

Maricopa County Air Quality Department Voluntary Vehicle Repair & Retrofit Program



Maricopa County Voluntary Vehicle Repair & Retrofit Program

Fiscal Year 2010

Annual Report

July 1, 2009 – June 30, 2010

U.S. Department of Energy

American Recovery and Reinvestment Act of 2009

Energy Efficiency Conservation Block Grant

Award/Contract DE-EE0000848

CFDA No. 81.128

Maricopa County Recovery Committee

CFY2010 Reporting Category: VE10



Maricopa County

Air Quality Department

SUBJECT: Voluntary Vehicle Repair & Retrofit Program
Annual Report - Fiscal Year 2010

FEDERAL GRANT: Under the American Recovery and Reinvestment Act of 2009
U.S. Department of Energy/EECBG/DE-EE0000848
CFDA No. 81.128

REPORT DATES: July 1, 2009 through June 30, 2010

Executive Summary

The FY2010 (July 1, 2009 – June 30, 2010) Annual Report for the Maricopa County Voluntary Vehicle Repair and Retrofit (VVR&R) Program will summarize the current progress and provide an overview of the historical success of the program.

Arizona law (A.R.S. §49-474.03) requires Maricopa County to operate and administer a VVR&R Program in Area A (A.R.S. §49-541) and to coordinate the program with the Arizona Department of Environmental Quality (ADEQ) and Arizona Department of Transportation (ADOT). The program is required to provide for quantifiable emission reduction based on actual emissions testing performed on the vehicle before repair and/or retrofit. The program offers the citizens of Maricopa County the opportunity to voluntarily repair and, when possible, retrofit their high-emitting older vehicles with newer technology.

The VVR&R Program was grant funded by the State of Arizona from July 2000 through June 2009. Program repair services were suspended on June 27, 2009 when FY2009 funding was exhausted. Due to budget constraints, the State eliminated program funding for FY2010.

Later in FY2010, the program was awarded \$725,000 in funding through an Energy Efficiency and Conservation Block Grant (EECBG) from the U.S. Department of Energy (DOE). DOE funding authority was approved for reimbursement of pre-award operational expenses back to July 1, 2009 and through August 30, 2012.

While program repair services were suspended from late-June through mid-November 2009, VVR&R Staff maintained a wait list of qualifying owners interested in the program. Repair services were resumed on November 20, 2009 when DOE funding became available via the American Recovery and Reinvestment Act (ARRA) of 2009. A total of 273 eligible customer names were added to the wait list. Once repair services were restarted, 44 still-eligible, wait list customers were contacted with 25 customers receiving program assistance with emission repairs.

Despite having emission repair services suspended for nearly 5 months of FY2010, from November 20, 2009 through June 18, 2010 the program repaired a total of 625 vehicles in FY2010. Of that total, 470 Inspection and Maintenance (IM147) tested vehicles accounted for emissions savings of 68.94 metric tons at a formulated program cost of \$1,643 per metric ton.

Environmental Implications

The VVR&R Program is a committed control measure contained in the regional Serious Area Carbon Monoxide Plan and the Serious Area PM₁₀ Plan. The program is not identified as a contingency measure within these plans. No control measure credit is taken for VVR&R Program emissions savings in maintenance modeling for region.

The Maricopa Association of Governments' Eight-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa Nonattainment Area – February 2009 states that “If any person (includes State, County, local governments, regional agencies, and other entities) fails to implement a committed measure, the County would file an action in Superior Court to have the Court order that the measure be implemented. Likewise, the Director of the Arizona Department of Environmental Quality will backstop the County if it fails to implement a committed measure or if the County fails to backstop the local governments and regional agencies.” However, it has been suggested that should the program be unable to continue operations due to a lack of funding or otherwise, it is unlikely that the County or ADEQ would pursue legal action because the VVR&R Program is acknowledged as a voluntary program where no emissions credits are taken for regional maintenance modeling.

Program Repairs and Costs

In order to conform to DOE/EECBG reporting timeline requirements, this report accounts for vehicle repair and test results completed between November 20, 2009 and June 18, 2010.

	FY2010 1 st Qtr	FY2010 2 nd Qtr	FY2010 3 rd Qtr	FY2010 4 th Qtr	FY2010 Total	FY2009 Total
Average Spent by Customers & Maricopa County / Vehicle Repaired	N/A	\$680	\$681	\$688	\$684	\$726
Average Spent by Maricopa County / Vehicle Repaired	N/A	\$466	\$468	\$475	\$471	\$495
Number of LD/ID Vehicles Repaired	N/A	2	8	13	23	50
Number of IM147 Vehicles Repaired	N/A	76	155	239	470	970
Number of OBD-II Vehicles Repaired	N/A	18	48	66	132	124
Number of Diesel Vehicles Repaired (8,500+ lbs.)	N/A	0	0	0	0	0
Number of Vehicles Repaired – All Test Types	N/A	96	211	318	625	1,144
Retrofit Kits Installed on Various LD/ID Vehicles	N/A	0	0	3	3	6
Amount Spent by Customers & Maricopa County for All Vehicles Repaired	N/A	\$65,324	\$142,290	\$218,753	\$427,379	\$829,981
Amount Spent by Maricopa County for All Vehicles Repaired	N/A	\$44,764	\$97,868	\$151,119	\$294,447	\$565,812
Administrative Costs	\$0	\$40,671 *	\$29,350	\$26,665	\$96,686	\$119,871

* Note: Second Quarter Administrative Costs include administrative expenses from July 1 – December 31, 2009

Emissions Reductions - Basic Idle and Loaded Testing

Emissions reduction calculations vary depending on the type of emissions test used. Older vehicles (1967 – 1981) and some newer trucks use the Basic Idle & Loaded methods for emissions testing. Because of how the hydrocarbons and carbon monoxide are measured, there is no formula available to determine cost effectiveness with these vehicles. The grid below illustrates the average percent reduction for each pollutant:

	Idle Test		Loaded Test	
	HC	CO	HC	CO
1 st Qtr FY10	N/A	N/A	N/A	N/A
2 nd Qtr FY10	58%	68%	1%	25%
3 rd Qtr FY10	78%	88%	81%	94%
4 th Qtr FY10	73%	85%	76%	89%
FY2010 Total	73%	86%	75%	91%
FY2009 Total	67%	82%	64%	72%

The following table shows the average and total amounts spent by 1) Customers and Maricopa County and 2) by Maricopa County on Basic Idle and Loaded tested vehicles:

	FY2010 1 st Qtr	FY2010 2 nd Qtr	FY2010 3 rd Qtr	FY2010 4 th Qtr	FY2010 Total	FY2009 Total
Average Spent by Customers & Maricopa County per Vehicle Repaired	N/A	\$904	\$669	\$647	\$677	\$667
Average Amount Spent by Maricopa County Per Vehicle Repaired	N/A	\$522	\$440	\$421	\$436	\$467
Total Spent by Customers & Maricopa County for Vehicles Repaired	N/A	\$1,807	\$5,352	\$8,405	\$15,564	\$33,373
Total Spent by Maricopa County for Vehicles Repaired	N/A	\$1,044	\$3,517	\$5,476	\$10,038	\$23,370

Emissions Reductions - Inspection and Maintenance (IM147) Testing

More modern vehicles (1981-1995) calculate emissions using the Inspection and Maintenance testing method. Because Inspection and Maintenance Testing measures each pollutant in grams per mile, a cost effectiveness formula can be applied, accounting for tons reduced and the average miles driven:

	HC	CO	NOx
1 st Qtr FY10	N/A	N/A	N/A
2 nd Qtr FY10	72%	82%	55%
3 rd Qtr FY10	74%	84%	61%
4 th Qtr FY10	70%	77%	63%
FY2010 Total	72%	80%	61%
FY2009 Total	71%	80%	59%

In the grid on the following page, costs are annualized over two years and assume that the program's emission savings benefits will be realized over at least that length of time. By comparison, emission reduction efforts of similar pollutants at stationary sources within the region can cost far more. Using current cost effectiveness values for Reasonably Available Control Technology (RACT), emission reduction costs range from \$5,000 to \$8,000 per ton for like-type pollutants. This demonstrates that the VVR&R Program is a cost effective way of reducing emissions from the largest source of emissions in Maricopa County.

