

Draft
Summary of Selected Control Measure Impacts
On Stagnation Design Day Concentration at Cowtown Monitor
10/29/2008

Emission Source Category/Control Measure	Design Day		Control Measure Reduction ($\mu\text{g}/\text{m}^3$)	Percent of Total Control Measure Reductions
	Share	Concentration ($\mu\text{g}/\text{m}^3$)		
Design Day Concentration	100%	188.8	-	-
Non-Anthropogenic Background	6.1%	11.5	-	-
Anthropogenic Emission Sources	93.9%	177.3	-	-
CAFOs	79.6%	141.0	-	-
Concrete Aprons in Pens Approaching Feed Bunks			14.1	36.2%
More Frequent Manure Removal			12.7	32.6%
Raise Moisture Content of Feed			0.6	1.5%
Unpaved Ag Roads	5.4%	9.5	-	-
Once/Year Application of Ligno 10 Palliative to All Roads			2.1	5.4%
Unpaved Public Roads	8.6%	15.2	-	-
10 mph Reduction All Roads With Speeds Exceeding 25 mph – Low Mixing Height Hrs			2.5	6.4%
Pave 9 miles			7.0	17.9%
Paved Roads	2.0%	3.5	-	-
No Controls			-	%
Other	4.5%	8.0	-	-
No Controls			-	-
Total Control Measure Reductions			39.0	100.%
Design Day with Control Measure Benefits		149.8	-	-

Summary of Benefits for Alternate Palliative Applications to Public Unpaved Roads on Modeled PM10 Concentrations at CWT on October 29, 2008											
Stagnation Design Day (188.8µg/m³)											
Control Measures	Control Efficiency	Modeled Concentration After Control (µg/m ³)				Modeled Control Benefit (%)				Total Control Measure Reduction (µg/m ³) All Public Roads	Modeled Design Day Concentration (µg/m ³)
		Public Dirt A	Public Dirt B	Public Dirt C	Public Dirt D	Public Dirt A	Public Dirt B	Public Dirt C	Public Dirt D		
Baseline Modeled Concentration		0	0	12.5	2.8					15.2	188.8
Palliatives Apply to all Public Roads											
Application of Dust Palliatives Once Per Year:											
Soil Sement	58.30%	0.0	0.0	5.2	1.1	58.3%	0.0%	58.3%	58.3%	8.9	179.9
Coherex	35.20%	0.0	0.0	8.1	1.8	35.2%	0.0%	35.2%	35.2%	5.3	183.5
Ligno 10	21.90%	0.0	0.0	9.7	2.2	21.9%	0.0%	21.9%	21.9%	3.3	185.5
Road Oyl	39.30%	0.0	0.0	7.6	1.7	39.3%	0.0%	39.3%	39.3%	6.0	182.8
Application of Dust Palliatives Four Times Per Year:											
Soil Sement	91.80%	0.0	0.0	1.0	0.2	91.8%	0.0%	91.8%	91.8%	14.0	174.8
Coherex	82.00%	0.0	0.0	2.2	0.5	82.0%	0.0%	82.0%	82.0%	12.5	176.3
