

Catawba County Schools – Diesel Oxidation Catalyst and Closed Crankcase Ventilation System Retrofits

Case Study Follow-up visit on 7-17-09

NC DENR, Division of Air Quality



Catawba County Schools has more than 300 buses available for student transportation.

Site Overview

Catawba County Schools is the local education agency for the North Carolina Department of Public Instruction in Catawba County, North Carolina. Catawba County Schools (CCS) provided transportation for over 56 percent of its students in 2008. Of the 24,257 students enrolled in 44 schools, an average of 13,678 students were transported twice daily on 246 buses. Currently, 14,500 students use school transportation on 271 buses.

The Fleet

The CCS bus fleet contained a total of 335 buses at the time of the grant, which included 246 regular route buses, 64 activity buses and 25 spare buses. CCS school buses traveled approximately 13,279 miles per day. The number of buses has since decreased; CCS now has 331 buses, including the 271 regular route buses, 35 activity buses and 25 spare buses. Over the course of the year, 375,585 gallons of diesel fuel and 69,433 gallons of gasoline are used (2,063 gallons and 382 gallons daily, respectively). Buses manufactured in 1997-2001 were deemed suitable for DOC retrofitting because they were in the USEPA verified age range and would be able to remain in the fleet for the next 10-12 years.

Implementation

In 2008, Catawba County Schools was awarded a Mobile Source Emission Reduction Grant (MSERG) that went toward the retrofits of 51 high emissions diesel fleet buses (with 1997-2001 Caterpillar Engines from the 3116 or 3126 families) with diesel oxidation catalysts (DOC) and closed crankcase ventilation systems (CCVS) in order to reduce exhaust emissions in the greater Catawba County area. The reduction of emissions from the buses has led to the following improvements and benefits:

- With the installation of DOC & CCVS, there was an expected emissions reduction of 50 percent for HC, 40 percent for carbon monoxide, and 20 percent for fine particulate matter.
- Teams from Cummins Atlantic were able to install the systems of two to three buses per day on-site, making the installation process simple to accomplish with a simple rotation.
- DOC have a lifespan of 100,000 to 150,000 miles with minimal maintenance requirements.
- CCVS prevents diesel exhaust from seeping into the cabin of the school bus and have cut back on the amount of necessary engine cleaning due to decreased fuel leaks and less engine blow-by.

N.C. Division of Air Quality

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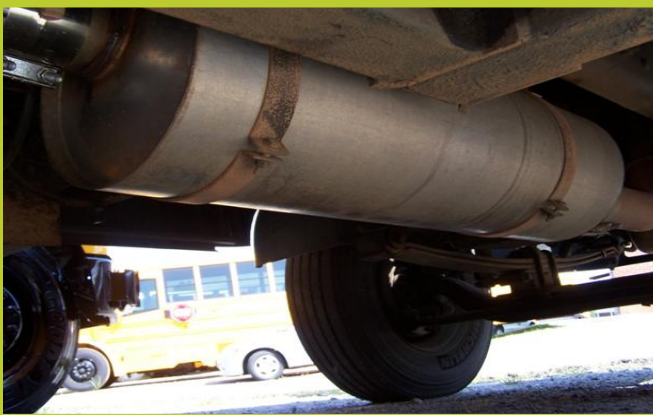
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Adjustments and Conclusion

Catawba County Schools did not encounter any major problems related to the grant process. In fact, they had a change in their budget which allowed 51 buses to be retrofitted instead of the original 40 proposed buses. Even with more buses being retrofitted, CCS was able to stay within the grant timeline.

Catawba County felt it was important to seek a leadership position within NC regarding mobile source emissions reduction projects, and their hope was to encourage other counties/municipalities in the region to undertake similar projects. The CCS bus fleet is also representative of the school bus fleets across North Carolina since all public school buses are funded and/or operated by the North Carolina Department of Public Instruction (NCDPI). Therefore, the experience and insight gained from the CCS project is available to other school systems that elect to similarly undertake retrofit projects.



The two methods of emission reduction for the CCS busses came in the forms of Diesel Oxidation Catalysts (above) and Closed Crankcase Ventilation Systems (below).

“The opportunity to install DOC and CCVS on 51 buses of the CCS fleet will be a proactive step in protecting our environment and safeguarding the physical health of the children and residents of Catawba County.”

- Cecil W. Davis, Transportation Director



Emission Reductions

Fine Particulate Matter (tons/yr)	Carbon Monoxide (tons/yr)
0.02	0.49

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