	FY2010 1 st Qtr	FY2010 2 nd Qtr	FY2010 3 rd Qtr	FY2010 4 th Qtr	FY2010 Total	FY2009 Total
Metric Tons Reduced	N/A	12.15	25.75	31.64	68.94	146.77
Standard Tons Reduced	N/A	13.39	28.38	34.88	75.99	161.78
Maricopa County Cost per Metric Ton	N/A	\$1,476	\$1,437	\$1,844	\$1,643	\$1,651
Maricopa County Cost per Standard Ton	N/A	\$1,339	\$1,304	\$1,625	\$1,491	\$1,497
Customer & Maricopa County Cost per Metric Ton	N/A	\$2,088	\$2,064	\$2,631	\$2,346	\$2,398
Customer & Maricopa County Cost per Standard Ton	N/A	\$1,894	\$1,872	\$2,375	\$2,128	\$2,175

The table below shows the cost effectiveness of repairs made to IM147 tested vehicles:

	FY2010 1 st Qtr	FY2010 2 nd Qtr	FY2010 3 rd Qtr	FY2010 4 th Qtr	FY2010 Total	FY2009 Total
Average Spent by Customers & Maricopa County per Vehicle Repaired	N/A	\$667	\$686	\$697	\$688	\$726
Average Amount Spent by Maricopa County Per Vehicle Repaired	N/A	\$472	\$477	\$488	\$482	\$500
Total Spent by Customers & Maricopa County for Vehicles Repaired	N/A	\$50,729	\$106,260	\$166,495	\$323,484	\$703,865
Total Spent by Maricopa County for Vehicles Repaired	N/A	\$35,864	\$74,011	\$116,674	\$226,549	\$484,510

Emissions Reductions - On-Board Diagnostic, Generation II (OBD-II) Testing

All newer vehicles (1996 and later models) receive Inspection and Maintenance testing using an On-Board Diagnostic, Generation II (OBD-II) method. This method along with traditional tailpipe testing offer different approaches in identifying vehicles in need of emission related repairs. OBD-II testing does not measure pollutants such as hydrocarbons, carbon monoxide and oxides of nitrogen. Instead, a failing emissions test will be comprised of varying Diagnostic Trouble Codes. With OBD-II testing, data is efficiently collected by connecting a generic scan tool to a Data Link Connector located under the instrument panel.

OBD-II systems use an Engine Control Module to continuously monitor the emissions control system in addition to other major engine components for proper operation. This technology makes it possible to diagnose failing or malfunctioning emission control devices for repair or replacement before high emissions occur. All related OBD-II technology standards including the data, the scan tool, the diagnostic test modes and the Diagnostic Trouble Codes are established by the Society of Automobile Engineers.

The following table presents the cost effectiveness of repairs made to OBD-II tested vehicles:

	FY2010 1st Qtr	FY2010 2nd Qtr	FY2010 3rd Qtr	FY2010 4th Qtr	FY2010 Total	FY2009 Total
Average Spent by Customers & Maricopa County Per Vehicle Repaired	N/A	\$710	\$667	\$664	\$669	\$748
Average Spent by Maricopa County Per Vehicle Repaired	N/A	\$436	\$442	\$439	\$438	\$467
Total Spent by Customers & Maricopa County for Vehicles Repaired	N/A	\$12,788	\$31,690	\$43,853	\$88,331	\$92,743
Total Spent by Maricopa County for Vehicles Repaired	N/A	\$7,856	\$21,035	\$28,969	\$57,860	\$57,931

Emissions Reductions - Diesel Program

In 2001, Maricopa County established a diesel repair program as mandated ARS §49-474.03. Qualifying diesel powered motor vehicles registered in Area A with a gross vehicle weight of more than 8,500 pounds that fail any random roadside vehicle test conducted by the state or that fail a required emissions test are eligible for up to \$1,000 in repair or retrofit costs from the program. Qualified vehicle owners will be responsible for one-half of the costs of the qualified repair and the other half of the costs may be funded by the program up to \$1,000.

Historically, demand for (heavy vehicle) diesel emission repair services under the VVR&R Program has been minimal.

Customer Satisfaction

Customers are provided a self-addressed stamped survey postcard after their vehicle is repaired. Using the following scale, customers are asked to rank how well the program requirements were explained to them, as well as, to rank their satisfaction with the repair process and the service received by their participating garage.

1. Extremely Disagree
2. Disagree
3. No Opinion/Okay
4. Agree
5. Extremely Agree

Of the 625 vehicles repaired during the FY2010, 259 customers returned their surveys resulting in a 41% response rate. The following chart reflects the collective, average response rates from all surveys received during this period:

Question on Comment Card	FY2010 Average Scores
When I called, the program was thoroughly explained.	4.79
My experience with the repair facility was satisfactory.	4.86
I am satisfied with the repairs made to my vehicle.	4.83

Repeat Customers

In 2004, the Voluntary Vehicle Repair and Retrofit Program Advisory Committee determined that since the intent of the program is to reduce tailpipe emissions on as many vehicles as possible, eligibility was extended to include the same owner, entering the same vehicle, through the program more than once. Below, the number of Repeat Customers is broken down by quarter for FY2010.

	FY2010 1 st Qtr	FY2010 2 nd Qtr	FY2010 3 rd Qtr	FY2010 4 th Qtr	FY2010 Total
Number of Repeat Customers	N/A	10	20	24	54

Vehicle Repair Summary

The number of vehicles repaired, the number of retrofit kits installed and the number of diesel vehicles repaired are detailed in the grid below for FY2010 (November 20, 2009 – June 18, 2010) and for the current, cumulative VVR&R Program (July 2000 – June 18, 2010).

