

**MARICOPA COUNTY  
AIR POLLUTION CONTROL REGULATIONS  
REGULATION II – PERMITS AND FEES**

**RULE 242  
EMISSION OFFSETS GENERATED BY THE VOLUNTARY PAVING OF UNPAVED  
ROADS**

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**MARICOPA COUNTY  
AIR POLLUTION CONTROL REGULATIONS  
REGULATION II – PERMITS AND FEES**

**RULE 242**

**EMISSION OFFSETS GENERATED BY THE VOLUNTARY PAVING OF UNPAVED  
ROADS**

**SECTION 100 – GENERAL**

**101 PURPOSE:** To establish enforceable procedures for calculating emission reductions of particulate matter at 10 microns or less (PM<sub>10</sub>) created through the voluntary paving of unpaved public roads that will be used as offsets to meet New Source Review (NSR) requirements.

**102 APPLICABILITY:** This rule applies to applicants subject to NSR requirements, who need PM<sub>10</sub> offsets for the construction of new major stationary sources or major modifications to an existing major stationary source in the Maricopa County PM<sub>10</sub> non-attainment area and those same applicants who also voluntarily elect to generate emission reductions of PM<sub>10</sub> by paving unpaved public roads in the Maricopa County non-attainment area.

**SECTION 200 – DEFINITIONS:** For the purpose of this rule the following definitions shall apply:

**201 EMISSION OFFSETS –** Emission reductions that have occurred and continue to occur within the Maricopa County PM<sub>10</sub> non-attainment area, used to mitigate emission increases from new or modified major sources.

**202 ENFORCEABLE –** Offsets are enforceable if they are independently verifiable, program violations are defined, those liable can be identified, and the Administrator and the Control Officer can apply penalties and secure appropriate corrective action where applicable.

**203 PERMANENT –** Continuing or enduring for the duration of the New Source Review (NSR) obligation.

**204 QUANTIFIABLE –** Emission reductions that can be reliably and replicably measured by adhering to the quantification protocol set forth in this rule.

**205 ROADWAY SEGMENT –** A section of roadway between two definitive points, including but not limited to intersections, road ends or other demarcation points, which define a change in the roadway structure. The length of such segments shall be expressed in miles and/or fractions thereof.

**206 SURPLUS –** The amount of emission reductions from the paving of an unpaved road that are not:

**206.1** Required by federal, state, local law or the Clean Air Act; or

- 206.2 Included, required or relied upon in the existing federally approved State Implementation Plan (SIP); or
- 206.3 Included in the Agricultural Best Management Plan; or
- 206.4 Used by any source to meet any other regulatory requirement including but not limited to, at the time offsets are used, Reasonable Available Control Technology (RACT); or
- 206.5 Required by any other legal settlement or consent decree; or
- 206.6 Included in any SIP-related requirements, including but not limited to: Reasonable Further Progress (RFP), milestones, attainment demonstration, conformity regulations, emissions inventories, operating permit regulations, operating permits issued under Maricopa County or Arizona operating permit regulations, any requirement contained in any new source review permits such as Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) determinations, limitations on operations of raw materials, emission reductions used for offset or netting purposes, and assumptions used in an attainment demonstration; or
- 206.7 Subject to be included in any of the following as contained in the SIP-approved Plan or in the latest locally-adopted rules or PM plan: Rule 310.01 or Rule 310 of the Maricopa County Air Pollution Control Rules and Regulations, the resolutions listed in 40 CFR 52.120(c)(100), Arizona Revised Statutes Sections 49-457 and 49-504.4, or contingency measures.

## SECTION 300 – STANDARDS

- 301 OFFSET PLAN REQUIREMENTS:** Applicants who choose to use the provisions of this rule to meet their NSR PM<sub>10</sub> offset requirements shall submit an Offset Plan. The Offset Plan shall at a minimum contain the information specified in Sections 301.1 through 301.8.
- 301.1 A statement that the offsets will be generated from the paving of unpaved public roads identified within the Offset Plan.
  - 301.2 A statement that the unpaved road(s) will be paved according to state or local government paving standards.
  - 301.3 A list of roads that the generator has proposed for paving including their location and roadway segment identification.
  - 301.4 A copy of a letter or agreement from the appropriate state or local government stating that the public road(s):
    - a. Has been inspected;
    - b. Has been described as being either gravel- or non-gravel-surfaced;
    - c. Will be adopted into the state or local government transportation network, if not already a part of the network; and
    - d. Will be maintained.
  - 301.5 Calculations that quantify vehicle miles traveled for each roadway segment, including all supporting data from the traffic counts performed pursuant to Section 302.1.

- 301.6 Calculations that quantify emissions from each roadway segment before and after paving, including all results and supporting data from any source-specific testing performed pursuant to Section 302.2.
- 301.7 Results of any silt content testing performed on the unpaved roads according to Section 502.
- 301.8 Documentation from the local government, photos, or videos of the public roads to be paved if they are classified as “non-gravel” roads.

