EMISSIONS REDUCTION ESTIMATES

Introduction

For more traditional air pollution sources, such as automobiles, emissions reductions are calculated by multiplying the baseline emissions by the effectiveness of a given control technology (e.g., catalytic converter). For non-traditional air pollution sources, such as fugitive dust, emissions reductions calculations are more difficult because the level of control necessary to comply will vary greatly due to site-specific conditions. For example, a construction site adjacent to the coast may need to apply less water to a grading project when compared to a site in a more arid, inland area. Moreover, a private landfill with limited vehicular activity may decide to apply chemical stabilizers to control paved road track-out whereas a high-activity public landfill may decide to pave the access road. Accordingly, it is not possible to quantify total emissions reductions from implementation of the rule amendments using traditional methodologies. Instead, it is feasible to develop multiple likely scenarios and then calculate a range of possible emissions reductions associated with implementation of the rule amendments.

The approach taken uses three key parameters: (1) a control effectiveness, (2) a relevancy factor, and (3) a usage factor. The control effectiveness is the estimated efficiency of each rule requirement in reducing PM_{10} emissions and is based on EPA guidance documents and demonstration projects. The relevancy factor is the extent to which rule requirements will apply to a given source category (in percent). For example, a relevancy factor of 50 for unpaved roads means that 50 percent of all identified unpaved roads will be subject to proposed rule requirements. The usage factor is the estimated level of usage of a particular rule requirement for a specific PM_{10} emission source category (e.g., unpaved roads) when multiple compliance options exist. For example, a usage factor of 40 for a control option (such as chemical stabilization) for a specific source group (such as unpaved roads) means that 40 percent of the relevant unpaved roads will be treated with chemical stabilizers, as opposed to other methods (e.g., paving, vehicular speed reductions). When the usage factor is 100, there are no compliance options.

Based on this methodology, the emissions reductions estimate for each proposed rule requirement and corresponding source category, is simply the product of total emissions (based on the post-Rule 403 emissions inventory), the relevancy factor, the usage factor, and the control effectiveness. By varying each of the key parameters, a range of emissions reductions are obtained (see Tables 1 and 2). The total emissions reductions for each scenario (e.g. low, medium or high) is then the sum of the emissions reductions as calculated for each emissions source category. The emissions reduction methodology

for each of the PAR 403 requirements is presented first and is followed by an estimate of the emissions reductions associated with each of the PR 1186 requirements.

PAR 403 (ASSUMPTIONS)

BCM 1a: Minimal Track-Out -- (d)(5)/Table 3[1]

Control Effectiveness

There are four control options for minimizing track-out from unpaved access connections: paving, chemical stabilization, installation of a track-out control device, and street cleaning. The intent of this requirement is to eliminate all track-out of material from unpaved access connections to paved public roadways. The control effectiveness could be 100; however, recognizing that these control options will not eliminate all unpaved road track-out, the overall efficiency is estimated at 90. Calculations are also provided for a low-value estimate of 85 and a high-value estimate of 95.

Relevancy Factor

EPA guidance indicates that 46 percent of paved road deposition is attributable to mud and dirt carryout (U.S. EPA, 1988). The relevancy factor is, however, estimated at 43 percent with the remaining 3 percent allocated to track-out from unpaved road shoulders (see discussion under PR 1186, BCM 1d/e: Curb & Gutter/Road Shoulder). Many permanent facilities (e.g., landfills, aggregate operations) presently implement minimal track-out control procedures; however, many temporary facilities (e.g., construction sites) do not. Recognizing that there will be no emissions reductions from facilities that presently implement minimal track-out procedures, the relevancy factor must be reduced by 60 percent. This translates into a relevancy factor of 17.

Usage Factor

The usage factor varies for the four control options. For paving, the usage factor is 20 percent due to the high cost of paving. It is also estimated that chemical stabilization would be used on 40 percent of unpaved access connections due its effectiveness on roads subject to heavy-duty vehicular travel. It is further estimated that track-out control devices would be used on 30 percent of unpaved access connections, and that track-out from the remaining 10 percent of the unpaved access connections would be subject to street cleaning.