Model Year	Number of Vehicles Repaired		Number of Retrofit Kits Installed		Number of Diesel Vehicles Repaired (gvw 8,500+ lbs)	
	FY2010	Cumulative Program	FY2010	Cumulative Program	FY2010	Cumulative Program
1967	0	28	0	0	0	0
1968	1	29	0	0	0	0
1969	0	35	0	0	0	0
1970	0	22	0	0	0	0
1971	1	29	0	0	0	0
1972	0	51	0	0	0	0
1973	0	41	0	0	0	0
1974	0	35	0	0	0	0
1975	0	33	0	18	0	0
1976	0	63	0	25	0	0
1977	1	61	0	28	0	0
1978	1	87	1	51	0	1
1979	6	111	2	70	0	0
1980	0	73	0	41	0	0
1981	4	156	0	2	0	0
1982	3	182	0	0	0	0
1983	3	259	0	1	0	0
1984	10	378	0	2	0	0
1985	15	573	0	0	0	0
1986	11	816	0	0	0	1
1987	20	852	0	1	0	0
1988	16	800	0	1	0	0
1989	24	787	0	2	0	0
1990	33	797	0	0	0	1
1991	33	659	0	0	0	0
1992	39	575	0	0	0	0
1993	56	603	0	0	0	0
1994	102	573	0	0	0	0
1995	113	486	0	0	0	0
1996	48	177	0	0	0	0
1997	48	90	0	0	0	0
1998	37	37	0	0	0	0
Total	625	9,498	3	242	0	3

Program Summary

The total number of vehicles receiving emission repairs and the total number of vehicles having emission repairs and/or a retrofit kit installed are detailed below. Also provided in the grid are the calculated average emissions saved by pollutant type and emissions test method. Total pollutants saved by IM147 tested vehicles are also displayed. Finally, the grid records the average and grand total of repair costs paid by Maricopa County during the pilot program and the current program.

	Pilot Program	Current Program
Dates of Service	1/1999 – 6/2000	* 7/2000 – 06/18/2010
Number of Vehicles Repaired	1,662	9,502
Number of Retrofit Kits Installed	37	242
Total Percent Reduction in HC – Idle	78%	73%
Total Percent Reduction in HC – Loaded	65%	66%
Total Percent Reduction in CO – Idle	77%	73%
Total Percent Reduction in CO – Loaded	77%	82%
Total Percent Reduction in HC – IM147	83%	73%
Total Percent Reduction in CO – IM147	87%	82%
Total Percent Reduction in NOx – IM147	76%	54%
Metric Tons Reduced – IM147	425	1,476
Standard Tons Reduced – IM147	469	1,627
Average Amount Spent by Maricopa County per Vehicle Repaired	\$383	\$499
Total Amount Spent by Maricopa County for All Vehicles Repaired	\$636,743.37	\$4,746,047.51

* Note: The program was suspended with no emission repairs completed, between June 27 and November 19, 2009.

Funding History

Below, the VVR&R Program grant amount and source of funding, by fiscal year, are documented:

Year	Amount	Source
Pilot	\$640,000	SB1427
FY01	\$1,920,000	SB1504
FY01	\$92,800	ADEQ's Catalytic Converter Replacement Program
FY02	\$320,000	HB2538
FY03	-0-	HB2538 Allocation removed during Special Legislative Session
FY04	\$399,534	ADEQ Contract 99-0089, Amendment No.7
FY05	\$725,000	ADEQ Contract EV05-0013
FY06	\$725,000	ADEQ Contract EV06-0008
FY07	\$725,000	ADEQ Contract EV06-0008, Amendment No.1
FY08	\$725,000	ADEQ Contract EV06-0008, Amendment No.2
FY09	\$725,000 \$688,700	ADEQ Contract EV06-0008, Amendment No.3 ADEQ Contract EV06-0008, Amendment No.4 (Funding reduced by \$36,300)
FY10	\$725,000	U.S. Department of Energy - EECBG (H.R. 6 Subtitle E - Energy Efficiency and Conservation Block Grants ((Sections 541-548)); HR 1) *DE-EE0000848

* Note: EECBG project/grant period is established as August 31, 2009 to August 30, 2012. The total award amount for the grant period is \$725,000. Pre-award project expenses dating to July 1, 2009 were allowed. Unspent grant funds from FY2010 will carry forward to FY2011.

Program Parameters

In order to qualify for the Voluntary Vehicle Repair and Retrofit Program, vehicles must meet the following criteria established by ARS §49-474.03 and by policy instituted by the VVR&R Program Advisory Committee:

- The owner must be willing to participate and the vehicle must be functionally operational
- The vehicle must be titled in Arizona
- The vehicle must have been registered during the immediately preceding 12 months. It cannot have been unregistered for more than 60 days
- The vehicle must have failed a required emissions test in the "Emissions Inspection Results" within the past 60 days; failures in the "Equipment" or "Pressure & Purge Inspection Results" are not eligible
- The emissions control system has not been tampered with, removed, or disabled
- Work must be done at a participating garage
- One vehicle per owner
- Motor homes, motorcycles, salvage/restored vehicles and fleet vehicles are not eligible
- If the vehicle is eligible for a retrofit kit (most 1975-1981 vehicles and some newer model year trucks), one must be installed
- There are no reimbursements available for work already completed
- Some vehicles may not be eligible for assistance if they are in extremely poor condition

Maricopa County – Contract Services

As stated in ARS §49-474.03, the county may contract with an independent contractor to develop and implement all or any portion of the program. Following a competitive bid and negotiation process, Maricopa County awarded Accurate Consulting Services, LLC with a three-year contract (Serial 08121 ITN) running through May 12, 2012. Maricopa County and Accurate Consulting Services have 3, 1-year options to extend the contract for emission repair services.

Accurate Consulting Services sub-contracts with skilled and reputable emission repair facilities that are regionally located for the convenience of Maricopa County residents. The contractor provides program training and support to the repair facilities.

The VVR&R Program currently has seven authorized repair facilities in the greater Phoenix metro area. Emission repair facilities are located in Avondale, Mesa, Gilbert, Tempe, North Phoenix, North-East Phoenix, and Central-West Phoenix.

Retrofit Kits

The sole-source retrofit kits utilized by the program have been supplied by Neutronics Enterprises, Inc. The kit converts vehicles originally built with open loop carburetor or fuel injection systems and oxidation catalysts into closed-loop (feedback) systems with three-way catalysts. Accurate Consulting Services, as an authorized vendor for Maricopa County, is responsible for providing the retrofit kits to the repair facilities. There were 3 retrofit kits installed during FY2010.

Process

The primary method of promoting the program is found in various pamphlets citizens receive as they proceed through the registration and emissions testing process. Information on the program is included on the pamphlet entitled "Important Emissions Testing Information" which is sent to all owners due to re-register their vehicles.

If they fail the emissions test, citizens also receive a pamphlet from the emissions station entitled “Car Care – Failed Vehicle Information.” Program awareness is also accomplished through VVR&R Program banners installed at each of Maricopa County's fifteen testing stations. Customers may call the VVR&R Program Helpline or go directly to the Maricopa County Air Quality Department website to locate an authorized repair facility.

When customers take their vehicle to the repair facility, they bring their title, current proof of registration, and the emissions failure notice. Customers sign an agreement sheet and a vehicle diagnostic is performed. The customers are informed about necessary repairs and associated costs. If customers continue in the program, they pay the first \$150 to the repair facility. The Maricopa County Air Quality Department pays, up to, an additional \$550 for repairs to address the specific emission failure or, up to, an additional \$650 for repair and retrofit kit installation. If the cost to bring the vehicle to emission standards exceeds these amounts, owners may opt to pay the additional expense or withdraw their vehicle from the program. If they choose to withdraw from the program, they are charged a \$50 diagnostic/inspection fee.

