

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Staff Report for:

PROPOSED RULE 1157: PM10 EMISSION REDUCTIONS FROM AGGREGATE AND RELATED OPERATIONS

December 3, 2004

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LIST OF ACRONYMS AND ABBREVIATIONS

AQMD	South Coast Air Quality Management District
AQMP	Air Quality Management Plan
BACT	Best Available Control Technology
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
EPA	U.S. Environmental Protection Agency
PM10	Particulate Matter with Aerodynamic Diameter less than 10 Microns
RWQCB	Regional Water Quality Control Board
SIC	Standard Industrial Classification
SIP	State Implementation Plan

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Background

The South Coast Air Quality Management District (AQMD) is the local government agency responsible for air quality assessment and improvement in the four-county area that includes Orange, the non-desert portions of Los Angeles and San Bernardino Counties, and most of Riverside County. In order to accomplish its mandate, AQMD is required to adopt and implement an Air Quality Management Plan (AQMP) that identifies the control strategies to achieve federal ambient air quality standards and demonstrate compliance with the state and federal clean air acts.

The South Coast Air Basin (Basin) is classified as a serious non-attainment area for PM₁₀ (particulate matter less than 10 microns) and must attain the standards by 2006. To address these state and federal mandates, the 2003 AQMP for the Basin included Control Measure BCM-08 – Further Emission Reductions from Aggregate and Cement Manufacturing Operations, which identified aggregate and cement operations as sources of PM₁₀ emissions. As such, Control Measure BCM-08 calls for the development of controls to reduce the emissions from these industries. Proposed Rule 1157 (PR 1157) – PM₁₀ Emission Reductions from Aggregate and Related Operations, is developed to implement a portion of Control Measure BCM-08. Subsequently, a separate rule will be proposed to address emissions generated by cement manufacturing operations.

This report provides background information and rule development recommendations that will be submitted to the AQMD Governing Board at the ~~December 3~~November 5, 2004 Hearing for PR 1157.

Industry Profile

The aggregate and related operations within the AQMD's jurisdiction includes 389 facilities categorized as follow: 29 aggregate facilities (which includes stone crushing), 100 concrete batching (CB) facilities, 152 concrete products facilities, 25 crushed miscellaneous base facilities (CMB) for concrete and asphalt recycling, 45 hot-mix asphalt (HMA) facilities, and 38 "other" facilities (i.e., sand and cement blending and bagging, and inert landfills handling construction and demolition debris). These facilities generate PM₁₀ during their mining, processing, and handling (i.e., transporting, loading/unloading, conveying, crushing, screening, mixing, and storing) of the aggregates. Their unpaved roads and track-out (where PM₁₀ generated by the facility is transported due to out-going truck traffic to part of the paved public and private roads) are other sources of PM₁₀ emissions.

Emissions Inventory and Emissions Reduction

The PM₁₀ baseline emissions inventory for the aggregate and related operations is estimated at 29 tons per day. The largest aggregate facility is estimated to generate approximately 800 tons per year (or 2.2 tons per day) of PM₁₀.

It is estimated that PR 1157 will reduce an additional of 18 tons per day of PM₁₀ emissions (beyond Rule 403) through good housekeeping and the use of dust suppressants (water and/or chemical), baghouses, enclosure, rumble grates (to remove dust agglomerated on vehicle's tires), and wheel washers, ~~and chutes (dirt skirts)~~.

Technical Assessment

AQMD staff has conducted a control technology assessment for the aggregate and related industries. The analysis evaluated enclosed conveyors, dust suppressants, drive-over grizzly and bottom dumping, telescopic chutes, rumble grates, wheel washers, and street sweepers. Based on this analysis, there are technological options that will significantly reduce emissions from the aggregate and related industries.

Cost-effectiveness Analysis

AQMD staff has analyzed cost-effectiveness for PR 1157, which is estimated at \$~~1,132,588~~ per ton of PM10 reduced. A socio-economic analysis is also conducted to assess the economic impacts of PR 1157.

Recommendation

PR 1157 can be summarized as follows:

- Performance Standards:
 - ✓ No ~~time-averaged or intermittent~~ dust emissions exceeding 20 percent opacity, based on an average reading of 12 consecutive readings, or
 - ✓ No ~~instantaneous discharge of~~ dust emissions exceeding 50 percent opacity, based on five individual, consecutive readings, or
 - ✓ No dust plume beyond 100 feet from any emission source
 - ✓ Removal and/or stabilization of spills
 - ✓ Specifications for gravel pad
- Process Control Options:
 - ✓ Apply ~~D~~ dust suppressants for loading/unloading/transferring activities, conveyors, crushers, screening equipment, and storage piles
 - ✓ Baghouse and/or enclosure options for crushers and screening equipment
- ~~Dust suppressants and sweeping for internal paved roads~~
- ~~Chemical stabilization for internal unpaved roads~~
- ~~Rumble grates, wheel washers, or truck washers for all facilities~~
- ~~Both rumble grates and wheel washers for large or active facilities~~
- ~~Emission Reduction Plan for repeat violators~~
- Internal Paved Roads:
 - ✓ Sweep daily or every other day depending on facility's activity level.
 - ✓ Apply dust suppressants (i.e. watering) on the days that sweeping is not required
- Internal Unpaved Roads, Parking and Staging Areas:
 - ✓ Apply chemical stabilizers or gravel pad
- Track-out:
 - ✓ All loads must be leveled, maintained with freeboard, and either covered or stabilized
 - ✓ Active Facilities – Install rumble grates and wheel washers
 - ✓ Less Active Facilities – A choice of rumble grates or wheel washers or truck washers

- Exemptions where control are infeasible
- Compliance Dates: July and ~~November~~ December 2005.

CHAPTER I

BACKGROUND INFORMATION

- ✓ Air Quality
- ✓ Background and Legal Authority
- ✓ Issues Facing the Aggregate and Related Industries
- ✓ Necessity for Proposed Rule (PR) 1157

AIR QUALITY

The AQMD is the local government agency responsible for air quality assessment in Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. Within the jurisdiction of the AQMD, the South Coast Air Basin (Basin) and the Coachella Valley portion of the Salton Sea Air Basin exceed State and federal ambient air quality standards for PM₁₀ (small particulate matter less than 10 microns in diameter). Accordingly, the U.S. EPA has designated both the Basin and the Coachella Valley as serious non-attainment areas for PM₁₀. Under the federal Clean Air Act, the AQMD is required to attain the PM₁₀ standards for both of these air basins by 2006.

