

# **ERRATA**

## **Estimated Volatile Hazardous Air Pollutant & Hydrocarbon Reductions During the Air Aware – Gas Cap Exchange Project 2004**

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## **Estimated Volatile Hazardous Air Pollutant & Hydrocarbon Reductions During the Air Aware – Gas Cap Exchange Project Fiscal Year 2004**

The Air Aware – Gas Cap Exchange Project was conducted in the Bernalillo County area over six summer months from March to the end of August 2004. During this period we reported that 641 gas caps were exchanged for leaking, missing, off-specification, or otherwise faulty gas caps. Participating vehicles included gasoline powered passenger cars, trucks and recreational vehicles.

Staff projects an estimated volatile organic compound reduction of 58.8 tons for 641 caps. The estimate was determined using the ratio of tons per cap exchanged provided by the Regional Air Pollution Control Agency's (RAPCA) *Air Quality Emission Reduction Analysis for the Regional Ozone Action Program – Summer 2000 (Dayton/Springfield, Ohio)*. RAPCA projected a reduction of "192 tons of volatile organic compound (VOC) emission savings for 2,000 leaking gasoline caps." This study references *Protocol of Determination of VOC Reduction from the Replacement of Gas Caps of Light Duty Gasoline Vehicles (1996)*, prepared for Sun Corporation by M.J. Bradley & Associates. We are also using information from *Technical Guidance Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities Vol. 1: Chapters [EPA-450/3-91-022a]* for the fuel vapor composition percentages.

Based on e-mail communications with staff in Cincinnati, RAPCA, Arizona and Pennsylvania, and searches on the internet, the studies cited are unique in their study of gas cap emissions. Caps in those REAL WORLD studies were pressure tested in summer and winter under hot and cold soak conditions. The Air Aware Project utilized Bureau of Automotive Repair 97 (BAR97) equipment to evaluate the caps that were evaluated for our program. Caps were exchanged because they leaked (BAR97), were missing, off-specification for the vehicle for which they were installed, or other reasons not specified.

Broad assumptions were made using information from these sources in order to estimate volatile hazardous air pollutant and hydrocarbon emission reductions. Variables including differences in ambient air temperatures in an arid environment, barometric pressures at higher altitudes, in addition to *missing* and *off specification* gas caps were not addressed in the 2000 and 1996 studies which may affect the potential reduction of VOC emissions. This special project was conducted during a moderately warm summer in 2004 in Bernalillo County at altitudes over 5000 feet. Temperatures average from cool nights in the low 40s°F to hot summer days in the upper 90s°F. See National Weather Service climatology for the Albuquerque area [[http://www.srh.noaa.gov/abq/climate/march\\_abq.htm](http://www.srh.noaa.gov/abq/climate/march_abq.htm)].

Table 1.0 on page 2 includes estimates of emissions from three volatile hazardous air pollutants (VHAP) and various hydrocarbons that can be estimated from the 58.8 tons of VOC emissions reduced during the Gas Cap Exchange project <http://www.cabq.gov/airquality/pdf/gasapexchange2004.pdf>. The table describes the gasoline vapor composition from the refueling process of average normal unleaded fuel data taken from EPA-450/3-91-022a.<sup>1</sup>

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<sup>1</sup> Furey, Robert and Nagel, Bernard. Composition of Vapor Emitted from a Vehicle Gasoline Tank During Refueling. SAE Technical Paper Series #860086, February 1986.

Based on a direct weight percent the amount of Volatile Hazardous Air Pollutants account for approximately three % (3%) of the total volatile organic compound reductions as shown on the table below.

Table 1.0

<b>Volatile Hazardous Air Pollutants</b>	<b>Chemical Abstract Service Number</b>	<b>Weight Percent</b>	<b>Emission Reduction Estimate, tons</b>
Benzene	71432	0.7	0.41
N-Hexane	110543	1.1	0.65
Toluene	108883	1.0	0.59
<b>Hydrocarbons</b>	<b>Chemical Abstract Service Number</b>	<b>Weight Percent</b>	<b>Emission Reduction Estimate, tons</b>
N- Propane, Isobutane, N-Butane, Isopentane, N-Pentane	74986, 75285 106978, 78784 109660	78.6	46.22
Cis-Dimethyl Butane Trans-Dimethyl Butane	75932 79298	1.6	0.94
2-Methyl Pentane 3-Methyl Pentane	107835 96140	6.3	3.70
3,3-Dimethyl Pentane	562492	1.1	0.65
Methyl Cyclopentane	96377	1.2	0.71
Cis-2-Pentene	627203	0.6	0.35
3-Methyl Hexane	589344	0.7	0.41
Other Hydrocarbons (less than 0.5% individual weight percents)	--	7.1	4.17