[1] Refers to sections of PAR 403

BCM 2: Wider Use of Plans - (e)

Control Effectiveness

Rule 403 presently contains special requirements for construction activities that qualify as large operations (i.e., more than 100 acres of disturbed surfaces or more than 10,000 cubic yards of earth-movement on at least three days per year). Specifically, Rule 403 provides large operations with two compliance options: 1) submit a plan which identifies reasonably available control measures, or 2) agree to implement the Rule 403 Table 1 and 2 control actions and conduct recordkeeping. The Rule 403 Staff Report (SCAQMD, 1992) estimated that all of the proposed amendments, including the special requirements for large operations, would result in a 13 percent reduction in emissions from construction activities. Based on the emissions reductions contained in the Rule 403 Staff Report, the additional emission reductions from wider use of plans is estimated to range from 2 to 12 percent. A mid-range control effectiveness of 6, a low value of 2, and a high value of 12 is provided in this analysis.

Relevancy Factor

It is estimated that 20 percent of the total estimated construction acreage in 1993 represents projects that would be reclassified as large operations under the revised threshold definition. It is further estimated that 20 percent of these projects already implement the Rule 403 Table 1 and 2 control actions to obtain an exemption from the visible emissions requirements of the Rule. In addition, it is presumed that 60 percent of the remaining projects would elect to implement the Table 1 and 2 control actions. Combining these two estimates results in a relevancy factor of 12 for this control measure (.2 x .6 = 12%).

Usage Factor

The usage factor is 100 because all of the construction projects meeting the revised threshold definition would be required to either submit a plan or implement the Table 1 and 2 control actions.

BCM 4: Agricultural Activities - (h)(1)(B)

Control Effectiveness

The intent of this control measure is to reduce PM_{10} emissions from agricultural operations through implementation of soil erosion control plans that would be approved by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). Model soil erosion control plans are currently being developed by the NRCS and will not be available until early 1997. Based on consultations between the air districts and NRCS staff involved in soil erosion control plan development, the intent is

to reduce emissions from agricultural tilling and windblown emissions from agricultural lands. District Rule 403.1 (adopted January 1993) is applicable only in the Coachella Valley and prohibits agricultural tilling when wind speeds exceed 25 miles per hour. The Rule 403.1 Staff Report (SCAQMD, 1993) estimated that this requirement would reduce agricultural tilling emissions by 3 percent. Accordingly, the control effectiveness of this control measure is estimated at 3 and a low value of 1 and a high value of 5 have been included in this analysis. U.S. EPA guidance indicates that natural vegetative cover is the most effective and economical method to control wind erosion until a permanent crop is started. U.S. EPA guidance further estimates that this method could deflect from 5 to 99 percent of the direct wind force from the soil surface (U.S. EPA, 1992). A mid-value control effectiveness of 52, a low value of 25, and a high value of 75 have been included in this analysis. The cost-effectiveness calculation is, however, based on the low range estimate due to uncertainties in the soil conservation plan requirements.

Relevancy Factor

The relevancy factor for agricultural activities is estimated at 80 because submittal of a soil erosion control plan would be optional to maintain the exemption from Rule 403 and because some growers are presumed to presently implement equivalent soil erosion control plan procedures.

Usage Factor

The usage factor for this control measure is 100 because there are no options other than plan submittal and implementation.

BCM 6: RACM to BACM Upgrades (Tables 1 and 2/Rule 403 Implementation Handbook)

Control Effectiveness

The BACM upgrades to the Implementation Handbook consist almost entirely of increased watering. For example, measure A-1 requires application of sufficient water to prevent visible emissions from extending more than 100 feet from active earth-moving areas. The Rule 403 Table 1 and 2 BACM upgrades also consist primarily of increased watering. For example, the Table 2 control measure for unpaved roads requires an increase in watering from 3 to 4 times per day. Presuming that, on average, the upgrades represent a 25 percent increase in watering and watering represents a 50 percent decrease in emissions, the control efficiency of the BACM upgrades is estimated at 12. Calculations are also provided for a low value of 10 and a high value of 15.

Relevancy Factor

Not all portions of construction sites lend themselves to increased watering. For example, steep slopes, building foundations, and landscaped areas will not be subject to watering. Presuming that 20 percent of active construction sites contain areas where watering is not feasible, the relevancy factor is estimated at 80.