Ligno 10	67.30%	0.0	0.0	4.1	0.9	67.3%	0.0%	67.3%	67.3%	10.2	178.6
Road Oyl	91.60%	0.0	0.0	1.0	0.2	91.6%	0.0%	91.6%	91.6%	13.9	174.9
Palliatives Apply to 10% Public Roads											
Application of Dust Palliatives Once Per Year:											
Soil Sement	58.30%	0.0	0.0	11.7	2.6	5.8%	0.0%	5.8%	5.8%	0.9	187.9
Coherex	35.20%	0.0	0.0	12.0	2.7	3.5%	0.0%	3.5%	3.5%	0.5	188.3
Ligno 10	21.90%	0.0	0.0	12.2	2.7	2.2%	0.0%	2.2%	2.2%	0.3	188.5
Road Oyl	39.30%	0.0	0.0	12.0	2.6	3.9%	0.0%	3.9%	3.9%	0.6	188.2
Application of Dust Palliatives Four Times Per Year:											
Soil Sement	91.80%	0.0	0.0	11.3	2.5	9.2%	0.0%	9.2%	9.2%	1.4	187.4
Coherex	82.00%	0.0	0.0	11.4	2.5	8.2%	0.0%	8.2%	8.2%	1.2	187.6
Ligno 10	67.30%	0.0	0.0	11.6	2.6	6.7%	0.0%	6.7%	6.7%	1.0	187.8
Road Oyl	91.60%	0.0	0.0	11.3	2.5	9.2%	0.0%	9.2%	9.2%	1.4	187.4
Palliatives Apply to 25% Public Roads											
Application of Dust Palliatives Once Per Year:											
Soil Sement	58.30%	0.0	0.0	10.6	2.4	14.6%	0.0%	14.6%	14.6%	2.2	186.6
Coherex	35.20%	0.0	0.0	11.4	2.5	8.8%	0.0%	8.8%	8.8%	1.3	187.5
Ligno 10	21.90%	0.0	0.0	11.8	2.6	5.5%	0.0%	5.5%	5.5%	0.8	188.0
Road Oyl	39.30%	0.0	0.0	11.2	2.5	9.8%	0.0%	9.8%	9.8%	1.5	187.3
Application of Dust Palliatives Four Times Per Year:											
Soil Sement	91.80%	0.0	0.0	9.6	2.1	23.0%	0.0%	23.0%	23.0%	3.5	185.3
Coherex	82.00%	0.0	0.0	9.9	2.2	20.5%	0.0%	20.5%	20.5%	3.1	185.7
Ligno 10	67.30%	0.0	0.0	10.4	2.3	16.8%	0.0%	16.8%	16.8%	2.5	186.3
Road Oyl	91.60%	0.0	0.0	9.6	2.1	22.9%	0.0%	22.9%	22.9%	3.5	185.3
Palliatives Apply to 50% Public Roads											
Application of Dust Palliatives Once Per Year:											
Soil Sement	58.30%	0.0	0.0	8.8	2.0	29.2%	0.0%	29.2%	29.2%	4.4	184.4
Coherex	35.20%	0.0	0.0	10.3	2.3	17.6%	0.0%	17.6%	17.6%	2.7	186.1
Ligno 10	21.90%	0.0	0.0	11.1	2.5	11.0%	0.0%	11.0%	11.0%	1.6	187.2
Road Oyl	39.30%	0.0	0.0	10.0	2.2	19.7%	0.0%	19.7%	19.7%	3.0	185.8
Application of Dust Palliatives Four Times Per Year:											
Soil Sement	91.80%	0.0	0.0	6.7	1.5	45.9%	0.0%	45.9%	45.9%	7.0	181.8
Coherex	82.00%	0.0	0.0	7.4	1.6	41.0%	0.0%	41.0%	41.0%	6.2	182.6
Ligno 10	67.30%	0.0	0.0	8.3	1.8	33.7%	0.0%	33.7%	33.7%	5.1	183.7
Road Oyl	91.60%	0.0	0.0	6.8	1.5	45.8%	0.0%	45.8%	45.8%	6.9	181.9