In order to attain healthful air, federal and state laws require the AQMD to adopt an Air Quality Management Plan (AQMP) that identifies control strategies to demonstrate compliance with federal ambient air quality standards and expeditious progress toward state air quality standards ⁽¹⁾. To address these state and federal mandates, the 2003 AQMP for the Basin included Control Measure BCM-08 – Further Emission Reductions from Aggregate and Cement Manufacturing Operations, which identified aggregate and cement operations as sources of PM₁₀ emissions. As such, Control Measure BCM-08 calls for the development of controls to reduce the emissions from these industries. Proposed Rule 1157 – PM₁₀ Emission Reductions from Aggregate and Related Operations, is developed to implement a portion of Control Measure BCM-08. Subsequently, a separate rule will be proposed to address emissions generated by cement manufacturing operations.

Particulate Matter (PM₁₀)

Aggregate (including stone crushing) and related operations, such as hot-mix asphalt, concrete batching, miscellaneous base crushing, concrete product plants, inert landfills handling construction and demolition debris, as well as facilities handling/using cement and aggregates are sources of direct PM₁₀ emissions.

PM₁₀ is generated during the mining, processing, and handling (i.e., transporting, loading/unloading, conveying, crushing, screening, mixing, and storing) of the aggregates. Other sources of PM₁₀ emissions are unpaved roads and track-out (where PM₁₀ generated by the facility is transported due to out-going truck traffic to part of the paved public [and private](#) roads.)

PM₁₀ is a public health concern since particles of less than 10 microns in size can be deposited in, and can damage the airways of the lower respiratory tract and the gas-exchange portions of the lung. The adverse health effects of particulates, especially PM₁₀, are well documented. Various health studies have linked PM₁₀ emissions to increased respiratory infections, more severe asthma, declines in pulmonary function, and shortened life spans. Current ambient levels of PM₁₀ (30 to 150 micrograms per cubic meter) are associated with increases in the number of people that die daily from heart or lung failure. Most of these deaths are common among the elderly. However, there is strong evidence that some children are also adversely affected by PM₁₀

⁽¹⁾ California Health and Safety Code Section 40460(a).

emissions. The Children's Health Study conducted by USC Keck School of Medicine, ~~Division of Occupational and Environmental Health to identify chronic effects of ambient pollutants in Southern California school children with varying reveals that significant lung function deficits are closely associated with~~ exposures to particulates, ~~nitrogen dioxide, and atmospheric acidity, and that decreased lung development may have permanent adverse effects in adulthood. exposures to ozone, particulates, and acid vapors, suggests that children with asthma living in a community with high PM10 concentrations may have suppressed lung growth. The study also concludes that children who move to cleaner communities with lower levels of PM10 and PM2.5 have improvement in lung function growth rates. This conclusion means that even small emission reductions can have immediate benefits to the long-term respiratory health of children living in polluted communities~~ ⁽²⁾. ~~After the children moved into cleaner cities, their lung growth returned to the normal rate, but they did not recover the lost potential growth, according to Dr. John Peters, the study's principle investigator.~~

Increases in ambient PM10 levels have also been shown to result in increases in acute respiratory hospital admissions, school absences in children, and increases in the use of medications in children and adults with asthma. The American Thoracic Society's Environmental and Occupational Health Assembly reviewed current health effects literature. They report that daily fluctuations in PM10 levels have been related to: acute respiratory hospital admissions in children; school and kindergarten absences; decreases in peak lung air flow rates in normal children; and, increased medication use in children and adults with asthma.

In December 2000, as a result of the requirements by The Children's Environmental Health Protection Act (Senate Bill 25), the CARB approved a joint CARB and OEHHA (Office of Environmental Health Hazard Assessment) staff report that contains reviews of all health-based California ambient air quality standards, including those for PM10. The report proposes amendments to the ambient air quality standards for both PM10 and PM2.5. In particular, the following were recommended and were adopted by the CARB in June 2002:

- PM10 Annual-Average Standards: Lower the annual-average standard for PM10 from 30 micrograms per cubic meter (ug/m^3) to 20 ug/m^3 (not to be exceeded). This recommendation was based on the results of numerous epidemiological studies which have found associations between long-term PM10 exposure and adverse health effects, such as mortality and morbidity from cardiopulmonary causes.
- PM10 24-hour-Average Standards: Retain the 24-hour-average standard for PM10 at 20 ug/m^3 (not to be exceeded).

According to the above report, attainment of the proposed standards would result in substantial health benefits. In particular, the estimated annual reductions (at 95 %

⁽²⁾ ARB News Release, ARB's 10-Year Children's Health Study Complete, June 24, 2004

confidence interval, CI) are 6,500 cases for premature mortality, 1,200 cases for chronic obstructive pulmonary disease, 1,700 cases for pneumonia, 3,100 for cardiovascular causes, and 960 for asthma. Among children ages 7 to 14, attainment of the proposed PM10 standards is estimated to result in about 389,000 fewer days of lower respiratory symptoms per year.

Silica Dust

Silica dust is generated during the surface mining, processing, and handling (i.e., transporting, loading/unloading, conveying, crushing, screening, mixing, and bagging) of the aggregates. Elevated silica dust levels are frequently found in granite quarrying and processing, in crushed stone and related industries. Currently OSHA (Occupational Safety and Health Administration) has established permissive exposure limit (PEL) of 0.1 mg/m³ for this type of operations.

Studies indicate that exposure to silica dust over a long period of time causes Silicosis. Silicosis (especially the acute form) is characterized by shortness of breath, fever, bluish skin, and may often be misdiagnosed as pneumonia or tuberculosis. Silicosis may be fatal when the lung scavenger cells are overwhelmed with silica dust and are unable to kill mycobacterium and other organisms. Studies of granite quarry workers also establish the link between human lung cancer and exposure to silica dust.

BACKGROUND AND LEGAL AUTHORITY

There are three levels of air emissions related regulatory requirements that apply to the aggregate and related industries: 1) federal requirements (i.e., U.S. Environmental Protection Agency or EPA); 2) state (i.e., the California Air Resources Board (CARB) and other state agencies), and, 3) local (i.e., the AQMD and local governments). The following is an overview of federal, state and local regulatory programs that are applicable to the aggregate and related operations.

Federal Requirements

The federal Clean Air Act requires the AQMD to adopt an AQMP that identifies a control strategy to demonstrate compliance with the federal ambient air quality standards. To address this federal mandate, the 2003 AQMP for the Basin included Control Measure BCM-08 – Further Emission Reductions from Aggregate and Cement Manufacturing Operations. In addition, there are other federal requirements that apply to aggregate and related operations. The following is a brief summary of these requirements.