Repairs generally take a day, after which the mechanic takes the vehicle to an emission station to obtain a pass notice. The facility forwards all paperwork (customer agreement, invoices with balances noted, and copies of title, registration, failure and pass notices) to Accurate Consulting Services. Accurate Consulting then copies this information for their records and submits the original information, along with a final invoice, to Maricopa County. Maricopa County pays Accurate Consulting who then distributes payment to each repair facility.

Checks & Balances

A system of checks and balances has been established, with the help of the State of Arizona Waiver Facilities, to ensure repairs are properly completed as indicated on the invoices and money is spent appropriately. Each customer is given a self-addressed stamped postcard with survey questions on the process and the service. This allows the program to gather immediate feedback. If customers call with complaints, they may be referred to a waiver station. There, technicians compare the invoiced repairs with what was actually done to the vehicles and test the vehicles to be sure they are passing the emissions test. Most vehicles receive positive reports from the waiver stations, but those that do not are referred back to the garages for further evaluation and repair.

Program Monitoring

The Air Quality Department employs a Program Manager to provide administrative oversight and responsibility for the planning, management and direction of operations for the program. The Program Manager develops and manages the budget and monitors contractual compliance and provides for internal contract management. The Program Manager provides assistance to the VVR&R Program Advisory Committee.

A Program Specialist/Coordinator is employed to monitor eligibility of program participants to ensure compliance with the governing state statute and program procedures. The Program Specialist also validates emission records and completes emissions database reporting. Following the review of invoicing by Accurate Consulting Services, the Program Specialist reexamines each invoice to further ensure sub-recipient contract compliance. Program staff and the contractor use auto repair industry software (Mitchell1) to verify conformity of allowable hourly labor charges and mark-up pricing on replacement parts.

Advisory Committee

The Advisory Committee, established under ARS §49-588.34, meets as needed to advise and make recommendations on the development and implementation of the Voluntary Vehicle Repair and Retrofit Program. Advisory Committee members are appointed by the Board of Supervisors and include representatives from the Arizona Department of Transportation, the Arizona Department of Environmental Quality, automobile hobbyists, and the automotive aftermarket products industry.

Program Status and Recommendations

The number of retrofit kits installed by the program has been on the decline, year after year. It is expected that this trend will continue as the regional vehicle fleet becomes newer and the number of vehicles that can accept a retrofit kit lessens. The program has a small inventory of retrofit kits available but future availability of the kit will be a concern once the inventory is exhausted. Neutronics has been unresponsive to recent 'new order' inquiries for retrofit kits.

For reference, on January 1, 2009, the California Air Resources Board (CARB) removed its certification of the Neutronics kit (Executive Order No. B-20-1: Certification by the California Air Resources Board of the Neutronics Retrofit Feedback Emissions Control System). CARB has not accredited any other retrofit kit for use in California.

Also effective January 1, 2009, the State of California changed its requirements for aftermarket catalytic converters used on pre-OBD-II vehicles. The new design requirements have resulted in good emission reduction benefits with efficiencies comparable to OBD-II compatible converters and performance much closer to the original equipment (OE) converter functionality levels. Because pre-OBD-II converters do not have to be designed to be compatible with OBD-II catalyst monitors, the pre-OBD-II aftermarket converters offer greater vehicle model coverage. Under these design standards, the California warranty requirements for new aftermarket converters is 5 years/50,000 miles and cover the cost of parts and labor if a replacement is needed.

As a result of the developments with the Neutronics Retrofit Kit coupled with favorable test results reported by CARB, staff recommends further examination of the California pre-OBD-II catalytic converter program including analysis of costs and availability. The Advisory Committee may be asked to consider recommendations for statute revisions that would eliminate the use of the retrofit kit and establish program requirements for installation of the higher standard pre-OBD-II catalytic converters now being manufactured for the California aftermarket.

Through June 30, 2010 the program has expended approximately 54% of the total \$725,000 DOE grant award. It is projected that current funding will be exhausted sometime in early 2011. Future program funding continues to be a top priority; however, to date no new source of funding has been identified. Staff will work with leadership of the Maricopa County Air Quality Department and the Office of Management & Budget to consider funding options, plans for EECBG project phase-out and the future of VVR&R Program operations as the DOE/EECBG fund balance is diminished.

Lastly, it should be noted that the U.S. Environmental Protection Agency (EPA) has proposed to strengthen the national ambient air quality standards for ground-level ozone, the main component of smog. In light of the newly proposed ozone standards, the cost effective pollution saving efforts offered by the VVR&R Program through reductions in tailpipe emissions from older high-emitting vehicles, should continue to be considered as a beneficial and complementary control measure aimed at improving regional ozone air quality.

Voluntary Vehicle Repair & Retrofit Program

Annual Report
July 1, 2009 – June 30, 2010

Report Tables

Year-to-Date Reports

Idle Emission Reduction Results
Loaded Emission Reduction Results
IM147 Emission Reduction Results (2 Pages)
OBD II Emission Results

Program-to-Date Reports

Idle Emission Reduction Results (2 Pages)
Loaded Emission Reduction Results (2 Pages)
IM147 Emission Reduction Results (2 Pages)
OBD II Emission Results

Voluntary Vehicle Repair and Retrofit Program

Idle Emission Reduction Results
From 07/01/2009 Through 06/23/2010

Run Date:
Wednesday, June 30, 2010

Run Time
2:48 PM

Year	Total # Vehicles	Total Before		Total After		Total Reduction		Total After		Maricopa County Costs		Total (County + Cust)	
		HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	Total Cost	Avg Cost	Total Cost	Avg Cost
1968	1	519.00	10.79	166.00	0.74	353.00	10.05	68.02	93.14	\$347.05	\$347.05	\$497.05	\$497.05
1971	1	211.00	0.90	168.00	1.52	43.00	-0.62	20.38	-68.89	\$182.56	\$182.56	\$332.56	\$332.56
1977	1	274.00	4.52	10.00	0.01	264.00	4.51	96.35	99.78	\$398.63	\$398.63	\$548.63	\$548.63
1978	1	384.00	0.02	24.00	0.01	360.00	0.01	93.75	50.00	\$393.15	\$393.15	\$903.15	\$903.15
1979	6	1846.00	8.13	612.00	0.64	1234.00	7.49	66.85	92.13	\$1,953.06	\$325.51	\$3,316.01	\$552.67
1987	1	855.00	7.13	32.00	0.01	823.00	7.12	96.26	99.86	\$539.05	\$539.05	\$689.05	\$689.05
1991	2	1065.00	12.81	43.00	0.02	1022.00	12.79	95.96	99.84	\$983.39	\$491.70	\$1,293.16	\$646.58
1992	1	887.00	4.29	186.00	0.39	701.00	3.90	79.03	90.91	\$354.88	\$354.88	\$504.88	\$504.88
1993	1	228.00	0.26	216.00	0.54	12.00	-0.28	5.26	-107.69	\$545.09	\$545.09	\$695.09	\$695.09
1994	2	844.00	2.30	372.00	0.77	472.00	1.53	55.92	66.52	\$1,044.40	\$522.20	\$1,911.10	\$955.55
1995	5	2261.00	13.63	780.00	4.42	1481.00	9.21	65.50	67.57	\$2,746.79	\$549.36	\$4,173.03	\$834.61
1996	1	523.00	0.63	17.00	0.01	506.00	0.62	96.75	98.41	\$550.00	\$550.00	\$700.30	\$700.30
Totals:	23	9897.00	65.41	2626.00	9.08	7271.00	56.33	73.47	86.12	\$10,038.05	\$5,199.17	\$15,564.01	\$7,860.11

