
Revisions to the Allocation of 2005 - 2006 Fiscal Year
State Budget Funds for the Lower Emission School Bus Program
February 23, 2006

Slide 1: Title

My name is Julian Imes and I am the Director of Exhaust/Emission Technology for Donaldson Company, Inc.

Slide 2: Agenda

Donaldson appreciates the opportunity to provide comments on ARB proposed revisions to the Lower Emission School Bus Program Guidelines. We are in opposition to certain aspects of the Retrofit Guidelines, particularly with regard to NO₂ control limits, associated ARB staff assessments and guidance, and unclear BACT determination impacts. For improvements, we offer technology alternatives for cost effective Total PM reduction, including Tailpipe PM and Crankcase PM control for school buses. Finally, we will provide summary recommendations which could allow greater PM control for California school buses.

Slide 3: Donaldson Overview

Donaldson is headquartered in Minneapolis, Minnesota, and is a leading worldwide provider of filtration systems and replacement parts. Donaldson serves customers in the industrial and engine markets with a product mix which includes air and liquid filters and exhaust and emission control products.

Slide 4: Donaldson Portfolio

Donaldson has actively worked with ARB staff in past years to develop and provide diesel retrofit control technology in support of ARB's Diesel Risk Reduction Plan (DRRP). We presently have Verified retrofit technologies for both ARB's DRRP program and for EPA's Voluntary Diesel Retrofit Program. These Verified system

technologies include Level 1 Diesel Oxidation Catalyst (DOC) mufflers, Level 2 Diesel Multi-State Filter (DMF) mufflers, Level 3 Diesel Particulate Filter (DPF) mufflers and Spiracle Crankcase Filter Systems.

Slide 5: Retrofit Program Requirements

2005 - 2006 State Budget language specifies that eligible retrofit devices have at least Level 3 verification and produce the lowest possible NO₂.

Slide 6: Retrofit Program Requirements

ARB Staff Report Guidance provides comments on BACT considerations in choosing eligible technology, with practical direction to give priority to uncatalyzed active particulate filters without regard to initial cost and any necessary infrastructure.

Slide 7: Opposition to School Bus Retrofit Guidelines

Review specific NO₂ Control Limit comments.

Slide 8: Opposition to School Bus Retrofit Guidelines

Review specific ARB Staff Guidance comments.

Slide 9: Opposition to School Bus Retrofit Guidelines

Improved guidance is needed from ARB staff on acceptable industry inputs to BACT determination, including such aspects as Technical criteria, Operational capability, Cost acceptance, and Exemption criteria.

Slide 10: Technology Alternatives

Review specific Alternative comments.

Slide 11: Diesel Multi-Stage Filter (DMF)

As one aspect of TOTAL PM control for Tailpipe PM reduction, Donaldson recently Verified with ARB a Level 2 technology with broad applicability for school bus applications. This DMF technology is currently ARB verified for 1991 to 2002 On-

Road engines, offering greater than 70% Tailpipe PM reduction and meeting ARB's proposed 20% NO₂/NO_x increase limits.

Slide 12: Closed Crankcase Filtration System

For additional TOTAL PM control for Crankcase PM reduction, Donaldson has also verified with ARB the combined use of Crankcase PM control systems with DOC and DMF Tailpipe PM control technologies. These systems also have broad applicability for school bus applications and are being used extensively in EPA's National School Bus Program.

Slide 13: Donaldson DECS Summary

This chart provides an overall summary of Donaldson ARB Verified PM control technologies, along with associated PM reduction performance and system costs. In particular note the DMF performance of greater than 70% Tailpipe PM Control (at less than 20% NO₂/NO_x increase) with approximate costs of \$5-6K, and the Spiracle performance of 100% Crankcase PM control, with approximate costs of \$1K.

Slide 14: Crankcase PM Measurements

It is well documented that Crankcase PM must be accounted for as part of the TOTAL PM EPA 2007 On-Road and Non-Road 2011 regulation Approved EPA measurement procedures exist for determining Baseline Crankcase PM, both for existing legacy engines and new engines.

Slide 15: Crankcase PM Contribution

This chart shows the increasing significance of Crankcase PM emissions as compared to decreasing Tailpipe PM On-Road regulations from 1998 to 2007. While Tailpipe PM regulated levels have decreased from .60 to .01 g/bhp-hr, unregulated Crankcase PM levels have remained at 0.01 to 0.04 g/bhp-hr. The average Crankcase PM level at 0.025 g/bhp-hr remains a significant PM source for existing legacy engine used in school buses and has dramatic impact on

in-cabin air quality. Controlling Crankcase PM with retrofit Crankcase Filtration systems offers significant benefits in reducing school bus TOTAL PM emissions.

Slide 16: Level 3 Technology Options

Review specific Option comments.

Slide 17: Summary/Recommendations

Review specific Summary comments.

Slide 18: Closing Comments

This concludes my presentation. Thank you for your time. Do you have any questions or comments?