Standards of Performance for Hot Mix Asphalt Facilities

EPA promulgated standards for new hot mix asphalt facilities in Title 40, Chapter I, Part 60, Subpart I of the Code of Federal Regulations (40 CFR Part 60, Subpart I). Subpart I assigns a 20 percent opacity limit and a 90 mg/dscm (micrograms/dry standard cubic meter) PM content for fugitive emissions.

Standards of Performance for Nonmetallic Mineral Processing Plants

EPA promulgated standards for various new equipment of aggregate and related operations in Title 40, Chapter I, Part 60, Subpart 000 of the Code of Federal Regulations (40 CFR Part 60, Subpart 000). In particular, Subpart 000 limits opacity to 10 percent for fugitive emissions at the transfer point of new conveyors; however, it does not address the dropping of materials from the conveyors to the storage piles. Subpart 000 also sets a limit of 15 percent opacity for fugitive emissions generated from new crushers.

State Requirements

State law also requires the AQMD to adopt an AQMP that identifies a control strategy to demonstrate progress towards achieving the state ambient air quality standards. The 2003 AQMP for the Basin that included Control Measure BCM-08 – Further Emission Reductions from Aggregate and Cement Manufacturing Operations, was also submitted to the CARB to comply with state law.

In addition, Senate Bill 656 (SB 656, Sher) which was enacted by the Legislature in 2003 requires the ARB in consultation with local air districts, to adopt a list of most feasible control measures to reduce PM₁₀ and PM_{2.5}. SB 656 also requires CARB and air districts to adopt implementation schedules for appropriate control measures by July 31, 2005, and CARB to report actions taken and recommend further actions to achieve the state PM standards.

The State of Texas, the San Joaquin Valley APCD, Clark County (Nevada), and Maricopa County (Arizona) have developed similar rules, primarily for process operations. Wisconsin, Florida, and Nevada have adopted rules governing aggregate operations, and Arizona is in the process of developing similar rules.

Local Requirements

AQMD Rule Requirements

At present, AQMD does not have a source-specific rule directed at aggregate and related operations located in the district. Instead, these operations are required to comply with AQMD Rule 203 - Permit to Operate, Rule 401 – Visible Emissions, Rule 402 – Nuisance, Rule 403 – Fugitive Dust, Rule 404 – Particulate Matter-Concentration, and Rule 405 – Solid Particulate Matter – Weight.

Rule 401 – Visible Emissions

Rule 401 controls visible emissions from any air contaminants discharged into the atmosphere from any single source. All sources are restricted from discharging emissions for a period or periods of time more than three minutes in any one hour which is as dark as or darker than the shade designated No. 1 on a Ringelmann Chart, or of such opacity to obscure an observer's view to a degree equal or greater than smoke designated No. 1 on a Ringelmann Chart. Commercial charbroilers excluding those with control equipment or those that are chain-driven; equipment for melting, heating or holding asphalt or coal tar pitch for on-site roof construction or repair; and pile-drivers are restricted from discharging emissions that are equivalent or exceed smoke designated No. 2 on a Ringelmann Chart or that obscure vision to a degree

equal or greater than smoke designated No. 2 on a Ringelmann Chart for period or periods of three or four minutes per hour depending on the type of equipment.

Rule 402 - Nuisance

Rule 402 limits the discharge of any air contaminant or other material from any sources that causes public injury, detriment, nuisance or annoyance. The rule also restricts emissions that endanger the comfort, repose, health or safety of the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Rule 403 – Fugitive Dust

PM10 emissions from all human dust generating activities, including aggregate and related operations are currently regulated by Rule 403. Rule 403 presents dust control measures in a series of three tables. Table 1 presents best available control measures (BACM). BACM are the most stringent emission limitations or control techniques which are commercially available. Table 2 details dust control measures for large operations. Large facilities are those with active operations on property which contains 50 or more acres of disturbed surface area; or any earthmoving operation with a daily earth-moving or throughput volume of 3,850 cubic meters or more three times during the most recent 365-day period. Table 3 displays Contingency Control Measures for Large Operations. Rule 403 generally focuses on PM10 emissions from construction/demolition activities, disturbed surface areas, earth-moving activities, open storage piles, movements of motorized vehicles; and wind-driven fugitive dust.

Under Rule 403, aggregate and related operations are required to implement applicable actions in Table 2 and applicable actions in Table 3 when applicable performance standards cannot be met from Table 2 actions. Facilities that conduct large operations that do not implement measures in Table 2 and 3 of Rule 403 are required to submit a fully executed Large Operation Notification (Form 204N) within seven days of qualifying as a large operation; maintain daily records to document the specific dust control actions taken; after January 1, 2005, install and maintain project signage and identify a dust control supervisor; and notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation.

Rule 403.1 - Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources

Rule 403.1 establishes special requirements for Coachella Valley fugitive dust sources. The requirements are applicable to active operation, open storage piles or disturbed surface areas, construction (earth-moving) activities that are not subject to local jurisdiction dust control ordinance requirements. Requirements include wind speed based operational restrictions; stabilization; control actions specified in Table 2 of Rule 403; restrictions on earth-moving activities; fugitive dust control plans; signage; wind monitoring; and recordkeeping.

Rule 404 - Particulate Matter- Concentration

Rule 404 regulates PM emissions from control exhausts based on concentration. Rule 404 includes a table which presents the maximum discharge rate of particulate

matter allowed by process weight over the lesser of one complete cycle of operation or one hour.

Rule 405 - Solid Particulate Matter – Weight

Rule 405 regulates PM emissions from control exhausts based on weight criteria. Rule 405 includes a table which presents the maximum concentrations of particulate matter allowed in discharged gas by volume of gas discharged over the lesser of one complete cycle of operation or one hour.

Local Governments

In addition, the AQMD adopted the 2002 Coachella Valley State Implementation Plan (CVSIP), which includes the most stringent measures analysis and appropriate control measures. As a result, every local Coachella Valley city and the County of Riverside have subsequently adopted dust control ordinances.

Other air pollution control districts in California, such as Great Basin Unified Air Pollution Control District (GBUAPCD) and San Joaquin Valley Air Pollution Control District (SJVAPCD) have also addressed those sources in their rule 431 and Regulation XIII, respectively.