Voluntary Vehicle Repair and Retrofit Program

Loaded Emission Reduction Results
From 07/01/2009 Through 06/23/2010

Run Date:
Wednesday, June 30, 2010

Run Time
2:49 PM

Year	Total # Vehicles	Total Before		Total After		Total Reduction		Total After		Maricopa County Costs		Total (County + Cust)	
		HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	Total Cost	Avg Cost	Total Cost	Avg Cost
1968	1	345.00	8.50	277.00	1.54	68.00	6.96	19.71	81.88	\$347.05	\$347.05	\$497.05	\$497.05
1971	1	239.00	6.66	125.00	1.20	114.00	5.46	47.70	81.98	\$182.56	\$182.56	\$332.56	\$332.56
1977	1	246.00	3.34	14.00	0.01	232.00	3.33	94.31	99.70	\$398.63	\$398.63	\$548.63	\$548.63
1978	1	177.00	4.86	19.00	0.01	158.00	4.85	89.27	99.79	\$393.15	\$393.15	\$903.15	\$903.15
1979	6	1332.00	7.35	348.00	1.51	984.00	5.84	73.87	79.46	\$1,953.06	\$325.51	\$3,316.01	\$552.67
1987	1	260.00	4.93	26.00	0.01	234.00	4.92	90.00	99.80	\$539.05	\$539.05	\$689.05	\$689.05
1991	2	500.00	10.75	47.00	0.08	453.00	10.67	90.60	99.26	\$983.39	\$491.70	\$1,293.16	\$646.58
1992	1	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	\$354.88	\$354.88	\$504.88	\$504.88
1993	1	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	\$545.09	\$545.09	\$695.09	\$695.09
1994	2	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	\$1,044.40	\$522.20	\$1,911.10	\$955.55
1995	5	103.04	0.75	32.04	0.05	71.00	0.70	68.91	93.33	\$2,746.79	\$549.36	\$4,173.03	\$834.61
1996	1	334.00	0.62	4.00	0.01	330.00	0.61	98.80	98.39	\$550.00	\$550.00	\$700.30	\$700.30
Totals:	23	3536.08	47.80	892.08	4.46	2644.00	43.34	74.77	90.67	\$10,038.05	\$5,199.17	\$15,564.01	\$7,860.11

Maricopa County's Voluntary Vehicle Repair and Retrofit Program
 IM147 Emission Reduction Results - July 2009 through June 23, 2010

FY2010 YTD - Cumulative Results Through Fourth Quarter (July 2009 - June 23, 2010 (07/01/2009 - 06/23/2010))

	Total # of Vehicles	Total Before (grams/mile)			Total After (grams/mile)			Total Reduction (grams/mile)			Total Reduction (%)		
		HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
Total	470	833.64	12,338.31	1,585.65	235.54	2,413.90	614.69	598.10	9,924.41	970.96	71.75	80.44	61.23
1981	4	15.52	287.70	8.77	4.63	71.02	6.72	10.89	216.68	2.05	70.17	75.31	23.38
1982	3	8.46	74.47	14.11	4.98	45.28	4.27	3.48	29.19	9.84	41.13	39.20	69.74
1983	3	12.76	411.52	3.95	1.46	18.34	6.61	11.30	393.18	-2.66	88.56	95.54	-67.34
1984	10	36.62	596.95	43.04	8.46	101.37	26.55	28.16	495.58	16.49	76.90	83.02	38.31
1985	15	43.05	858.16	47.57	14.46	169.05	29.69	28.59	689.11	17.88	66.41	80.30	37.59
1986	11	19.71	298.67	38.59	7.27	62.47	15.77	12.44	236.20	22.82	63.12	79.08	59.13
1987	19	34.86	731.12	68.33	12.81	165.24	33.70	22.05	565.88	34.63	63.25	77.40	50.68
1988	16	31.05	432.59	53.28	10.37	122.07	21.71	20.68	310.52	31.57	66.60	71.78	59.25
1989	24	46.44	800.88	66.04	13.19	189.31	33.84	33.25	611.57	32.20	71.60	76.36	48.76
1990	33	50.74	848.44	108.54	14.72	159.53	46.88	36.02	688.91	61.66	70.99	81.20	56.81
1991	31	63.85	829.94	98.21	11.24	124.87	29.37	52.61	705.07	68.84	82.40	84.95	70.09
1992	38	63.10	906.50	111.37	17.52	143.36	44.35	45.58	763.14	67.02	72.23	84.19	60.18
1993	55	101.98	1,218.23	184.71	27.10	246.40	74.96	74.88	971.83	109.75	73.43	79.77	59.42
1994	100	155.41	2,190.69	347.53	41.46	359.33	118.90	113.95	1,831.36	228.63	73.32	83.60	65.79
1995	108	150.09	1,852.45	391.61	45.87	436.26	121.37	104.22	1,416.19	270.24	69.44	76.45	69.01

* For ease in calculations, only light duty gas vehicle mileage is used.
 This information is generated from the (LDV-M6 and LDGT-M6) Mobile6 model.

The numbers highlighted in blue are entered from the IM147 report from SQL
 The numbers highlighted in red are calculated numbers entered into the reports

Maricopa County's Voluntary Vehicle Repair and Retrofit Program
 IM147 Emission Reduction Results - July 2009 through June 23, 2010

Average Miles per Year*	Total Reduction (metric tons/year)			Total Reduction Per Vehicle Year (metric tons/year)	Maricopa County Costs			Total Cost (County + Customer)		
					Total Cost Per Vehicle Year	Cost Per Metric Ton**	Average Cost of Repair	Total Cost Per Vehicle Year	Cost Per Metric Ton**	Average Cost of Repair
	HC	CO	NOx							
79,145	3.66	58.99	6.29	68.94	\$226,548.90	\$1,643.05	\$482.02	\$323,484.26	\$2,346.08	\$688.26
3,616	0.04	0.78	0.01	0.83	\$1,844.97	\$1,111.02	\$461.24	\$2,875.73	\$1,731.73	\$718.93
3,803	0.01	0.11	0.04	0.16	\$1,626.12	\$5,029.27	\$542.04	\$2,376.12	\$7,348.88	\$792.04
4,001	0.05	1.57	-0.01	1.61	\$1,647.31	\$512.32	\$549.10	\$2,718.28	\$845.40	\$906.09
4,208	0.12	2.09	0.07	2.27	\$4,923.62	\$1,082.93	\$492.36	\$7,957.43	\$1,750.20	\$795.74
4,427	0.13	3.05	0.08	3.26	\$7,540.91	\$1,157.86	\$502.73	\$10,454.92	\$1,605.28	\$696.99
4,656	0.06	1.10	0.11	1.26	\$5,553.48	\$2,196.93	\$504.86	\$8,009.66	\$3,168.58	\$728.15
4,898	0.11	2.77	0.17	3.05	\$9,427.68	\$1,545.88	\$496.19	\$13,675.69	\$2,242.43	\$719.77
5,152	0.11	1.60	0.16	1.87	\$7,934.72	\$2,122.73	\$495.92	\$11,255.94	\$3,011.23	\$703.50
5,420	0.18	3.31	0.17	3.67	\$10,826.00	\$1,475.15	\$451.08	\$15,737.89	\$2,144.45	\$655.75
5,701	0.21	3.93	0.35	4.48	\$15,540.94	\$1,732.80	\$470.94	\$23,959.79	\$2,671.49	\$726.05
5,997	0.32	4.23	0.41	4.96	\$14,554.42	\$1,468.17	\$469.50	\$21,742.30	\$2,193.25	\$701.36
6,308	0.29	4.81	0.42	5.52	\$19,610.05	\$1,774.93	\$516.05	\$26,839.53	\$2,429.28	\$706.30
6,636	0.50	6.45	0.73	7.67	\$26,578.90	\$1,731.69	\$483.25	\$36,741.47	\$2,393.81	\$668.03
6,980	0.80	12.78	1.60	15.17	\$47,289.97	\$1,558.25	\$472.90	\$65,263.48	\$2,150.49	\$652.63
7,342	0.77	10.40	1.98	13.15	\$51,649.81	\$1,964.33	\$478.24	\$73,876.03	\$2,809.63	\$684.04