**302 CALCULATION METHODOLOGY:** Calculations of vehicle miles traveled and the emission(s) reductions from the voluntary paving of roads, for each roadway segment, shall be determined according to the procedures in Sections 302.1 and 302.2.

- 302.1 Vehicle Miles Traveled (VMT):** For the purpose of calculating VMT/day and VMT/year for emission reduction calculations, the applicant shall conduct two traffic counts for each roadway segment.
- a. Each traffic count shall measure vehicular traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Vehicular traffic shall be measured continuously during each 24-hour period.
  - b. The two distinct 24-hour traffic counts shall be conducted on two non-holiday weekdays.
  - c. The VMT/day and VMT/year calculations for each roadway segment shall be based on the time-weighted averages of the two separate traffic counts for that particular roadway segment.
  - d. The VMT/day shall be calculated by multiplying traffic count results by the length of the roadway segment in miles to the nearest 1/10 of a mile.
  - e. The average raw daily traffic count shall be multiplied by the daily and monthly seasonal adjustment factors for paved roads and added together for each of the 12 months to calculate the annual vehicle miles traveled. For the purpose of the rule, the adjustment factors shall be obtained from the most recent Freeway Management System data provided by the Arizona Department of Transportation.

**302.2 Emissions from Unpaved and Paved Roads:**

- a. The equations provided in Appendix A shall be used to determine the quantity of PM<sub>10</sub> emissions (in terms of lbs/VMT) emitted from each unpaved and paved road segment.
- b. The default values provided in Appendix A for silt content shall be used to calculate PM<sub>10</sub> emissions, unless the applicant provides source-specific values obtained in accordance with Section 502.
- c. The PM<sub>10</sub> emission reduction associated with paving a segment of unpaved road shall be calculated as the difference, in tons per year, between the emissions from the road in the unpaved condition and the emissions from the road in the paved condition.

**303 STANDARDS FOR APPROVING OFFSET PLANS**

- 303.1** The Control Officer will approve an Emission Offset Plan if it complies with Section 301 and demonstrates that the emission reductions are quantifiable, permanent, enforceable, and surplus.
- 303.2** The Control Officer shall issue a written approval of the Offset Plan within 90 days after receiving all of the information required by Section 301, indicating which roadway segment(s) may be paved and the amount of resulting emission offsets that may be generated for each roadway segment.
- 303.3** An approved Offset Plan shall not generate offsets from roadway segments that were paved before June 20, 2007.

**304 OFFSET PLAN COMPLETION:**

- 304.1** When the applicant has completed paving any of the roadway segment(s) specified in Section 303.2, the applicant shall submit to the Control Officer a summary report that identifies each roadway segment(s) paved, provides the date(s) paving was completed, and includes a copy of the local or state governments' report or written statement evaluating the condition of each roadway segment. If a written statement is submitted in lieu of a report, the applicant shall submit a follow up report within 30 days after the local or state government's report is available.
- 304.2** The Control Officer shall issue an approval in writing for the quantity of emission reductions actually generated, based on data submitted pursuant to Section 304.1, prior to the applicant commencing normal operations.
- 304.3** The quantity of emission reductions approved by the Control Officer pursuant to Section 304.2, may be used to meet NSR PM<sub>10</sub> offset requirements.

**305 ROAD INTEGRITY RESPONSIBILITIES:** After the paving of the roadway segment(s) identified in Section 304.1 is completed, the applicant for a period of 30 years shall:

- 305.1** At least once every two years after the initial summary report required by Subsection 304.1 is submitted obtain a copy of the local or state governments' report evaluating the condition of each roadway segment(s) identified in Section 304.1; and
- 305.2** Review the report upon receipt and determine if any roadway segment(s) identified in Section 304.1 is degraded. The roadway segment shall be considered degraded if the pavement condition score is less than 30% according to the pavement condition analysis criteria listed in the document published by the American Association of State Highway and Transportation Officials (AASHTO) entitled *Guidelines for Pavement Management Systems, July 1990*.
- 305.3** Within 60 days of receipt of the report, submit to the Control Officer a copy of the report and a statement identifying any roadway segment(s) that is degraded.

**306 OFFSET INTEGRITY RESPONSIBILITIES:**

**306.1** If pursuant to Section 305.3 any of the road segments paved and approved by the Control Officer under Section 304.2 are found to be degraded, then within 12 months of the report submittal date, the applicant shall provide replacement offsets.

**306.2** Replacement offsets may be provided by:

- a. Repaving the degraded road segment(s) identified in Section 305.3, and upon completion submit a report that includes the information specified in Section 304.1 or
- b. Generating the appropriate number of PM<sub>10</sub> offsets pursuant to Rule 242 or
- c. Generating the appropriate number of PM<sub>10</sub> offsets pursuant to Rule 204.