ISSUES FACING THE AGGREGATE AND RELATED INDUSTRIES

Compliance ~~Public Nuisance~~ Issues

PM10 is generated during the mining, processing, and handling (i.e., transporting, loading/unloading, conveying, crushing, screening, mixing, and storing) of the aggregates. Other significant sources of PM and PM10 emissions are internal unpaved roads and track-out in which materials from the facility are transported to part of the public and private roads where it can be crushed and entrained into the air by passing traffic. The problem can be worse during high winds. Many facilities have applied adequate controls but this application is not consistent among all facilities. As a result, from January 1, 2000 to May 2004, AQMD staff has issued 33 Notices to Comply (NC) and 35 Notices of Violation (NOVs) to the aggregate and related operations for violating ~~the~~ Rules 401 and 403 requirements. Many of these notices have not yet been settled by the facilities and the AQMD.

Environmental Effects of Gravel Mining Study

In response to concerns expressed by some residents in Irwindale and other communities about the effects of the mining operations on air and water quality, Congresswoman Hilda Solis and Congressman Henry Waxman initiated an investigation. The findings of this investigation⁽³⁾ were published in December 2002. According to this study, gravel mining and processing generate large quantities of particulate matter from the mining, processing, and handling of aggregates, as well as from the diesel fueled heavy machinery used in mining and heavy-duty trucks, which generate over one million truck trips per year to transport gravel.

⁽³⁾ Report entitled “Environmental Effects of Gravel Mining in Irwindale, CA; Basic Information Is Not Available to Assess Health and Environmental Risks to the Community”

Representatives Solis and Waxman asked the EPA to:

- Quantify the specific pollutants from the mining operations
- Provide available monitoring data in the area
- Describe permit requirements applicable to the mining operations and the compliance with permit conditions
- Estimate the cumulative exposures, specifically from the emissions associated with gravel mining operations.

After reviewing this report, several industry associations forwarded to staff an August 2003 letter to the California Environmental Protection Agency's Regional Water Quality Control Board from Congressman Jerry Lewis, Chairman of the House Government Reform Committee and six other members of the House of Representatives. This letter stated that this report "is not an official report approved by the House Government Reform Committee or the House of Representatives. It therefore does not represent any official findings by Congress..."

The EPA responded by providing information held by EPA and the State of California related to the mining operations and environmental conditions in the area. Further inquiries were then made to the AQMD and the California Water Quality Control Board for the Los Angeles Region for additional information.

2004 AQMD Monitoring Program

In May 2003, the AQMD initiated a comprehensive air monitoring study at six of the largest gravel mining and processing operations in Irwindale area to characterize their potential air quality impacts. This PM10 ambient monitoring follows the 40 CFR, Part 50, Appendix J monitoring procedures provided in Rule 403, which establishes a PM10 upwind/downwind differential concentration level that facilities must comply with. The following are the key findings:

- Monitoring completed at four of the six sites indicate upwind/downwind PM10 measured differences greater than 50 ug/m³ threshold established by AQMD Rule 403. The exceedances resulted in the issuance of NOVs to the responsible facilities.
- Results of the upwind sampling at two facilities suggest that unpaved access roads and track-out to paved public and private roads may contribute significantly to ambient PM10 levels. The finding is consistent with track-out observed at several locations by AQMD inspectors.

In addition, the AQMD staff is conducting on-going monitoring, field surveillance and inspections of aggregate and related operations in Irwindale to ensure compliance with health protective emission standards found in Rules 401 and 403.

Irwindale Task Force

The AQMD established the Irwindale Task Force (ITF) which consisted of representatives from the AQMD, the city of Irwindale, the aggregate and related operations in Irwindale area, the Southern California Rock Products Association (SCRPA), the Southern California Ready Mixed Concrete Association (SCRMA),

and the consultants. The purposes of the ITF are to: 1) enhance communication between the AQMD, the city of Irwindale, and affected industries, 2) assist the affected industries in complying with current dust rules, and 3) seek commitments to mitigate fugitive dust.

This effort has been very successful ~~and the~~ while AQMD staff provides training to assist the facilities in identifying and further implementing effective dust controls. The AQMD staff also works with the city of Irwindale to implement an Interagency Workplan that allows for joint surveillance, ~~and~~ inspection activities and interagency complaint referral between the two ~~agencies~~ jurisdictions.

NECESSITY FOR PR 1157

The concept of source-specific controls for aggregate and related operations was first introduced in the 2003 AQMP. PR 1157 was developed to fulfill the AQMD's commitment in the 2003 AQMP to further reduce PM10 emissions from aggregate and related operations, and to help attaining the federal and state PM10 ambient air quality standards.

Aggregate and related operations, despite being subject to Rule 403 – Fugitive Dust, continue to be sources of fugitive dust. While Rule 403 allows a choice of compliance options for general fugitive dust source categories, PR 1157 specifies the emission controls that go beyond Rule 403 requirements, and are technologically feasible and cost-effective. It is expected that PR 1157 will reduce emissions of fugitive PM10 by an additional 60 percent and thus minimizing potential dust impacts on the surrounding communities.

CHAPTER II

INDUSTRY PROFILE AND EMISSIONS INVENTORY

- ✓ Aggregate and Related Operations
- ✓ Industry Profile
- ✓ Emissions Inventory

AGGREGATE AND RELATED OPERATIONS

Aggregate Operations

Aggregate operations produce sand, gravel, crushed stones, quarried rocks, slag, and rock dust.

Crushed stone might be composed of limestone, granite, and any other hard rocks that are produced by blasting and then crushing. Sand and gravel consist of unconsolidated granular materials found in natural deposits. The processing of sand and gravel is different depending on the types of products produced.

Construction Sand and Gravel

Sand and gravel are usually mined in a moist or wet condition by open pit excavation or by dredging. Open pit excavation is carried out with front end loaders, bucket wheel excavators, or draglines. Mining by dredging is carried out with suction or bucket-type dredges that remove sand and gravel from the bottom of a lake or river.

After mining, sand and gravel are transported by conveyors, trucks, barges, or earth movers to the aggregate plants where they are either stockpiled or dumped into hoppers. Sand and gravel are then transported by belt conveyors, hydraulic pumps, or bucket elevators to scalping screens. Materials that pass through scalping screens are fed into sizing screens, which consist of either horizontal or sloped single or multi-deck vibrating screens. Oversize materials are directed to crushers for size reduction before returning to the screening process.