**This is cost annualized over two years.

It is assumed, that benefits though paid for in one year, will be realized over two or more years.

Per Vehicle Year (standard tons/year)	Maricopa County Costs			Total Cost (County + Customer)		
	Total Cost Per Vehicle Year	Cost Per Standard Ton**	Average Cost of Repair	Total Cost Per Vehicle Year	Standard Ton**	Average Cost of Repair
75.99	\$226,548.90	\$1,490.57	\$471.89	\$323,484.26	\$2,128.35	\$667.49

Maricopa County's Voluntary Vehicle Repair and Retrofit Program
OBD II Emission Results - FY10 YTD
July 2009 through June 23, 2010

Vehicle Model Years	Total # of Vehicles	Maricopa County Costs		Customer Costs		Total Cost (County + Customer)	
		Total Cost of Repair	Average Cost of Repair	Total Cost of Repair	Average Cost of Repair	Total Cost of Repair	Average Cost of Repair
Total	132	\$57,859.56	\$438.33	\$30,470.94	\$230.84	\$88,330.50	\$669.17
1996	47	\$19,693.97	\$419.02	\$11,182.59	\$237.93	\$30,876.56	\$656.95
1997	48	\$21,884.18	\$455.92	\$11,187.03	\$233.06	\$33,071.21	\$688.98
1998	37	\$16,281.41	\$440.04	\$8,101.32	\$218.95	\$24,382.73	\$658.99

Voluntary Vehicle Repair and Retrofit Program

Idle Emission Reduction Results
From 08/03/2000 Through 06/23/2010

Run Date:
Wednesday, June 30, 2010

Run Time
2:50 PM

Year	Total # Vehicles	Total Before		Total After		Total Reduction		Total After		Maricopa County Costs		Total (County + Cust)	
		HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	Total Cost	Avg Cost	Total Cost	Avg Cost
1967	28	14650.00	163.09	6317.00	67.05	8333.00	96.04	56.88	58.89	\$10,530.51	\$376.09	\$15,555.33	\$555.55
1968	29	15704.00	156.07	6408.00	56.89	9296.00	99.18	59.20	63.55	\$9,829.81	\$338.96	\$14,481.04	\$499.35
1969	35	20550.00	145.98	7759.00	66.02	12791.00	79.96	62.24	54.77	\$15,030.50	\$429.44	\$23,252.65	\$664.36
1970	22	13317.00	96.38	4924.00	40.13	8393.00	56.25	63.02	58.36	\$8,614.11	\$391.55	\$12,382.77	\$562.85
1971	29	16310.00	124.06	6886.00	48.31	9424.00	75.75	57.78	61.06	\$11,484.59	\$396.02	\$18,477.51	\$637.16
1972	51	29205.00	197.11	10889.00	92.89	18316.00	104.22	62.72	52.87	\$19,253.90	\$377.53	\$30,915.09	\$606.18
1973	41	18886.00	139.25	7458.00	70.15	11428.00	69.10	60.51	49.62	\$17,760.41	\$433.18	\$26,324.11	\$642.05
1974	35	20253.00	144.75	6391.00	54.98	13862.00	89.77	68.44	62.02	\$12,724.60	\$363.56	\$23,393.83	\$668.40
1975	33	12542.00	76.09	2397.02	12.64	10144.98	63.45	80.89	83.39	\$17,175.13	\$520.46	\$25,717.74	\$779.33
1976	63	24293.82	220.04	7366.01	32.73	16927.81	187.31	69.68	85.13	\$32,033.55	\$508.47	\$46,255.47	\$734.21
1977	61	23109.00	158.72	5611.00	25.87	17498.00	132.85	75.72	83.70	\$31,596.97	\$517.98	\$46,983.58	\$770.22
1978	86	34619.00	240.17	6754.02	35.41	27864.98	204.76	80.49	85.26	\$47,197.09	\$548.80	\$67,913.86	\$789.70
1979	111	37846.01	239.74	5796.07	12.02	32049.94	227.72	84.69	94.99	\$61,219.89	\$551.53	\$92,625.24	\$834.46
1980	73	28218.00	170.24	2195.43	4.65	26022.57	165.59	92.22	97.27	\$41,143.39	\$563.61	\$58,582.15	\$802.50
1981	4	2044.00	18.94	367.01	4.02	1676.99	14.92	82.04	78.78	\$1,805.02	\$451.26	\$2,661.29	\$665.32
1982	4	2028.00	12.50	629.00	6.30	1399.00	6.20	68.98	49.60	\$2,099.60	\$524.90	\$3,231.28	\$807.82
1983	6	3742.00	23.51	393.55	2.46	3348.45	21.05	89.48	89.54	\$2,953.76	\$492.29	\$4,172.87	\$695.48
1984	7	3199.00	23.03	1090.00	7.62	2109.00	15.41	65.93	66.91	\$2,844.78	\$406.40	\$4,182.66	\$597.52
1985	22	13181.00	30.99	3266.00	28.95	9915.00	2.04	75.22	6.58	\$8,647.12	\$393.05	\$13,868.10	\$630.37
1986	27	11915.00	72.86	3592.00	37.92	8323.00	34.94	69.85	47.95	\$11,509.44	\$426.28	\$16,072.41	\$595.27
1987	9	5567.00	36.69	647.00	3.96	4920.00	32.73	88.38	89.21	\$4,935.48	\$548.39	\$8,266.57	\$918.51
1988	12	5233.00	50.11	1083.00	6.64	4150.00	43.47	79.30	86.75	\$5,268.92	\$439.08	\$7,579.66	\$631.64
1989	10	4091.00	21.23	774.01	5.25	3316.99	15.98	81.08	75.27	\$4,594.74	\$459.47	\$7,526.69	\$752.67
1990	9	3538.60	8.81	589.00	1.47	2949.60	7.34	83.35	83.31	\$3,974.67	\$441.63	\$5,989.15	\$665.46
1991	12	5673.00	54.52	1182.00	3.54	4491.00	50.98	79.16	93.51	\$5,676.46	\$473.04	\$9,165.84	\$763.82
1992	7	3103.40	18.14	849.00	5.43	2254.40	12.71	72.64	70.07	\$3,549.41	\$507.06	\$6,553.39	\$936.20
1993	9	3256.40	16.00	1295.00	5.17	1961.40	10.83	60.23	67.69	\$4,532.62	\$503.62	\$7,061.35	\$784.59
1994	13	5958.75	15.64	1518.00	3.25	4440.75	12.39	74.52	79.22	\$6,962.85	\$535.60	\$12,088.70	\$929.90
1995	15	7365.00	51.27	1566.01	5.68	5798.99	45.59	78.74	88.92	\$7,310.45	\$487.36	\$10,479.45	\$698.63