Usage Factor

For construction activities, the usage factor is 100 because increased watering is the only available control action.

PR 1186[2]

BCM 1b: Routine Street Cleaning (d)(2)

Control Effectiveness

Previous studies have documented that routine street sweeping is not effective in reducing ambient PM_{10} concentrations and, in fact, broom sweepers resuspend as many particles as they remove (Chow, et al., 1989). A recent study, however, documented that vacuum-based, PM_{10}-efficient street sweepers represented an 80-percent reduction in resuspended PM_{10} emissions compared with mechanical broom sweepers. The study also documented that these PM_{10}-efficient street sweepers removed 99 percent of street surface silt loading (CE-CERT, 1995). Together, the reduction in resuspended emissions and improved collection efficiency of PM_{10}-efficient street sweepers is estimated to result in a control effectiveness of 79 percent on the day of street sweeping (.99 x .80 = 79%). Presuming that street silt loading returns to equilibrium 3 days after they are cleaned, the control effectiveness for days 2 and 3 is estimated at 53 and 26 percent, respectively (based on a linear interpolation). If street sweeping occurs an average of twice per month (24 days/year) the overall control effectiveness of the measure is estimated at 10 [(.79 x 24 + .53 x 24 + .26 x 24)/365 = .10]. A low control effectiveness value of 5 and a high value of 15 are also included in this analysis.

Relevancy Factor

Street sweeping is not routinely conducted on freeways due to safety considerations. Accordingly, the relevancy factor for routine street sweeping is estimated as the percentage of PM_{10} emissions generated from non-freeway roadways within the District. Based on 1993 data, an average of 70 percent of the District's entrained road dust PM_{10} emissions are from local, collector, and major streets. Unlike the requirements for

[2] Refers to sections of PR 1186

minimal track-out, the relevancy factor does not need to be adjusted because the measure attempts to reduce silt loadings regardless of their origin. The resulting relevancy factor is 70.

Usage Factor

For routine street sweeping requirements, the usage factor is 100 because routine street cleaning is the only available option.

BCM 1c: Post-Event Cleaning (d)(1)

Control Effectiveness

Based on the information presented for the routine street cleaning measure, the control effectiveness of the post-event cleaning measure is estimated at 79 percent. This is based on use of a PM_{10}-efficient street sweeper for final street cleaning (presumes that heavy equipment is presently used for larger accumulations and not as a result of this control measure). A high control-effectiveness value of 85 and a low value of 70 have also been included in this analysis.

Relevancy Factor

U.S. EPA guidance indicates that 9 percent of paved road deposition is attributable to erosion from adjacent areas (U.S. EPA, 1988). In the absence of other information regarding post-event street loadings, the relevancy factor for this control measure is estimated at 9.

Usage Factor

The usage factor is 100 because street cleaning is the only option available to comply with the intent of the control measure.

BCM 1d/e: Curb and Gutter/Chemical Stabilization (e)(1)

Control Effectiveness

Limited research has been conducted regarding the effectiveness of curb and gutter or road shoulder improvements (e.g., chemical stabilization/asphaltic road base) in reducing paved road silt loading. Dust loadings for streets with uncurbed shoulders were, however, estimated to be four times greater than that observed for curbed streets (U.S. EPA, 1992). Accordingly, the control effectiveness of these measures is estimated at 75. A high value of 80 and a low value of 70 have also been included in this analysis.

Relevancy Factor

These proposed control measures attempt to prevent material from being tracked from unpaved road shoulders onto paved public roadways. U.S. EPA guidance estimates that 46 percent of paved road deposition is attributable to mud and dirt carryout (U.S. EPA, 1988). As discussed under the Rule 403 requirements for minimal track-out, 43 percent of the paved road silt loadings have been attributed to track-out from unpaved roads or unpaved access connections and the remaining 3 percent are assigned to vehicular erosion from unpaved road shoulders. The resulting relevancy factor is estimated at 3.

Usage Factor

The usage factor for chemical stabilization is estimated at 10 and asphaltic road base is estimated to have a usage factor of 40. Curb and gutter construction is estimated to have a usage factor of 50.