After screening, sized gravel is stockpiled and sand is directed to log washers or rotary scrubbers for the removal of clay and impurities. After scrubbing, sand is sized by water classification, and then dewatered by hydroseparators or separatory cones before being stockpiled.

Industrial Sand and Gravel

Industrial sand and gravel are mined from open pits of quartz-rich sand and sandstone.

After mining, the materials are transported by trucks or conveyors to the aggregate plants where they are stockpiled and crushed. For primary and secondary crushing, gyratory crushers, jaw crushers, and impact mills are used. After crushing, the materials are further ground to smaller sizes (50 micrometers or smaller) by hammer mills or jet mills, and then classified by screening process(es).

After initial crushing and screening, industrial sand and gravel are washed and classified again before being scrubbed to remove surface stains and further deslimed. The purified sand is conveyed to drainage bins and is then dried in rotary dryers. After drying, industrial sand is cooled and classified again before being stockpiled or packaged for shipment.

Concrete Batching

Concrete is mainly composed of water, cement, sand, and coarse aggregate. Mineral admixtures or pozzolans such as fly ash and ground granulated blast-furnace slag may be added to reduce permeability, increase strength, or influence other concrete properties. Chemical admixtures may also be added to entrain air or modify the setting rate.

Approximately 75 percent of the U.S. concrete is produced at concrete batch plants. Many plants are located near aggregate sources; others may be temporarily set up near major job sites. At most of the concrete batch plants, the above constituents are gravity fed (charged) from the weigh hopper into the mixer trucks, which mix the ingredients on the way to the job sites (dry batch operation). Concrete may also be charged into a central mix drum and transferred to a truck (wet batch operation). The remaining manufactured concrete includes concrete masonry and precast products, such as concrete bricks, paving stones, pipes, structural components, bridge girders, and panels for cladding.

Typical equipment in a concrete batch plant includes conveyors, elevators, elevated storage bins and silos, weight hoppers, and mixers.

The primary concern is particulate matter emissions, mostly from cement dust. Cement is so fine that it contains approximately 150 billion particles per pound, about 10% to 20% of which are smaller than 5 microns in diameter. Dust may also originate from pozzolan, sand, and aggregates. These dust particulates are generated during the transferring and mixing of materials, as well as from sand and aggregate open storage piles. The movement of heavy trucks on unpaved or dusty surfaces around the plants also generates dust. Typical dust controls at concrete batch plants may include water sprays, dust suppressants, hoods, baghouses, etc.

Hot Mix Asphalt

Hot mix asphalt (HMA) is a mixture of size-graded, high quality aggregate, and, as a binder, liquid asphalt cement, which is heated and mixed in measured quantities. To produce good quality HMA, certain amount of fine aggregate less than 74 micrometers is required. Today, reclaimed asphalt pavement (RAP) is widely used in the mixture. Aggregate and RAP usually constitute over 92 percent, by weight, of the total mixture.

HMA is manufactured by batch mix, continuous mix, parallel flow drum mix, and counterflow drum mix plants, which can be permanent, skid-mounted, or portable. In 1996, there were approximately 2,300 batch plants and 1,000 parallel flow drum mix plants out of 3,600 estimated active HMA plants in the United States, and they produced approximately 240 million tons and 260 million tons, respectively. Today, the majority is the counterflow drum mix plants (about 85 percent) while batch plants and parallel flow drum plants account for 10 and 5 percents of the total, respectively.

In general, at the HMA plants, dust particulates are generated during conveying, screening, and mixing of materials, as well as from aggregate open storage piles. The movement of heavy trucks on unpaved or dusty surfaces around the plants also generates dust. Typical dust controls may include water sprays, hoods, enclosures, baghouses, etc. In addition, the drying of aggregate may also generate dust emissions. However, the dryers vent to a baghouse filter for particulate control.

Batch Mix

With the batch mix process, aggregate is dried by a rotary dryer. The hot aggregate is then screened, and according to its grade (size), is transferred to individual bins over a weigh hopper. The aggregate with desired mix and weight is dry-mixed in a mixer (pug mill) for 6 to 10 seconds. The appropriate amount of liquid asphalt cement and RAP are transferred to the pug mill. The total mixing time usually is less than 60 seconds. The hot mix is stored in a silo or transferred directly into an asphalt truck.

Parallel Flow Drum Mix

With the parallel flow drum mix process, the size-graded aggregate is transferred to the drum at the burner end. As the drum rotates, the aggregate and the combustion products move parallel toward the other end of the drum. Appropriate amount of liquid asphalt cement is introduced in the mixing zone located in the middle of the drum. The mixture is discharged at the end of the drum and is conveyed to either a surge bin or a silo for loading into a transport truck.

~~This mixing process captures a substantial amount of aggregate dust, therefore, lowering the load on the downstream PM collection equipment. As a result, only primary dust collection equipment such as baghouse is needed.~~

Counterflow Drum Mix

With the counterflow drum mix process, the aggregate flows in opposite direction to the exhaust gases. In addition, the liquid asphalt cement mixing zone is located behind a burner flame zone. As a result, this process is expected to generate less organic emissions compared to the parallel flow drum mix.

INDUSTRY PROFILE

Based on information obtained from the AQMD permit system and the 2001-2002 Annual Emissions Reporting (AER) database, AQMD staff identified 316 aggregate and related facilities. With the assistances of the Southern California Rock Products Association (SCRPA) and the Southern California Ready Mixed Concrete Association (SCRMA), staff also identified an additional 79 potential facilities.

This preliminary inventory was refined through an industry survey. Data collected from the surveys was used to better:

- identify and characterize facilities subject to the proposed rule;
- estimate PM10 emissions generated by the facilities; and,
- establish the baseline PM10 emissions for this industry in the air basin.

The surveys were distributed on March 26, 2004 to 395 potential facilities. Out of 156 responses received, 47 responses were from concrete batching (CB), 29 from aggregate, 26 from hot mix asphalt (HMA), 25 from concrete product (CP), 15 from crushed miscellaneous base (CMB) facilities, 8 from facilities that fall under the “other” category (i.e., blending and bagging sand and cement, landfill handling construction and demolition debris, etc.), and 6 from exempt facilities (i.e., located outside the air basin and non-aggregate business). The majority of the survey responses were from large and medium facilities, as well as facilities with more than one location in the air basin.

Based on the survey results and further input from the industry, staff has determined that there are approximately 29 aggregate, 100 CB, 45 HMA, and 25 CMB facilities in the air basin. For the rest of the 190 facilities in the universe, staff estimated 152 CP and 38 “other” facilities.