**Summary of Benefits of Paving Alternate Miles of Public Unpaved Roads on Modeled PM10 Concentrations at CWT on October 29, 2008 Stagnation Design Day
(188.8 µg/m3)**

Control Measures	Control Efficiency	Modeled Concentration After Control (µg/m3)				Modeled Control Benefit (%)				Total Control Measure Reduction (µg/m3)	Modeled Design Day Concentration (µg/m3)
		Public Dirt A	Public Dirt B	Public Dirt C	Public Dirt D	Public Dirt A	Public Dirt B	Public Dirt C	Public Dirt D	All Public Roads	
Baseline Modeled Concentration		0	0	12.5	2.8					15.2	188.8
Total Miles in the Domain		1.6	1	8	5.7					16.3	
Paving 5 miles (no priority, on All roads)	99%	0.0	0.0	8.7	1.9	30.4%	0.0%	30.4%	30.4%	4.6	184.2
Paving 10 miles (no priority, on All roads)	99%	0.0	0.0	4.9	1.1	60.9%	0.0%	60.9%	60.9%	9.2	179.6
Paving 20 Miles	99%	0.0	0.0	0.1	0.0	99.0%	0.0%	99.0%	99.0%	15.0	173.8

Summary of Benefits for Unpaved Road Speed Reduction on Modeled PM10 Concentrations at CWT on October 29, 2008 Stagnation Design Day All Hours				
Speed Category	Speeds (mph)	Unpaved Road Impact at Monitor ($\mu\text{g}/\text{m}^3$)	Modeled Reduction (%)	Modeled Concentration ($\mu\text{g}/\text{m}^3$)
Public A				
Base Speed	20	0.0	-	188.8
Reduced Speeds	15	0.0	13.40%	188.8
Public B				
Base Speed	25	0.0	-	188.8
Reduced Speeds	20	0.0	0.00%	188.8
	15	0.0	0.00%	188.8
Public C				
Base Speed	30	12.5	-	188.8
Reduced Speeds	25	11.4	8.72%	187.7
	20	10.2	18.36%	186.5
	15	8.8	29.30%	185.1
Public D				
Base Speed	35	2.8	-	188.8
Reduced Speeds	30	2.6	7.42%	188.6
	25	2.3	15.49%	188.4
	20	2.1	24.42%	188.1
	15	1.8	34.55%	187.8

Summary of Benefits for Unpaved Road Speed Reduction on Modeled PM10 Concentrations at PCH on October 29, 2008 Stagnation Design Day Low Mixing Height Hours				
Speed Category	Speeds (mph)	Unpaved Road Impact at Monitor ($\mu\text{g}/\text{m}^3$)	Modeled Reduction (%)	Modeled Concentration ($\mu\text{g}/\text{m}^3$)
Public A				
Base Speed	20	0.0	-	188.8
Reduced Speeds	15	0.0	12.84%	188.8
Public B				
Base Speed	25	0.0	-	188.8
Reduced Speeds	20	0.0	0.00%	188.8
	15	0.0	0.00%	188.8
Public C				
Base Speed	30	12.5	-	188.8
Reduced Speeds	25	11.5	7.82%	187.8
	20	10.4	16.46%	186.7
	15	9.2	26.27%	185.5
Public D				
Base Speed	35	2.8	-	188.8
Reduced Speeds	30	2.6	6.00%	188.6
	25	2.4	13.77%	188.4
	20	2.2	21.71%	188.2
	15	1.9	30.72%	188.0

**Impact of Non Cropland (Unpaved Ag Road) Controls on Modeled Concentrations at CWT on October 29, 2008 Design Day* for Stagnation Conditions
(188.8µg/m3)**

Control Measures	Control Efficiency	Modeled Concentration After Control (µg/m3)	Modeled Control Benefit (%)	Total Control Measure Reduction (µg/m3)	Modeled Design Day Concentration (µg/m3)	Cost Effectiveness (\$/ton)
Ag Road Portion of Design Day Concentration (µg/m3)		9.5			188.8	
Application of Dust Palliatives Four Times Per Year: Road Oyl**	91.60%	0.8	91.60%	8.7	180.1	3,995
Application of Dust Palliatives Once Per Year: Soil Segment**	58.30%	4.0	58.30%	5.5	183.3	2,138
Application of Dust Palliatives Once Per Year: Ligno 10**	21.90%	7.4	21.90%	2.1	186.7	769
Access Restriction	2.00%	9.3	2.00%	0.2	188.6	
Watering	72.00%	2.7	72.00%	6.8	182.0	

**Cost-Effectiveness of Selected PM10 Control Measures, prepared for Maricopa County Department of Transportation by Sierra Research, June 30, 2006

62.8 miles of unpaved ag roads in modeling domain

**Impact of Tillage/Harvesting Controls on Modeling Concentrations at CWT on October 29, 2008 Stagnation Design Day
(188.8µg/m3)***

Control Measures	Control Efficiency	Modeled Concentration After Control	Modeled Control Benefit (%)	Total Control Measure Reduction (µg/m3)	Modeled Design Day Concentration (µg/m3)
Baseline Modeled Concentration				141	188.8
Concrete aprons in pens approaching feed bunks	10%	126.9	10%	14.1	174.7
Add moisture to pen area via sprinkling	56%	62.0	56%	79.0	109.8
More frequent manure removal	10%	126.9	10%	14.1	174.7
Raise moisture content of feed	10%	126.9	10%	14.1	174.7
Apply fibrous layer in pens	10%	126.9	10%	14.1	174.7
Concrete aprons in pens approaching feed bunks	7.5%	130.4	7.5%	10.6	178.2
Add moisture to pen area via sprinkling	42.0%	81.8	42.0%	59.2	129.6
More frequent manure removal	7.5%	130.4	7.5%	10.6	178.2
Raise moisture content of feed	0.5%	140.3	0.5%	0.7	188.1
Apply fibrous layer in pens	7.5%	130.4	7.5%	10.6	178.2