

CHAPTER 3– YUMA PM₁₀ MAINTENANCE PLAN TSD -- CONTROLS

3.1 Controls to Reduce PM

Controls to reduce PM₁₀ emissions have been carried out in Yuma at least since the early 1990's and, no doubt, before. At present, Yuma is officially in nonattainment for PM₁₀, although a redesignation request by the Arizona Department of Environmental Quality is underway. As part of this redesignation an emissions and air quality modeling analysis was conducted, with 1999 as the base year and 2016 as the future year. To be eligible for attainment status, Yuma had to have no violations in the ambient monitoring record for 2002, 2003, and 2004 (there were none, nor were there any in 2005). Also, a demonstration that PM₁₀ concentrations would remain within standards by 2016 was necessary (this was part of the technical analysis).

This chapter documents specific controls to reduce PM₁₀ emissions in Yuma after the base year of 1999 and through 2016. The controls consist of a variety of projects such as paving unpaved roads and parking lots, watering unpaved roads, chemically stabilizing unpaved roads, and controlling access to the canal roads. A complete list of such projects is given below.

- Paving unpaved roads
- Watering unpaved roads
- Chemically stabilizing unpaved roads
- Installing curbs and sidewalks
- Paving alleys
- Street sweeping
- Applying magnesium chloride to unpaved roads
- Reducing unauthorized traffic on canal roads by barricades, signs, and patrolling
- Reducing authorized traffic on canal roads by stocking fish, pipelining
- Controlling dust on open areas with vehicular traffic

PM₁₀ emissions reduced through these projects have been calculated with standard emission factors and estimates of vehicular traffic. The average annual reduction from these projects in 2000 through 2004 was 1466 tons, eight percent of the annual anthropogenic total.

In this accounting, emission reductions are not carried over from year to year. For example, an unpaved road being paved in one year gets emission reduction credit for that year only, not the years after completion of the project. Some of the larger reductions in 2000 and 2001 were unpaved road and unpaved shoulder watering by Somerton (1532 and 2188 tons, respectively). Paving unpaved roads by the City of Yuma in 2000 and 2001 accounts for 42 and 218 tons, respectively. Of the 104 projects reported, the average emission reduction was 75 tons, but the size varied from 0.02 to 1247 tons. Table 3-1 gives the emission reductions of PM₁₀ for each governmental entity for 2000 through 2004.

Agency	2000	2001	2002	2003	2004
City of Yuma	114	430	103	111	109
City of Somerton	584	677	996	1393	1376
Yuma County	27	351	55	254	19
Yuma County Water Users	99	107	85	198	203
Marine Corps Air Station	0.06	0.02	0.00	2.80	2.70
Immigration/Naturalization	7	7	7	7	7
Total	831	1571	1247	1966	1717

The future year reductions from these dust control projects are assumed to be the average of 2000 – 2004, which is 1466 tons per year. Figure 3-1 and Table 3-2 show what contribution each type of project made to the total reduction of emissions.

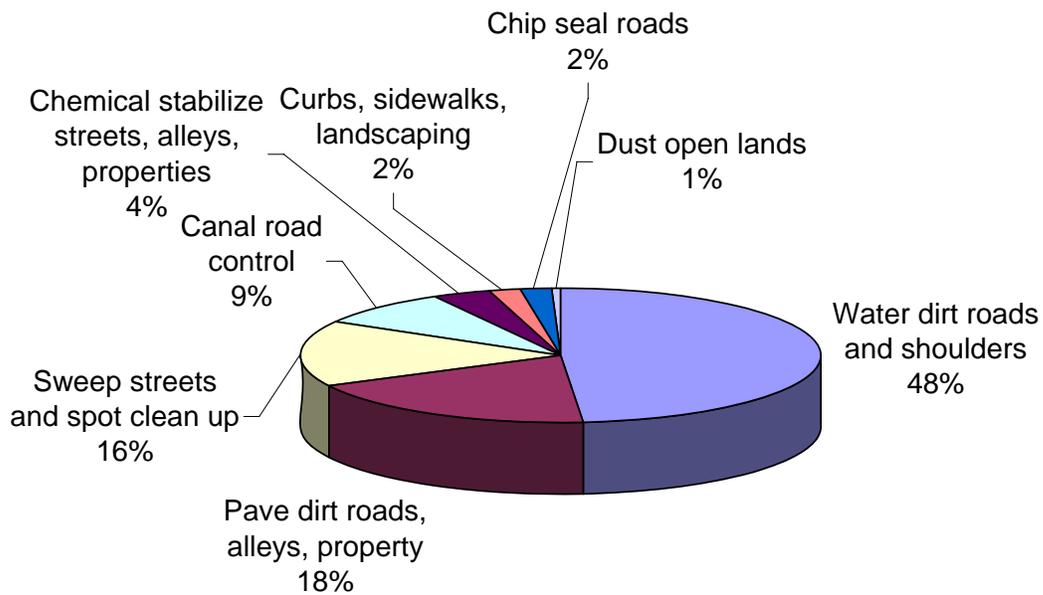


Figure 3-1. PM₁₀ Emission Reductions by Project Type

Type of Project	Tons/Yr
Water Dirt Roads and Shoulders	3808
Pave Dirt Roads, Alleys, Property	1476
Sweep Streets and Spot Clean Up	1242
Canal Road Control	672
Chemical Stabilize Streets, Alleys, Properties	288
Curbs, Sidewalks, Landscaping	159
Chip Seal Roads	134
Control Dust on Open Lands	52