Table 2-1 – Aggregate and Related Facilities in the South Coast Air Basin

Category	Number of Facilities
Aggregate	29
Concrete Batching	100
Concrete Product	152
Crushed Miscellaneous Base	25
Hot Mix Asphalt (HMA)	45
“Other”	38
Total	389

EMISSIONS INVENTORY

According to the 2003 AQMP, the year 1997 PM₁₀ baseline emissions inventory for aggregate and related operations was estimated to be 1.4 tons/day, of which, 0.9 tons/day of PM (or approximate 0.45 tons/day of PM₁₀) came from large aggregate and related operations that generate a minimum of 4 tons of criteria pollutants per year. This estimate was based on the 75 facilities and did not include PM emissions from associated unpaved roads, open storage piles, and track-out. From work on similar facilities (Rules 1158, 403, 1186), and site visits, the AQMD staff believed that total PM emissions of this industry were underestimated.

AQMD staff utilized the survey data in an effort to improve the emissions inventory. PM₁₀ emissions for each facility and each category (i.e., aggregate, CB, HMA, CMB, CP, and “other”) were estimated based on input provided by facilities participating in the survey. Then, staff scaled up the average PM₁₀ emissions generated by each category to estimate the baseline emissions inventory for the aggregate and related operations in the air basin. Staff used only data from dry aggregate materials to calculate PM₁₀ emissions for each applicable activity and/or equipment (i.e., loading/unloading, hopper/surge bin, conveyor transfer point, crushing, screening, milling, silo, cement truck loading, HMA load-out, and open storage pile). Staff also estimated PM₁₀ emissions from unpaved roads and track-out.

Based on staff's evaluation, baseline PM10 emissions for the aggregate and related operations are estimated to be 29 tons per day. The majority of the emissions generated by the aggregate facilities come from unpaved roads, open storage piles, screening equipment, and conveyors. Table 2-2 – PM10 Baseline Emissions by Category and Table 2-3 - Process and Fugitive PM10 Emissions summarize the emissions profile for the industry categories subject to PR 1157. Detailed assumptions and calculation methodology for baseline PM10 emission estimates are included in Appendix A of this report.

Table 2-2 – PM10 Baseline Emissions by Category

Category	Emissions (tons/day)
Aggregate	16.7
Concrete Batching	3.2
Concrete Product	4.1
Crushed Miscellaneous Base	0.4
Hot Mix Asphalt (HMA)	2.6
“Other”	2.0
Total	29

Table 2-3 – Process and Fugitive PM10 Emissions by Category

Category	Emissions (tons/day)		
	Process	Fugitive – Open Piles	Fugitive – Unpaved and Paved Roads
Aggregate	6.4	1.7	8.6
Concrete Batching	2.9	0.1	0.2
Concrete Product	3.5	0.5	0.1
Crushed Miscellaneous Base	0.2	0.2	0.04
Hot Mix Asphalt (HMA)	1.2	0.9	0.5
“Other”	0.03	1.9	0.03
Total	14.2	5.3	9.5

CHAPTER III

CONTROL TECHNOLOGY ASSESSMENT

- ✓ Available Control Technologies
- ✓ Effectiveness of Controls

AVAILABLE CONTROL TECHNOLOGIES

Many technologies are currently available to control PM10 emissions for aggregate and related operations. No new technologies will need to be developed.

Enclosed Conveyors

PM10 emissions from the open conveyors are generated due to the following: wind impaction on the open conveyors, conveyor belt vibrations during the delivery of materials, residual materials that remain on the return side of the conveyor belt, and materials that fall to the ground and become airborne or are tracked outside of the facility. A conveyor that is inside a tube or a similar construction that is dust impermeable would eliminate PM10 emissions. Dust curtains can be used to contain dust within a conveyor enclosure. They should be installed at the head, or ends to provide easy access during maintenance. However, ventilation in the conveyor tube is usually required for worker safety; therefore, the ventilation system should be equipped with PM10 filters.

This type of system is currently employed by Koch Carbon (a facility that handles coke which is a petroleum refining byproduct) in Pittsburg, California, and several waste water treatment plants (WWTP) in the United States to transport biosolids (i.e., Corona WWTP in Corona, California, South Bayside WWTP in Redwood City, California, Chambers Creek in Washington, Rahway WWTP in New Jersey, 91th Ave. WWTP in Arizona, West Boise WWTP in Idaho, South Valley WWTP in Utah, and Sand Island WWTP in Hawaii).

The estimated cost for this system is \$1,000 per foot, and yearly maintenance is required (according to Ed Morris of Parkson Inc., a company in Florida that manufactures the enclosed conveyors). The enclosure can be quite expensive and the maintenance associated with the enclosure is an issue for aggregate operations where the conveyors are usually many miles long; therefore, this type of system is not currently employed by any of the aggregate operations in the U.S. Staff has ruled out this technology as a reasonable option for further reducing emissions from conveyors in existing facilities.

Open Conveyors with Dust Suppressants

An automated dust suppressant spray system can be installed at the transfer points to dampen and stabilize materials transported on open or partially enclosed conveyors. These systems are very effective in reducing PM10 emissions. For open or partially enclosed conveyors and tunnel feeds, daily housekeeping is essential to inspect fallout of materials from belt vibrations and from residual materials that adhere to the belt and fall out on the belt return side (carry-back). These control methods are commercially available and are currently being implemented by many affected facilities.

Dust Suppressants

Dust suppressants including water and chemical stabilizers (in both liquid and foam forms) are utilized to suppress the generation of airborne dust. The liquid spray

suppression system is utilized to control PM10 emissions from material handling at conveyor transfer points, and to stabilize open storage piles as well as unpaved roads. The wetting agent can be water or a combination of water and chemical surfactant. There are several types of chemical surfactants commercially available; however, magnesium chloride and calcium chloride are the most popular. According to the research by EPA in 1983, chemical surfactant reduces the surface tension of water; hence, reduces the quantity of water necessary to achieve a good control by a minimum ratio of 4:1.

South Western Sealcoating, Inc., a vendor of a magnesium chloride product, indicated that magnesium chloride has been used for years by the mining industry on haul roads. This company provided documentation of permission to use magnesium chloride from the Colorado River Basin Regional Water Quality Control Board (RWQCB) (Khan, 1991). The Arizona Department of Environmental Quality, Office of Water Quality gave similar permission for the use of magnesium chloride dust suppressants (Sobchak, 1989).