BCM 3: Unpaved Roads (d)(3)

Control Effectiveness

For unpaved roads there are three control options: paving, chemical stabilization, and speed reduction. Paving unpaved roads has been estimated to reduce 94 percent of PM_{10} emissions (SCAQMD, 1992). Chemical stabilization has been estimated to reduce 75 percent of PM_{10} emissions (AeroVironment, 1992) and speed reduction have been estimated to reduce 50 percent of unpaved road PM_{10} emissions (U.S. EPA, 1992). Low, medium, and high values have not been calculated for this measure as emissions reductions for these control options are well documented.

Relevancy Factor

The proposed control measure exempts unpaved roads which experience fewer than 50 average daily trips (ADT). Recognizing that many unpaved roads in the District serve 22only one or two residences or are located in remote areas with low traffic levels, it is estimated that only 10 percent of the unpaved roads will be subject to treatment requirements. However, as PM_{10} emissions are dependent on ADT levels, unpaved roads that experience high-ADT will generate much greater PM_{10} emissions compared to low-ADT roads. Accordingly, the relevancy factor for this measure is estimated at 50.

Usage Factor

For unpaved roads, the usage factor varies for the three control options. Based on the current rule language it is estimated that there will be an increase in the amount of paving compared to the preliminary draft staff report assumptions. Additionally, based on local jurisidction concerns over the use of chemical stabilization, it is further assumed

that fewer roads will be treated with chemical stabilizers. Accordingly, the revised usage factors for unpaved road treatment have been revised to: 30 percent for paving, 20 percent for stabilization, and 50 percent for speed control. ~~For paving, the usage factor is estimated at 5 due to the high cost of paving. Chemical stabilization is estimated to be used on 25 percent of qualifying unpaved roads and the remaining 70 percent of unpaved roads would be subject to vehicular speed reduction due to lower costs compared to paving or chemical stabilization.~~

BCM 5: Weed Abatement - (e)(2)

A study conducted for the BACM Working Group concluded that emissions from this source category are not significant (AeroVironment, 1996). Accordingly, this requirement has been removed from consideration ~~placed in PR 1186 as a contingency requirement and no emissions reduction estimate has been provided.~~

EMISSIONS REDUCTION CALCULATIONS

The emissions reduction estimate for each of the control measures is calculated by multiplying the control effectiveness by the relevancy factor by the usage factor. The product of this calculation represents the percent emissions reduction from the applicable fugitive dust source category (e.g., entrained road dust). This percentage is then applied to the 2006 baseline emissions inventory to determine the estimated emissions reduction. For example, applying the mid-range 10 percent emissions reduction estimate for BCM 6 (RACM to BACM upgrades) to the 2006 construction baseline emissions inventory (58.9 tons per day) results in an emissions reduction estimate of 5.9 tons of PM_{10} per average annual day. Table A-5 of Appendix III of the 1997 AQMP provides the baseline emissions inventory for fugitive dust sources. It should be noted that the cost-effectiveness and socioeconomic analyses were based on the mid-range emissions reduction estimates applied to the 2010 baseline emissions inventory. Tables 1 and 2 show how the emissions reduction was calculated for each of the control measures.

TABLE 1

Emission Reductions Calculations for the Control Measures in PAR 403

Control Measure	Control Effectiveness	Relevancy Factor	Usage Factor	Percent Reduction	2006 Reductions (tons/day)	2010 Reductions (tons/day)
BCM 1a	Low -.85	.17	.20 .30 .40 .10	Low - 14%		
BCM 1a	Medium - .90	.17	.20 .30 .40 .10	Medium - 15%	28.14	28.88
BCM 1a	High - .95	.17	.20 .30 .40 .10	High - 16%		
BCM 2	Low - .02 Medium - .06 High - .12	.16	1	Low - <1% Medium - 1% High - 2%	0.56	0.6
BCM 4 (Tilling)	Low - .01 Medium - .03 High - .05	.8	1	Low - <1% Medium - 2% High - 4%	0.28	0.29
BCM 4 (Windblown)	Low - .25 Medium - .52 High - .75	.8	1	Low - 20% Medium - 42% High - 60%	8.57	8.68
BCM 6	Low - .10 Medium - .12 High - .15	.8	1	Low - 8% Medium - 10% High - 12%	5.9	6.1