1996	2	600.00	1.12	23.00	0.02	577.00	1.10	96.17	98.21	\$1,097.68	\$548.84	\$1,397.98	\$698.99
Totals:	865	389997.98	2727.05	106015.13	747.42	283982.85	1979.63	72.82	72.59	\$413,357.45	\$13,955.45	\$623,157.76	\$21,318.50

Voluntary Vehicle Repair and Retrofit Program

Loaded Emission Reduction Results
From 08/03/2000 Through 06/23/2010

Run Date:

Wednesday, June 30, 2010

Run Time

2:51 PM

Year	Total # Vehicles	Total Before		Total After		Total Reduction		Total After		Maricopa County Costs		Total (County + Cust)	
		HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	HC (ppm)	CO (%)	Total Cost	Avg Cost	Total Cost	Avg Cost
1967	28	7546.00	116.25	4204.00	38.90	3342.00	77.35	44.29	66.54	\$10,530.51	\$376.09	\$15,555.33	\$555.55
1968	29	9369.00	110.90	4005.00	30.60	5364.00	80.30	57.25	72.41	\$9,829.81	\$338.96	\$14,481.04	\$499.35
1969	35	9611.00	104.80	5126.00	35.89	4485.00	68.91	46.67	65.75	\$15,030.50	\$429.44	\$23,252.65	\$664.36
1970	22	6203.00	73.31	3256.00	29.51	2947.00	43.80	47.51	59.75	\$8,614.11	\$391.55	\$12,382.77	\$562.85
1971	29	10148.00	130.83	4551.00	33.37	5597.00	97.46	55.15	74.49	\$11,484.59	\$396.02	\$18,477.51	\$637.16
1972	51	15154.00	141.22	6692.00	56.41	8462.00	84.81	55.84	60.06	\$19,253.90	\$377.53	\$30,915.09	\$606.18
1973	41	11798.01	120.83	5262.01	42.19	6536.00	78.64	55.40	65.08	\$17,760.41	\$433.18	\$26,324.11	\$642.05
1974	35	11095.00	95.61	4373.00	37.29	6722.00	58.32	60.59	61.00	\$12,724.60	\$363.56	\$23,393.83	\$668.40
1975	33	6970.01	68.38	1589.02	9.05	5380.99	59.33	77.20	86.77	\$17,175.13	\$520.46	\$25,717.74	\$779.33
1976	63	13110.01	793.08	4472.01	31.52	8638.00	761.56	65.89	96.03	\$32,033.55	\$508.47	\$46,255.47	\$734.21
1977	61	15659.00	195.25	3592.00	23.52	12067.00	171.73	77.06	87.95	\$31,596.97	\$517.98	\$46,983.58	\$770.22
1978	86	19537.00	201.58	4986.00	24.98	14551.00	176.60	74.48	87.61	\$47,197.09	\$548.80	\$67,913.86	\$789.70
1979	111	19982.02	210.97	4523.03	22.67	15458.99	188.30	77.36	89.25	\$61,219.89	\$551.53	\$92,625.24	\$834.46
1980	73	12420.00	171.98	2076.01	8.26	10343.99	163.72	83.28	95.20	\$41,143.39	\$563.61	\$58,582.15	\$802.50
1981	4	454.00	4.93	126.01	1.09	327.99	3.84	72.24	77.89	\$1,805.02	\$451.26	\$2,661.29	\$665.32
1982	4	885.00	10.11	268.00	3.33	617.00	6.78	69.72	67.06	\$2,099.60	\$524.90	\$3,231.28	\$807.82
1983	6	1200.02	17.63	264.02	4.74	936.00	12.89	78.00	73.11	\$2,953.76	\$492.29	\$4,172.87	\$695.48
1984	7	614.01	9.07	305.01	5.61	309.00	3.46	50.32	38.15	\$2,844.78	\$406.40	\$4,182.66	\$597.52
1985	22	3145.00	31.28	1744.00	26.40	1401.00	4.88	44.55	15.60	\$8,647.12	\$393.05	\$13,868.10	\$630.37
1986	27	5083.00	57.58	1780.00	27.86	3303.00	29.72	64.98	51.62	\$11,509.44	\$426.28	\$16,072.41	\$595.27
1987	9	1818.01	22.75	212.01	2.11	1606.00	20.64	88.34	90.73	\$4,935.48	\$548.39	\$8,266.57	\$918.51
1988	12	2321.00	29.91	624.01	6.07	1696.99	23.84	73.11	79.71	\$5,268.92	\$439.08	\$7,579.66	\$631.64
1989	10	2566.02	8.09	356.03	1.30	2209.99	6.79	86.13	83.93	\$4,594.74	\$459.47	\$7,526.69	\$752.67
1990	9	1728.03	11.16	292.03	1.80	1436.00	9.36	83.10	83.87	\$3,974.67	\$441.63	\$5,989.15	\$665.46
1991	12	1267.07	29.42	261.07	1.24	1006.00	28.18	79.40	95.79	\$5,676.46	\$473.04	\$9,165.84	\$763.82
1992	7	468.06	0.90	74.06	1.18	394.00	-0.28	84.18	-31.11	\$3,549.41	\$507.06	\$6,553.39	\$936.20
1993	9	732.07	5.18	186.07	1.04	546.00	4.14	74.58	79.92	\$4,532.62	\$503.62	\$7,061.35	\$784.59
1994	13	0.13	0.13	0.13	0.13	0.00	0.00	0.00	0.00	\$6,962.85	\$535.60	\$12,088.70	\$929.90
1995	15	850.11	21.42	118.11	0.51	732.00	20.91	86.11	97.62	\$7,310.45	\$487.36	\$10,479.45	\$698.63

1996	2	600.00	1.12	23.00	0.02	577.00	1.10	96.17	98.21	\$1,097.68	\$548.84	\$1,397.98	\$698.99
Totals:	865	389997.98	2727.05	106015.13	747.42	283982.85	1979.63	72.82	72.59	\$413,357.45	\$13,955.45	\$623,157.76	\$21,318.50

Maricopa County's Voluntary Vehicle Repair and Retrofit Program
 IM147 Emission Reduction Results - July 2000 through June 23, 2010

FY2010 - Cumulative Results for Program Years July 2000 - June 23, 2010 (07/01/2000 - 06/23/2010)