Micron-sized foam application is an alternative to water spray systems. The foam system can provide greater control at lower additional moisture rate than the liquid spray system; however, the foam should be distributed throughout the materials rather than simply covering them. In addition, the amount applied should allow foam to dissipate. The presence of foam in the materials indicates that either too much foam was used or foam was not adequately dispersed within the materials.

Dust suppressants are currently being used by the majority of the affected facilities.

Drive-Over Grizzly and Bottom-Dumping

A drive-over grizzly is a device where materials are delivered and received from the bottom of the truck trailer through a set of uniformly spaced bars, rods, or rails constructed on top of an underground hopper. Materials are then transported to various processing equipment throughout the facilities by conveyors which are equipped with liquid spray dust suppressant system. During recent site visits to facilities already using this system, AQMD staff observed no fugitive dust emissions during the unloading activity using drive-over grizzly and bottom-dump trucks; however, to many operations where unloading are done directly to stockpiles due to limited space, the drive-over grizzly may not be practical.

Telescopic Chute

Telescopic chute is used to minimize the height from which materials carried by the conveyors fall onto open storage piles, and hence, reduces associated PM10 emissions. The chute is attached to the transfer point of the conveyor. The telescopic chute is usually cable-connected so a winch can lift the sections of the chute. The lower end of the chute should be kept clear from the top of the pile to reduce dust. The materials should be contained within the chute until discharged to within five feet from the top of the pile. The chute is extendable or retractable to adjust the distance between the top of the pile and the chute. To be effective, chutes are equipped with

dust suppressant spray systems to knock down airborne dust. Staff has not found any telescopic chute being used at aggregate and related operations. However, because of the weight of the chutes and safety concerns, telescopic chutes for the aggregate operations might require the re-design of the existing conveyors in order to sustain the weight of the chutes, rendering such retrofitting cost ineffective.

Telescopic chutes are currently used to reduce dust emissions only at coke and coal handling operations, where fine and light-weight materials do not require heavy telescopic chutes. Staff has observed the chutes to be effective in reducing PM10 emissions at coke and coal operations in Southern California.

Rumble Grate

A rumble grate is a wheel shaker device consisting of raised dividers (rails, pipe, or grate that are of minimum of three inches tall, six inches apart and 20 feet long. As a vehicle passes over the rumble grate, vibration is produced to shake dust off the wheels. Rumble grates are currently utilized by some affected facilities in combination with wheel washers. Some cities in Southern California such as Manhattan Beach require the use of these grates before dump trucks enter local highways from an active construction site.

Wheel Washer

An effective wheel washer system provides a thorough rinsing of the entire circumference of the tires and rims of a vehicle before exiting the facility. These systems are designed to prevent track-out onto paved public and private roadways where dust is re-entrained in to the air by other vehicles. Typically, a sensor is used to activate the wheel washer before the truck/trailer enters, thereby ensuring that all four tires are in contact with water spray. Installing a rumble grate before the wheel washer would remove excessive dust from the tires and slow down the truck/trailer so that the wheel washer can be most effective. Effective wheel washers are designed so that water runoff flows away from the truck/trailer, preventing re-entrainment of dust onto the tires.

Wheel washers are not technology forcing dust control equipment. They are currently being used at several aggregate facilities as well as concrete batch plants in California. Some existing systems might need to be upgraded to improve their efficiency in removing dust.

PM10 Efficient Street Sweepers

Aggregate and related operations are currently using street sweepers to remove silt from paved surfaces that are used for material transport. However, their efficiency can be improved by implementing design requirements found in AQMD Rule 1186.

Truck Transport

Truck/trailers used to transport aggregates can be leveled and covered with tarps to prevent materials from falling off; hence, reduce track-out. Leveling loads and maintaining freeboard are also requirements of California Vehicle Code 23114.

Covers on the truck/trailers will prevent airborne particulates and re-entrainment that staff has observed; however, because of safety concerns, staff does not recommend truck covering, providing that the freeboard requirement is met.

EFFECTIVENESS OF CONTROLS

All of the above-mentioned control technologies and measures can be very effective if properly operated, maintained, and supervised. The expected effectiveness of dust control strategies are summarized in the following table:

Table 3-4 – Control Efficiency

Type of Control	Control Efficiency (%)
Watering/misting	60
Watering and sweeping	75
Watering/misting with hooding at conveyor transfer points	75
Chemical dust suppressant	80
Wheel washer and rumble grate	80
Covered screening equipment with watering/misting	90

The above projected control efficiency was derived based on information from the EPA's Emission Factor Documentation for AP-42 (April 1995), the Texas Natural Resource Conservation Commission (TNRCC)'s Rock Crushing Plant document (February 2002), and the SCAQMD's CEQA Handbook, Chapter 11 (1993).

CHAPTER IV

COST AND COST-EFFECTIVENESS

- ✓ Emission Reductions
- ✓ Cost and Cost-Effectiveness
- ✓ Incremental Cost-Effectiveness

EMISSION REDUCTIONS

The emission reductions in the 2003 AQMP for control measure BCM-08 – Further Emission Reductions from Aggregate Operations (PM10) were estimated to be 0.7 tons per day by the year 2010. However, because the emissions in the 2003 AQMP inventory were understated, the emissions reductions reported by the 2003 AQMP have also been understated.

Emission reductions have been assessed based on the following assumptions: (1) control efficiency of 20 percent for loading/unloading/transferring activities, conveyors, hoppers/surge bins, storage piles, and internal roads; (2) control efficiency of 90% for crushers and silos, and (3) control efficiency of 50% for screening equipment from the levels of controls currently employed by aggregate and related operations to comply with Rule 403. Staff now estimates that PR 1157 will reduce an additional of 18 tons per day of PM10 emissions (beyond Rule 403) through the use of chemical dust suppressant, misting/watering, covered screening equipment, wheel washers and rumble grates, and sweeping paved roads~~hooding at the conveyor transfer points~~.

The application of chemical dust suppressants is expected to achieve 80% to 90% control efficiency if it is prepared and used appropriately according to the manufacturers' suggestions (i.e, minimum application of 2 times per every 12 months). The control efficiency for watering/misting ranges from 60% to 75%, depending greatly on the usage frequency. According to the EPA study (AP-42, Chapter 13.2.2, December 2003), watering would be able to achieve a control efficiency of 75% if the moisture ratio is 2. (Moisture ratio is calculated by dividing the surface moisture content of the watered road by the surface moisture content of the uncontrolled road).

For the purpose of projecting the emission reductions, staff assumes the control efficiencies presented in Chapter III of this report.

