

FINAL REPORT

MSRC Proposal #PA2006-06-25
Funding for 8 Heavy Duty Natural Gas Vehicles

CONTRACT: ML06036

CITY OF RIVERSIDE

May 05, 2009

Prepared for:

Mobile Source Air Pollution Review Committee (MSRC)

Under AB 2766 Discretionary Fund Work Program

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This report was submitted in fulfillment of contract ML06036 the 'MSRC Proposal #PA2006-06-25 Funding for 8 Heavy Duty Natural Gas Vehicles by the City of Riverside, under the partial sponsorship of the Mobile Source Air Pollution Reduction Review Committee (MSRC). Work was completed as of 2/23/07.

DISCLAIMER

"The statements and conclusions in this report are those of the contractor and not necessarily those of the Mobile Source Air Pollution Review Committee (MSRC) or the South Coast Air Quality Management District (SCAQMD). The mention of commercial products, their sources or their uses in connection with material reported herein is not to be construed as either an actual or implied endorsement of such products".

SUMMARY AND CONCLUSIONS

Scope, Purpose and Background

The scope of this project was to replace eight gasoline powered heavy duty municipal fleet maintenance vehicles with alternative fuel models, which would meet the needs of the City of Riverside and reduce air pollution emissions within the South Coast Air Basin. Due to the age and condition of the vehicles, it was determined their service life had been exceeded. Subsequent investigation discovered a potential funding source through the MSRC, in conjunction with the purchase of alternative fuel vehicles. A grant proposal was submitted to the MSRC. The City received the award of a grant in the amount of \$200,000 and executed a contract in March 2007 with the South Coast Air Quality Management District /MSRC for partial funding of the purchase of eight CNG fueled heavy duty maintenance service vehicles.

The City of Riverside advertised a competitive bid for the eight vehicles. Three CNG dump trucks and five CNG refuse packers were purchased and are included in this contract. The vehicles were manufactured and delivered to the City and subsequently placed into service. There were no innovative procedures applied to this project.

The project involved vehicle purchase contracts. All bidding and purchasing was conducted per City of Riverside's purchasing guidelines and administrative regulations. All replacement vehicles have been retired from California service and processed using a CARB compliant auction house.

No mechanical problems have been logged since the vehicles have been in service. Regarding regular maintenance, the CNG and diesel vehicles have required similar routine service in areas such as brake inspections and mechanical servicing but the CNG vehicles have required significantly less frequent oil changes due to cleaner burning engines. However there are some more frequent maintenance requirements for the natural gas vehicles such as fuel tank inspections every three years and annual replacement of spark plugs. Taking all servicing into consideration, maintenance costs for the two different types of vehicles essentially equals out in the end. When doing an overall operating cost comparison between the new CNG heavy duty trucks and the replaced diesel units, the City of Riverside has found that the CNG trucks have averaged \$1.75 per mile lower operating costs due mainly to the price of fuel.

Recommendations

Based on the knowledge and experience gained through the successful completion of this and other alternative fuel based projects, Riverside suggests that agencies pursuing fleet vehicle purchases consider the following recommendations.

- Include firm delivery parameters in the bidding package.
- Verify CARB certification on the vehicle of choice and compliance with MSRC requirements prior to advertising for bids.
- Bear in mind that vehicles may be 'built' to order on a manufacturer's platform and might not be factory equipped to operate on an alternative fuel. Extra efforts should be taken to insure that 'converted' engines have all components or modifications necessary to result in a vehicle that will operate at the same performance level as the non-alternative fuel platform and carry appropriate warranties.
- Maintenance and repair of alternative fuel vehicles may require additional training of employees and modifications to repair facilities. Plan accordingly for additional costs associated with these parameters.

Emissions Benefits

The eight CNG vehicles with Cummins "C Gas Plus" 8.3 liter engines, have logged a total of 219,785 miles since being placed into service, significantly reducing emissions that would have been created by the diesel vehicles that were replaced. At the time of this report the calculated annual emission reduction of all eight vehicles for NOx is 1.950 tons/year and the PM Reduction is 0.164 tons/year. The emission reduction calculation table is attached.

EMISSION REDUCTION CALCULATION TABLE

Emission reduction calculations for vehicles purchased under MSRC contract # ML06036 from in-service dates through April 2009