	Total # of Vehicles	Total Before (grams/mile)			Total After (grams/mile)			Total Reduction (grams/mile)			Total Reduction (%)		
		HC	CO	NOx	HC	CO	NOx	HC	CO	NOx	HC	CO	NOx
Total	8,328	16,515.50	301,357.10	24,084.32	4,501.88	55,436.83	11,188.14	12,013.62	245,920.27	12,896.18	72.74	81.60	53.55
1981	152	454.93	8979.56	419.06	127.27	2137.02	231.49	327.66	6,842.54	187.57	72.02	76.20	44.76
1982	178	553.04	10209.34	511.11	165.79	2367.36	299.84	387.25	7,841.98	211.27	70.02	76.81	41.34
1983	253	711.68	15232.62	747.08	200.42	2960.46	425.38	511.26	12,272.16	321.70	71.84	80.56	43.06
1984	371	1114.82	22378.43	1082.62	286.12	4118.68	706.37	828.70	18,259.75	376.25	74.33	81.60	34.75
1985	551	1522.83	31815.80	1684.41	435.05	6089.99	967.16	1,087.78	25,725.81	717.25	71.43	80.86	42.58
1986	788	1749.33	33536.17	2307.35	482.33	5744.44	1154.57	1,267.00	27,791.73	1,152.78	72.43	82.87	49.96
1987	843	1698.23	31337.28	2486.37	485.46	5892.39	1184.48	1,212.77	25,444.89	1,301.89	71.41	81.20	52.36
1988	788	1706.26	31646.15	2161.13	424.41	5274.70	1069.52	1,281.85	26,371.45	1,091.61	75.13	83.33	50.51
1989	777	1451.26	27277.42	2080.55	406.88	5184.52	1051.09	1,044.38	22,092.90	1,029.46	71.96	80.99	49.48
1990	787	1227.63	22048.99	2169.33	310.27	3554.16	882.15	917.36	18,494.83	1,287.18	74.73	83.88	59.34
1991	647	993.07	17084.90	1766.45	248.34	2753.38	673.85	744.73	14,331.52	1,092.60	74.99	83.88	61.85
1992	568	942.15	15501.76	1611.55	237.39	2527.55	616.21	704.76	12,974.21	995.34	74.80	83.70	61.76
1993	594	955.35	15694.83	1784.53	266.98	2730.90	723.65	688.37	12,963.93	1,060.88	72.05	82.60	59.45
1994	560	791.39	10565.64	1747.19	231.59	2230.60	647.84	559.80	8,335.04	1,099.35	70.74	78.89	62.92
1995	471	643.53	8048.21	1525.59	193.58	1870.68	554.54	449.95	6,177.53	971.05	69.92	76.76	63.65

Maricopa County's Voluntary Vehicle Repair and Retrofit Program
 IM147 Emission Reduction Results - July 2000 through June 23, 2010

Average Miles per Year*	Total Reduction (metric tons/year)			Total Reduction Per Vehicle Year (metric tons/year)	Maricopa County Costs			Total Cost (County + Customer)		
	HC	CO	NOx		Total Cost Per Vehicle Year	Cost Per Metric Ton**	Average Cost of Repair	Total Cost Per Vehicle Year	Cost Per Metric Ton**	Average Cost of Repair
83,252	66.30	1,332.56	76.25	1,475.11	\$4,190,922.76	\$1,420.54	\$503.23	\$6,293,203.94	\$2,133.13	\$755.67
3,803	1.25	26.02	0.71	27.98	\$76,092.27	\$1,359.68	\$500.61	\$118,729.15	\$2,121.56	\$781.11
4,001	1.55	31.38	0.85	33.77	\$90,899.11	\$1,345.84	\$510.67	\$141,329.14	\$2,092.50	\$793.98
4,208	2.15	51.64	1.35	55.15	\$127,989.10	\$1,160.45	\$505.89	\$203,750.78	\$1,847.36	\$805.34
4,427	3.67	80.84	1.67	86.17	\$186,890.97	\$1,084.43	\$503.75	\$297,524.10	\$1,726.37	\$801.95
4,656	5.06	119.78	3.34	128.18	\$277,591.74	\$1,082.79	\$503.80	\$436,511.93	\$1,702.68	\$792.22
4,898	6.21	136.12	5.65	147.98	\$394,391.72	\$1,332.62	\$500.50	\$611,131.62	\$2,064.97	\$775.55
5,152	6.25	131.09	6.71	144.05	\$421,073.87	\$1,461.58	\$499.49	\$639,163.85	\$2,218.59	\$758.20
5,420	6.95	142.93	5.92	155.80	\$398,199.31	\$1,277.94	\$505.33	\$606,336.16	\$1,945.91	\$769.46
5,701	5.95	125.95	5.87	137.77	\$390,346.29	\$1,416.61	\$502.38	\$580,888.52	\$2,108.11	\$747.60
5,997	5.50	110.91	7.72	124.13	\$396,647.43	\$1,597.66	\$504.00	\$584,443.64	\$2,354.08	\$742.62
6,308	4.70	90.40	6.89	101.99	\$328,788.75	\$1,611.82	\$508.17	\$477,409.41	\$2,340.40	\$737.88
6,636	4.68	86.10	6.61	97.38	\$292,828.48	\$1,503.55	\$515.54	\$418,238.06	\$2,147.48	\$736.33
6,980	4.80	90.49	7.40	102.70	\$300,931.38	\$1,465.13	\$506.62	\$428,297.82	\$2,085.23	\$721.04
7,342	4.11	61.20	8.07	73.38	\$277,991.61	\$1,894.26	\$496.41	\$406,645.61	\$2,770.92	\$726.15
7,723	3.47	47.71	7.50	58.68	\$230,260.73	\$1,961.89	\$488.88	\$342,804.15	\$2,920.79	\$727.82

**This is cost annualized over two years.

It is assumed, that benefits though paid for in one year, will be realized over two or more years.

Total Reduction Per Vehicle Year (standard tons/year)	Maricopa County Costs			Total Cost (County + Customer)		
	Total Cost Per Vehicle Year	Standard Ton**	Average Cost of Repair	Total Cost Per Vehicle Year	Standard Ton**	Average Cost of Repair
1,626.02	\$4,190,922.76	\$1,288.71	\$503.23	\$6,293,203.94	\$1,935.16	\$755.67

Maricopa County's Voluntary Vehicle Repair and Retrofit Program
OBD II Emission Results - Program to Date
July 2000 through June 23, 2010

Vehicle Model Years	Total # of Vehicles	Maricopa County Costs		Customer Costs		Total Cost (County + Customer)	
		Total Cost of Repair	Average Cost of Repair	Total Cost of Repair	Average Cost of Repair	Total Cost of Repair	Average Cost of Repair
Total	302	\$138,446.51	\$458.43	\$76,984.89	\$254.92	\$215,431.40	\$713.35
1996	175	\$80,761.49	\$461.49	\$46,622.94	\$266.42	\$127,384.43	\$727.91
1997	90	\$41,403.61	\$460.04	\$22,260.63	\$247.34	\$63,664.24	\$707.38
1998	37	\$16,281.41	\$440.04	\$8,101.32	\$218.95	\$24,382.73	\$658.99