**307** **PROCEDURES FOR PAVING PROJECTS ALREADY COMPLETED ALREADY COMPLETED:** Notwithstanding the provisions of Section 303.3, the owner or operator of any previously permitted modifications that utilized PM<sub>10</sub> offsets generated from road paving which-occurred before June 20, 2007, may establish federal enforceability and secure federal recognition of the offsets, by complying with the following requirements:

**307.1** Submit an Offset Plan consistent with the requirements of Section 301, with the following modification to Section 301.5: the traffic counts are not required to be performed pursuant to Section 302.1

**307.2** Submit a summary report consistent with the requirements of Section 304.1

**307.3** The silt content of the unpaved road(s) used in calculating the PM<sub>10</sub> emission reductions under Section 302.2 shall be that for a gravel road, 6.2%, unless the Arizona government transportation agency responsible for the road(s) provides documentary evidence that the road(s) did not, in fact, have a gravel surface.

**307.4** Comply with Sections 305, 306 and 501.

## **SECTION 400 – ADMINISTRATIVE REQUIREMENTS (NOT APPLICABLE)**

## **SECTION 500 – MONITORING AND RECORDS**

**501** **RECORDKEEPING AND RECORDS RETENTION:** After the Control Officer has issued an approval of the emission reductions in writing, copies of the documents submitted and/or obtained pursuant to Sections 301, 303.2, 304.1, 305.1, 305.2 and 306 shall be maintained onsite for a minimum of thirty (30) years and provided to the Control Officer upon request.

**502** **TEST METHODS:** Unless the applicant uses the default silt content values provided in Appendix A, silt content of the unpaved road segments shall be determined using the sampling and laboratory analysis procedures provided in EPA's "Compilation of Air Pollutant Emission Factors," (AP-42), Fifth Edition, Volume 1, Appendix C.1. If the applicant performs any silt content analysis, or has such analysis performed on its behalf, the applicant must use the silt content determined from that analysis to calculate PM<sub>10</sub> emissions.

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**APPENDIX A**

Appendix A consists of calculations for emissions of unpaved and paved roads from the document: *AP-42, Fifth edition, Compilation of Air Pollutant Emission Factors, Volume 1, Stationary and Point Area Sources, Miscellaneous Sources, Chapter 13, December, 2003.*

**1. UNPAVED ROADS:**

- a. For the purposes of this rule, the following empirical expression shall be used to estimate the quantity in pounds (lb) of particulate emissions from publicly accessible unpaved roads, dominated by light duty vehicles, per vehicle mile traveled (VMT) is:

$$\text{Equation \#1: } E = \frac{k(s/12)^a (S/30)^d}{(M/0.5)^c} - C$$

where k, a, c, and d are empirical constants given in Table A below and

E = size-specific emission factor (lb/VMT)

s = surface material silt content (%)

M = surface material moisture content (%)

S = mean vehicle speed (mph)

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tear.

- b. The default values listed for surface material silt content, (s), in Table B shall be used in Equation 1, as applicable, unless the applicant provides source-specific values for (s) using the methods specified in Section 502.
- c. The source characteristics s, and M in this formula are referred to as correction parameters for adjusting the emission estimates to local conditions. The conversion from lb/VMT to grams (g) per vehicle kilometer traveled (VKT) is as follows:

$$\text{Equation \#2: } 1 \text{ lb/VMT} = 281.9 \text{g/VKT}$$

**TABLE A  
CONSTANTS FOR EQUATION #1 UNPAVED PUBLIC ROADS**

CONSTANT	PM-2.5	PM-10
k (lb/VMT)	0.27	1.8
a	1	1
c	0.2	0.2
d	0.5	0.5
Quality Rating	C	B

**TABLE B  
DEFAULT VALUES FOR EQUATION #1 –UNPAVED PUBLIC ROADS**

VARIABLE	DEFAULT VALUE
s (%)	6.2 % gravel road
s (%)	11 % dirt road
W	average weight of vehicle
M	1%
S	20 mph
C	0.00047 lb / VMT

**2. PAVED ROADS:**

- a. The quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road may be estimated using the following empirical expression:

$$\text{Equation \#3 } E = k (sL/2)^{0.65} (W/3)^{1.5} - C$$

where:

E = particulate emission factor (having units matching the units of k)

k = particulate size multiplier for particle size range and units of interest

sL = road surface silt loading (grams per square meter) (g/m<sup>2</sup>)

W = average weight (tons) of the vehicles traveling the road

C = emission factor for 1980s vehicle fleet exhaust, brake wear and tire wear.

- b. The particulate size multiplier (k) above varies with aerodynamic size range. To determine particulate emissions for a specific particle range, use the appropriate value of k in Table C.

**TABLE C  
PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION  
(k constant)**

SIZE RANGE	g/VKT	g/VMT	lb/ VMT
PM -2.5	1.1	1.8	0.0040
PM -10	4.6	7.3	0.016
PM -15	5.5	9.0	0.020
PM -30	24	38	0.082

**TABLE D  
DEFAULT VALUES FOR EQUATION #3 - PAVED ROADS**

VARIABLE	DEFAULT VALUE
sL(g/m <sup>2</sup> ) - public roads	0.23 grams/m <sup>2</sup>
W	3.74 tons
C	0.00047 lb/ VMT