TABLE 2

Emission Reduction Calculations for the Control Measures in PR 1186

Control Measure	Control Effectiveness	Relevancy Factor	Usage Factor	Percent Reduction	2006 Reductions (tons/day)	2010 Reductions (tons/day)
BCM 1b	Low - .05 Medium - .1 High - .15	.7	1	Low - 4% Medium - 7% High - 11%	13.13	13.48
BCM 1c	Low - .7 Medium - .79 High - .85	.09	1	Low - 6% Medium - 7% High - 8%	13.13	13.48
BCM 1d/e	Low - .7 Medium - .75 High - .8	.03	.5 .4 .1 .5 .4 .1 .5 .4 .1	Low - 2% Medium - 2% High - 2%	3.8	3.9
BCM 3	.94 (paving) .75 (stabilization) .5	.5	~~.05~~ .3 ~~.25~~ .2 ~~.7~~ .5	~~29~~ 33%	~~15.21~~ 17.3	~~15.21~~ 17.3
~~BCM 5~~	~~Not quantified~~					

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APPENDIX G

COST-ESTIMATE ASSUMPTIONS

COST ESTIMATE ASSUMPTIONS

Various data sources were used to estimate compliance costs associated with PAR 403 and PR 1186 implementation. These include industry associations; state, regional, and local agencies; affected businesses; and professional publications. Once the compliance costs were estimated, the information was provided to the District's Socioeconomic staff to conduct the cost-effectiveness analysis and socioeconomic assessment. In most cases, the scenario 2 assumptions were used in the cost-effectiveness analysis and socioeconomic assessment. Results of the cost-effectiveness analysis are presented in the body of the staff report under the heading BACM selection.

PAR 403 (ASSUMPTIONS)

BCM 1a: Minimal Track-Out - (d)(5)/Table 3[1]

This section presents the costs incurred by the construction industry, aggregate facilities, and landfills to comply with the minimal track-out provisions. The following assumptions apply to this section:

1) There are 5,402 acres of construction in the Basin (Construction Industry Research Board, 1993). An average project size of 10 acres and one access connection per site results in an estimate of 540 access connections.

2) There are 66 aggregate facilities in the Basin (Department of Conservation, 1993) and each has one access connection.

3) There are 45 landfills in the Basin (Integrated Waste Management District) and each has one access connection.

4) The estimated total number of access connections is 651 (540 + 66 + 45 = 651).

5) Of the subject unpaved access connections, 20 percent will be paved, 40 percent will be chemically treated, 30 percent will install a track-out control device, and 10 percent will use street sweeping.

[1] Reference to PAR 403 section.

6) Costs for these treatments are as follows (SCAQMD, 1994):

Paving: $8,496

Chemical stabilization: $984

Track-clean: $ 4,800

Street cleaning: $ 29,970[2]

Scenario 1: *40 percent of the access connections will require treatment.*

Scenario 2: *30 percent of the access connections will require treatment.*

BCM 2: Wider Use of Plans - (e)(1)

This section presents the costs incurred by the construction industry to comply with the contingency requirements for medium operations. The following assumptions apply to this section:

1) Compliance costs to the construction industry are estimated from the high-end cost analysis prepared for the 1992 Rule 403 amendments: $1,930,865 per year or $112 per acre (SCAQMD, 1992).

2) Based on the assumptions contained in the emissions reductions analysis, 20 percent of the total 1993 construction acreage would be re-classified as a large operation under the proposed threshold definition. This results in 1,080 additional acres classified as a medium operation (5,402 x .2 = 1,080).

3) 20 percent of these facilities presently implement the Rule 403 Table 1 and 2 control actions to obtain an exemption from the Rule's visible emission standards and the remaining 80 percent (864 acres) will be required to comply with the requirements for medium operations (80% x 1,080 acres = 864 acres).