Proposer Name	Vehicle Model	Vehicle Type	Fuel	Main Engine Model	Main Engine Hp	Baseline Main Engine NOx Standard (g/bhp-hr)	Baseline Aux Engine NOx Standard (g/bhp-hr)	Main Engine Optional NOx Standard (g/bhp-hr)	Auxiliary Engine NOx Standard (g/bhp-hr)	NOx Fuel Correction Factor	PM Fuel Correction Factor	Diesel NOx Fraction	Alt-Fuel NOx Fraction	Annual Mileage	Annual Fuel Consumption (DEG)	NOx Reduction (tons/year)	PM Reduction (tons/year)	Vehicle Asset #
City of Riverside	Autocar WX64	Automated Refuse	CNG	Cummins B6.230	280	2.5	N/A	1.7	N/A	0.87	0.90	0.95	0.80	36,733	17,522	0.281	0.022	J166
City of Riverside	Autocar WX64	Automated Refuse	CNG	Cummins 8.3 G Plus	280	2.5	0	1.7	0.0	0.87	0.90	0.95	0.80	31,612	18,854	0.209	0.024	J166
City of Riverside	Autocar WX64	Automated Refuse	CNG	Cummins 8.3 G Plus	280	2.5	0	1.7	0.0	0.87	0.90	0.95	0.80	35,619	17,848	0.198	0.023	J167
City of Riverside	Autocar WX64	Automated Refuse	CNG	Cummins 8.3 G Plus	280	2.5	N/A	1.7	N/A	0.87	0.90	0.95	0.80	34,925	18,168	0.302	0.023	J168
City of Riverside	Autocar WX64	Automated Refuse	CNG	Cummins 8.3 G Plus	280	2.5	N/A	1.7	N/A	0.87	0.90	0.95	0.80	33,834	18,318	0.304	0.023	J168
City of Riverside	Autocar WX64	Dump Truck	CNG	Cummins 8.3 G Plus	280	2.5	N/A	1.7	N/A	0.87	0.90	0.95	0.80	17,854	14,231	0.237	0.018	S138
City of Riverside	Autocar WX64	Dump Truck	CNG	Cummins 8.3 G Plus	280	2.5	N/A	1.7	N/A	0.87	0.90	0.95	0.80	14,324	12,701	0.211	0.016	S138
City of Riverside	Autocar WX64	Dump Truck	CNG	Cummins 8.3 G Plus	280	2.5	N/A	1.7	N/A	0.87	0.90	0.95	0.80	14,884	11,946	0.189	0.015	S140
Totals																1,950	0.164	

NOx Emission Reduction to Date: 1.95 tons
 PM Emission Reductions to Date: 0.164 tons

Project Documentation

Submitted in conjunction with this report:

Photos of each of the trucks showing Clean Transportation Funding decals

Outreach documentation:

Copy of page from Public Works annual report

Copy of city webpage showing CNG vehicle with decal and write up with link to MSRC Clean Transportation Funding webpage.



PUBLIC WORKS DEPARTMENT CLEAN AIR

CITY HOME PUBLIC WORKS HOME 1900 MAIN STREET • RIVERSIDE, CA 92502 • 951-826-5011

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:: CLEAN FLEET

Dedicated to clean air in the South Coast Air Basin, the City of Riverside applies for and receives grant funds to aid in the purchase of clean fuel vehicles for the city's service fleet.

Clean Transportation Funding from Mobile Source Air Pollution Reduction Review Committee (MSRC) has been a big source of funding for fleet replacement. These rebated diesel vehicles are also rebated from California, so that the vehicles will not contribute further to pollution in the South Coast Air Basin.



Clean Air

- Air Quality
- Clean Fleet
- 50 Ways to Cleaner Air
- Clean Air Act
- Clean & Green
- Sustainable Riverside
- General Plan 2025
- Air Quality Element
- Green Kids
- Model Clean Air City

Do Your Part

- Conserve at Work
- What You Can Do
- Your Carbon Footprint

Make Airflow Lines

- FAQs
- What is Smog?
- Your Health

Our Air Quality



Air Quality Index

Index	Health	Color
0-50	Good	Blue
51-100	Moderate	Yellow
101-150	Unhealthy for Sensitive Groups	Orange
151-200	Unhealthy	Red
201-300	Very Unhealthy	Purple
301-500	Hazardous	Magenta



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Public Works Hours

8:00 a.m. - 5:00 p.m.
Monday - Friday
1900 Main Street - 4th Floor
[Click for Map](#)
Closed on Weekends and Major Holidays

To Report a Problem:

Call 951-826-5011 or visit the city's 311 Call Center to report a problem.

For Questions or Comments

Clean Air - 951-826-5041

Search the City's Site



311 CALL CENTER



One call does it all!

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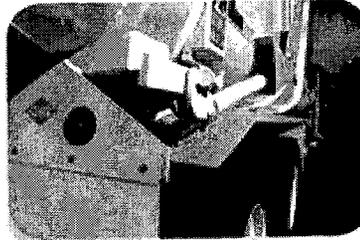
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FROM PUBLIC WORKS 2006 ANNUAL REPORT

Commitment to Air Quality Improvement

- **City Air Quality Fund**

The City of Riverside is mandated by the State of California to reduce mobile source emissions each year. A portion of state vehicle registration money is distributed to the City to spend on air quality improvement programs that aid in reaching desired emission reduction. Public Works administers the funds received, allocates them to a variety of programs that benefit the community, and reports results directly to the South Coast Air Quality Management District (SCAQMD) on the behalf of the City.



- **Department Fleet Replacement**

In support of a commitment to clean air, Public Works service vehicles are being replaced with alternative fuel vehicles whenever possible. In February 2006 Public Works submitted an application and received approval for \$200,000 in funding from the AQMD Mobile Source Reduction Committee to supplement the purchase of eight heavy-duty, clean-fuel, service vehicles for Public Works and the Public Utilities Departments.

- **Preserving our Environment through Recycling and Reuse of Recycled Paint**

Leftover paint brought to household hazardous waste collection events and facilities is collected and sent to a recycled paint manufacturer. The manufacturer mixes it with other paint products, adds color pigment, and then resells it as recycled paint that can be applied in the same way "new" paint is applied. Recycled paint is used exclusively in our Graffiti Eradication Program.



- **Rubberized Sidewalks**

Using rubberized concrete sidewalk panels saves on the cost of replacing sidewalks that are damaged by tree roots. As tree roots lift the sidewalk, the panels can be removed, the tree roots pruned, and the very same pieces of rubberized concrete sidewalk reinstalled. This process not only costs a fraction of the cost of removing and replacing sidewalks made of standard concrete but also helps the environment by using old tires that would otherwise have gone to a landfill.