To put these numbers into context, it is useful to consult the inventory. All of these measures except the last one concern PM₁₀ emissions from unpaved roads, unpaved shoulders, and paved roads. PM₁₀ emissions from paved and unpaved roads amount to about 13,000 tons per year, meaning that on an annual basis, the paving and stabilization measures carried out in Table 3-1 are providing an emission reduction in the PM₁₀ from roadways of about 12%. Except for the emission factors, these reductions are estimates calculated independent of the inventory. Although their values may better be viewed more qualitatively than quantitatively, however they are viewed, their impact is substantial.

Another fruitful way to understand these emission reductions is to compare them with the progress made from 1991, the year of the first nonattainment area plan, through 1999. This comparison is given by project type in Table 3-3 and shows that the rate of progress in 2000-2004 is nearly twice that of the earlier period.

Project Type	1991-99	2000-04
Paving & Chip Seal Unpaved Roads	618	322
Watering Unpaved Roads	248	762
Open Burning	195	371
Street & Runway Sweeping	3	248
Canal Roads Control	8	134
Chemically Stabilize Unpaved Roads	9	58
Dust Control On Construction Projects	4	5
Dust Control On Open Land	0	10
Stabilizing Unpaved Lots	0	2
Overall Reduction (TPY)	1,085	1,913

A complete list of the emission reduction projects in 2000 – 2004 is given in Table 3-4.

Table 3-4. 2000-2004 Yuma Area Implemented Control Measures and PM₁₀ Emission Reductions (Tons per Year)

Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
City of Yuma	Pave unpaved roads	2000	42	5.74 mi				
		2001	21.8		2.98 mi			
	Pave unpaved alleys	2000	3.5	0.83 mi				
		2001	3.5		0.83 mi			
	Paving unpaved vacant land		1.1				6835 sq yds	
	Chemically stabilize Unpaved roads	2001	4.1		1.0 mi			
		2002						
		2003	19.5				44287 yds	
		2004	39.0					88575 yds
	Watering shoulder	2001	6.3		5436' of 8' shoulder			
	Street sweeping Paved roads	2000	64	17128 mi				
		2001	64		171218 mi			
		2002	64			17128 mi		
		2003	64				17128 mi	
		2004	64					17128mi
		2005	64	17128 mi				
	Install curbs & sidewalks	2000	8	0.63 mi				
		2001	122		10.14 mi			
	Landscaping median	2000	0	5.74 mi				
	Magnesium chloride on Alleys	2003	3.8				87930 sq yds	
								87930 sq yds
						63852 sq yds		
City property	2003	1.9				63852 sq yds		
	2004	1.9					63852	

Table 3-4. 2000-2004 Yuma Area Implemented Control Measures and PM₁₀ Emission Reductions (Tons per Year)

Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
								sq yds
City of Somerton	Water unpaved roads	2000	511	400 mi				
		2001	511		400 mi			
		2002	None repth					
		2003	1247			1211 mi		
		2004	1247					1211 mi
	Water unpaved Shoulders	2000	0.1	1820 mi				
		2001	0.1		1820 mi			
	Street sweeping	2000	66.5	1376 mi				
		2001	158.8		3286 mi			
		2002	139.6			2888 mi		
		2003	128.7				2662 mi	
		2004	123.1					2548 mi
		2005	141.0	2918 mi				
	Pave unpaved roads	2002	830			4.5 mi		
	Weekly cleanup of paved roads, mud, trackout, spills	2000	3.6	52				
		2001	3.6		52			
		2002	3.6			52		
		2003	3.6				52	
		2004	3.6					52
	Pave unpaved lots(ft2)	2002	6.41			505,440		
	Install curbs (mi)	2002	5.5			0.5 mi		
	Landscape shoulders (mi)	2002	11.0			1.0 mi		
		2003	13.7				1.25 mi	
	2004	2.7					0.25 mi	

Table 3-4. 2000-2004 Yuma Area Implemented Control Measures and PM₁₀ Emission Reductions (Tons per Year)

Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
Yuma County	Paved unpaved roads	2000	73.58	1.0 mi				
		2001	73.58		1.0 mi			
		2002	73.58			1.0 mi		
		2003	73.58				1.0 mi	
		2004	73.58					1.0 mi
	Developers add new paved	2000	883	12.0 mi				
	Roads	2001	883		12.0 mi			
		2002	883			12.0 mi		
		2003	883				12.0 mi	
		2004	883					12.0 mi
	Chip/sealed unpaved rods	2001	138		0.75 mi			
	Magnesium chloride on							
	Unpaved roads	2000	17	56.2 mi				
		2001	17		56.2 mi			
		2002	18			56.7 mi		
		2003	17					
		2004	19					64 mi
	Street Sweeping	2000	10		100 mi			
		2001	23			200 mi		
		2002	36				300 mi	
	2003	23					200 mi	
	2004	19						175 mi
Immigration and Naturalization Service	Water drag roads	2000	7.1	18 mi				
		2001	7.1		18. mi			
		2002	7.1			18 mi		
		2003	7.1				18 mi	
		2004	7.1					18 mi
Yuma County Water Users Association	Stock 8,420 white	2000	3.35	Restock				
		2001	3.35		Restock			

Table 3-4. 2000-2004 Yuma Area Implemented Control Measures and PM ₁₀ Emission Reductions (Tons per Year)								
Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
	amur fish/year	2002	3.35			Restock		
		2003	3.35				Restock	
		2004	3.35					Restock
	Pipelined 1 mile	2000	4.0	2 mi				
		2002	1.6			0.8 mi		
		2003	1.0				0.5 mi	
	Maintain 350 "No Trespassing" signs & 50 barricades	2000	10	Enforcement				
		2001	10		Enforcement			
	Patrol & water unpaved canal roads	2000	82	400 mi				
			2001	82		400 mi		
			2002	82			400 mi	
		2003	82				400 mi	
		2004	82					400 mi
	3 mi posted/barricaded	2001	4.2		3 mi			
	Paved 2.5 mi			5.0		2.5 mi		
	1.5 mi fenced off			2.1		1.5 mi		
Abandoned 3/8 mi	2003		1.3				2.6	
Lined 8 mi of canal	2004		8.9					17.8
N. Gila Irrigation District	20 miles posted	1999	0					
Unit B Irrigation District	3 mi posted/barricaded	1999	0					

Table 3-4. 2000-2004 Yuma Area Implemented Control Measures and PM₁₀ Emission Reductions (Tons per Year)								
Agency	Projects	Year	Tons	2000	2001	2002	2003	2004
Bureau of Reclamation	Water 960 miles of canal banks	2003	108				960 mi	
		2004	108					960 mi
Marine Corps Air Station	Remove 26 gas Vehicles	2000	0.06	0.06				
	Remove 15 gas Scooters	2001	0.02		0.02			
	Pave 1403299 ft2 roadway		1.4				70165 ft2	
			1.4					70165 ft2
	Pave 102112 ftparking	half in 2003	0.2				0.2	0.2
		half in 2004	0.2					
	Sweeping 717,221 yd2 runway							
	Sweeping 388,952 yd2 taxiway							
	Sweeping 401,090 yd2 aprons and 121,380 yd2 other							
	Sweeping Totals		1.1/Year					
Stabilize desert	0.1			25,726 ft2			2,533,500 ft ²	
Total TONS				3604	3495	2866	2293	3384

The other type of control measure being considered in the PM₁₀ Maintenance Plan is called a contingency measure. These measures are invoked if PM₁₀ concentrations exceed 95% of the standards: that is, if the 24-hour average is 143 µg/m³ or greater; and the annual average is 48 µg/m³ or greater. Three such measures are given in Table 3-5, along with their annual PM₁₀ emission reductions. These measures are particularly well suited as contingencies, as the agencies involved would be able to accelerate their paving and stabilizing above their normal rate.

Contingency Measure	Details	Tons/Year
Pave unpaved roads	City of Yuma: 0.44 mile/year City of Somerton: 0.1 mile/year Yuma County: 1.0 mile/year	78.7*
Chemically stabilize unpaved roads twice a year	City of Yuma: 10 miles City of Somerton: 30 miles Yuma County: 60 miles	2,555
Adopt 20% opacity rule for fugitive dust	All road and building construction sites in the nonattainment area	149
Total		2,783

* For each paved mile with 500 vehicles per day

3.2 Effect of Controls on PM₁₀ Concentrations

In the construction of the emissions inventory for 2016, Pechan, the contractor, relied on the best estimates of community growth, of emission factor change, and of committed control measures. For example, unpaved road vehicle miles traveled was figured to decline from 98,000 miles per day in 1999 to 64,000 in 2016. These future estimates of PM₁₀ emissions were used in the air quality modeling for 2016 to predict future concentrations. As shown in Table 2-23, the ISC model predictions for 2016 are on average 24% lower than the 1999 concentrations (the 2016/1999 average ratio was 0.76). The future concentrations reflect the degree of PM₁₀ emission controls from paving but not from other activities such as watering, chemical stabilization, and so forth. Excluding these reductions from the air quality modeling for 2016 introduces an element of conservatism in its estimates. Had they been included, then the estimated future concentrations would have been even lower.