Scenario 1: *The Rule 403 cost-per-acre estimates will be required for the additional 864 acres that will be re-classified as medium operations.*

BCM 4: Agricultural Operations (h)(1)(B)

This section presents the costs incurred by the agricultural industry to comply with the likely requirements of the soil erosion control plans (i.e., high wind tilling prohibitions and stabilization of fallow fields). The following assumptions apply to this section:

[2] Based on equipment, labor, and maintenance costs for street cleaning equipment at one facility.

1) The total annual value of vegetable, melon, and seed crops for 95,173 acres is $186,150,705 [excludes citrus, tree and vine crops] (Annual Crop Reports, 1993). These values are reduced by 20 percent to account for the 80 percent of growers that will elect to submit to soil erosion control plan requirements (subject valuation - $148,920,564/subject acreage - 76,138).

3) Real interest rate is 4%.

4) The average farm size is 127 acres (Department of Finance, 1989).

5) Average labor cost for a worker involved in agricultural operations is $10 per hour and the minimum work duration is 4 hours.

6) The total interest expense which could potentially be incurred for the entire Basin due to tilling prohibitions is estimated to be $16,320 per day ($148,920,564 x 0.04/365 = 16,320).

7) The total cost of lost labor due to tilling prohibitions is estimated at $47,920 per day (599 farms x 2 employees per site x 10 hour x 4 hours).

8) Stabilization of fallow fields is estimated at $100 per acre per year (Grantz, 1996).

9) Windblown agricultural emissions are attributable to fallow fields and 10 percent of the agricultural acreage is fallow at any given time.

Scenario 1: *High winds would result in a delay in tilling of 4 days and an average of two workers would be affected at each site. 10 percent of the subject agricultural acreage would require stabilization to prevent wind erosion.*

Scenario 2: *High winds would result in a delay in tilling of 2 days and an average of two workers would be affected at each site. 5 percent of the subject agricultural acreage would require stabilization to prevent wind erosion.*

BCM 6: RACM to BACM Upgrades (Tables 1 and 2/Rule 403 Implementation Handbook)

This section presents the costs incurred by the construction industry to comply with the PAR 403 RACM to BACM upgrades. The following assumptions apply to this section:

1) There are 5,402 acres of construction in the Basin (Construction Industry Research Board, 1993) with an average of 10 acres per site, resulting in an estimate of 540 projects per year.

2) Each project has an average of 1 water truck, resulting in an estimate of 540 water trucks.

3) The cost of renting a watering truck ranges from a low of $200 per day without a driver (US Rentals, 1996) to a high of $600 per day with a driver (SCAQMD, 1994). A mid-value of $400 is selected for this analysis.

4) A 2,000 gallon water truck can make approximately 12 treatments per day, resulting in a water demand of 3,209 cubic feet per day. Based on a worse-case water price of $1.50 per 100 cubic feet of water (Pabbruwee, 1996), the daily water cost would be $48 per day. The total cost for increasing watering is, therefore, estimated at $448 per day.

5) The average duration of the mass grading phase of a project is 15 days.

Scenario 1: *There will be a 25 percent increase in the number of watering trucks and water usage during the mass grading phase of a project.*

Scenario 2: *There will be a 15 percent increase in the number of watering trucks and water usage during the mass grading phase of a project.*

PR 1186 (ASSUMPTIONS)

BCM 1b: Routine Street Sweeping - (d)(2)

This section presents the costs incurred by the municipal and county governments to comply with the PR 1186 routine street sweeping requirements. The following assumptions apply to this section:

1) The average price of a non-PM_{10} efficient street sweeper is $120,000 (Berryhill, 1996). The average price of a PM_{10} efficient street sweeper is $157,148 (Mechanick, 1995). The resulting price differential is $37,148.

2) Each of the 150 jurisdictions in the Basin have an average of three street sweepers in-house or under the control of a contractor, resulting in a total inventory of 450 street sweepers in the Basin.

3) PM_{10}-efficient street sweepers travel at two-thirds the speed of a non PM_{10}-efficient street sweeper.

4) Jurisdictions will need to purchase three PM_{10}-efficient street sweepers for each two non PM_{10}-efficient street sweepers replaced.

5) The current rule text that encourages jurisdictions to target PM_{10}-efficient street sweeper use on roads with high silt loading potential will only require the replacement of a third of the street sweeper inventory with PM_{10}-efficient street sweepers.

6) Annual maintenance costs for the additional PM_{10}-efficient street sweeper are estimated at $19,000 (Sunline Transit Agency, 1996).

7) Annual labor costs for the additional PM_{10}-efficient street sweeper operator are estimated at $46,560 (U.S. Department of Labor, 1994).

Scenario 1: *Based on a seven-year lifespan for street sweeping equipment, 14 percent of the street sweepers will be replaced per year.*

Scenario 2: *Based on a ten-year lifespan for street sweeping equipment, 10 percent of the street sweepers will be replaced per year.*

BCM 1c: Post Event Cleaning - (d)(1)

This section presents the costs incurred by agencies to comply with the PR 1186 requirements intended to reduce paved road silt loading following storm events. The following assumptions apply to this section:

1) Below is an inventory of primary arterials, minor arterials, collectors and local urban roadways in the Basin, by county (Caltrans, 1993):

Los Angeles- 18,018

Orange - 5,838

San Bernardino - 784

Riverside - 2,066

Total - 26,707

2) Removal of major accumulations of material from mudslides and other natural events are presently conducted by responsible jurisdictions and are not included in this analysis.

3) Costs for contracting for a vacuum sweeper are $67 per hour (Padilla, 1996).

4) On average, post-event clean-up requires 10 hours of contracted street sweeper time and 2 hours are needed for equipment delivery, resulting in a cost estimate of $804 per event.

Scenario 1: *Of the subject urban roadway inventory, 1 percent will require post-event clean-up once per year.*

Scenario 2: *Of the subject urban roadway inventory, 0.5 percent will require post-event clean-up once per year.*

BCM 1d/e: Curb and Gutter/Chemical Stabilization - (e)(1)

This section presents the costs incurred by the municipal and county governments to comply with the PR 1186 requirements intended to reduce paved road silt loading from unimproved road shoulders. The following assumptions apply to this section:

1) There are 349 miles of roadway construction in the Basin annually (Caltrans, 1993) and this amount is doubled to 698 to incorporate road shoulders.

2) The inventory of paved road construction projects will be the same for the future years.

3) Of the total inventory of roadway construction, 33% will be required to implement one of the control options.

4) Of the applicable roadway construction projects, 50 percent will select curb and gutter installation, 10 percent will utilize chemical treatments, and 40 percent will use asphaltic road base to stabilize road shoulders.

5) Costs for these treatments are as follows (SCAQMD, 1994):

   Curb and gutter: $ 79,200 per mile

   Chemical stabilization: $2,384 per mile

   Asphaltic road base: $6,800 per mile

Scenario 1: *Of the total roadway construction project inventory, 33 percent will require one of the above treatments.*

Scenario 2: *Of the total roadway construction project inventory, 25 percent will require one of the above treatments.*

BCM 3: Unpaved Roads - (d)(3)

This section presents the costs incurred by agencies to comply with the BACM requirements for unpaved roads. The following assumptions apply to this section:

1) There are 4,596 miles of unpaved roads in the Basin. An estimated 10 percent of the unpaved roads will require treatment ~~be subject to this control measure~~, resulting in an estimate of 460 miles of subject unpaved roads.

2) Of the subject unpaved roads, 30 percent will be paved, 20 percent will be chemically treated and 50 percent will be subject to speed control.

~~2) Of the subject unpaved roads, 5 percent will be paved, 25 percent will be chemically treated, and 70 percent will utilize speed reductions.~~

3) Costs for these treatments are as follows:

   Paving: $350,000 per mile (Western Riverside COG, 1996)

   Chemical stabilization: $16,107 per mile (SCAQMD, 1994)

   Speed limit reduction: $200 per sign with four signs required per mile for a total of $800 per mile (Western Riverside COG, 1996) ~~ten percent of mileage will require signage~~

Scenario 1: *Of the ~~subject~~ unpaved road inventory, 10 percent will require treatment.*

BCM 5: Weed Abatement - (e)(2)

A study conducted for the BACM working group concluded that emissions from this source category were not significant (AeroVironment, 1996). Accordingly, this portion of PR 1186 has been removed from consideration ~~placed as a contingency requirement and no estimate of costs are provided~~.

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