COST AND COST-EFFECTIVENESS

PR 1157 would reduce PM10 emissions from 389 aggregate and related operations through the use of the following dust controls: (1) dust suppressants (water and/or chemical) and/or other dust controls for loading, unloading, and transferring activities, conveyors, open storage piles, and internal unpaved roads, (2) watering and sweeping internal paved roads, (3) ~~chutes (dirt skirts) at the conveyor transfer points,~~ (4) baghouses or dust suppressants for the crushers, (5) 4 dust suppressants or enclosed screening equipment with baghouses, (6) 5 rumble grates, or truck washer, and/or wheel washers, and (7) 6 load leveling and spillage stabilization and removal.

The estimated compliance cost for PR 1157 has accounted for: (1) the capital costs of the wheel washers, rumble grates, ~~chutes~~, misting systems, and paving, and (2) the operating and maintenance (O & M) costs, ~~which include costs for water and chemical consumption that are associated with the following:~~

- ♦ watering/misting storage piles, process equipment, and 100 ft of paved roads, and water consumption for the wheel washers;
- ♦ chemical stabilizer consumption on unpaved roads and for stabilizing storage piles at the HMA facilities;
- ♦ sweeping services;
- ♦ water trucks; and
- ♦ maintaining and operating wheel washers and misting systems.

Costs associated with baghouses, enclosed screening equipment, load leveling, spillage stabilization and removal, and paved road watering and cleaning were not included in the estimates for the following reasons: (1) dust suppressants would be widely used unless baghouses and enclosures are needed to comply with BACT requirements, (2) load leveling is also a requirement of the California Vehicle Code 23114 with which trucking companies (not aggregate facilities) must comply, and (3) spillages do not occur regularly and are usually removed as part of the facility's operations and/or to avoid the track-out prohibited by Rule 403, ~~and (4) watering and sweeping of internal paved roads are parts of Rule 403 compliance.~~

The following additional assumptions were made in order to estimate the compliance costs for PR 1157:

(A) Assumptions

Wheel Washers and Rumble Grates

PR 1157 requires all 389 existing facilities to operate rumble grates. Large or active, New, permanent facilities and large or active existing, permanent facilities must have both wheel washers and rumble grates. Specifically, any existing, permanent facility with ~~land size in excess of 50 acres or with~~ a minimum of 60 aggregate and/or mixer trucks exiting the facility on any day is to install both rumble grate and wheel washer at each exit used by those trucks, leading to a paved public road.

Based on the survey responses and the methodology of scaling survey data presented in Appendix B, staff estimated that 102 facilities would need wheel washers based on their truck trips. Some of the affected facilities have indicated in the surveys that they currently have wheel washers (as a control measure to reduce track-out under Rule 403). Based on such information and the scaling methodology, staff estimated that 80 facilities would need wheel washers to comply with PR 1157. This number is consistent with the assumption that 20% of the facilities currently have wheel washers. Due to 11 facilities that have 2 exits, staff estimated that a total of 91 wheel washers (80 + 11 = 91) would be needed for compliance with PR 1157.

Staff assumed that 20 % of the facilities currently have rumble grates to comply with Rule 403; therefore, only 320 rumble grates ((389 +11) x 0.8 = 320) would be needed for compliance with this proposed rule.

~~staff identified 30 facilities with land size in excess of 50 acres, 27 facilities with land size smaller than 50 acres having at least 60 trucks exiting the facilities on any day, of which 8 facilities have 2 exits. Because the majority of the survey responses came~~

~~from large and medium-size facilities, as well as facilities with more than one location, staff assumed that all facilities with land size in excess of 50 acres and all facilities with 2 exits have been identified; hence, staff did not scale up these facilities. Staff has determined that not all facilities with minimum of 60 truck trips have been identified through survey results; therefore, this category was scaled up to include 62 facilities instead of 27 (detailed assumptions and methodology are in Appendix A).~~

~~Staff estimated that 92 facilities would need wheel washers ($30 + 62 = 92$). Due to 8 facilities that have 2 exits, staff estimated that the total of 100 wheel washers ($92 + 8 = 100$) and 397 rumble grates ($389 + 8 = 397$) would be needed for the compliance with PR 1157. To be conservative, staff did not account for the wheel washers and rumble grates that are currently in use or soon to be installed as part of the Rule 403 compliance.~~

Based on the information obtained from NESCO (a vendor of the wheel washers), staff assumed a capital cost of \$40,000 for each wheel washer and \$10,000 for each reclaimed water pond associated with the wheel washer, and a 20% installation fee, which includes soil preparation, equipment installation, and miscellaneous costs. According to a sales representative of Trench Shoring Co (a vendor of the rumble grates), each facility would need one set of rumble grates consisting of 2 panels (10 feet wide x 16 feet long) that cost approximately \$5,000. Since rumble grates can be installed on dirt and do not require grading or paving, staff assumed a 10 % installation fee for this category.

Chutes (Dirt Skirts)

~~PR 1157 requires a chute to be used, at each conveyor transfer point where the material is dropped to an open storage pile. Based on the limited information from the surveys regarding conveyors and the fact that not all conveyors would need a chute, staff assumed that each of the 29 aggregate facilities would need 10 chutes and each of the other 360 facilities would need 5 chutes for the dropping of dry and fine materials to open piles. Staff estimated that a total of 2090 chutes would be required by PR 1157 ($(10 \times 29) + (5 \times 360) = 2090$).~~

~~Since the chute is a simple, low-tech device that is usually made out of rubber, staff assumed a capital cost of \$200 for each chute, a minimal installation fee, and a replacement frequency of once a year.~~

Misting Systems

PR 1157 requires dust suppressants (water and/or chemical) or other dust control methods be used as needed during the loading, unloading, and transferring activity, as well as for process equipment and open storage piles. According to the industry, dust suppressants would be widely used over other dust controls. Dust suppressants are usually delivered through a misting system.

Based on the information obtained from NESCO (a vendor of the misting systems), staff assumed that each facility would need one misting system capable of delivering dust suppressants to various equipment and open storage piles. The cost for each misting system is \$40,000. Staff assumed that 20% of the affected facilities ($389 \times 0.2 = 78$ facilities) are currently using the misting systems to comply with Rule 403, and 311 other facilities would need misting systems to comply with PR 1157. Staff also assumed a 15% installation fee for the misting systems, which covers equipment installation fees and miscellaneous costs.

Paving

For facilities that need both rumble grates and wheel washers:

PR 1157 requires that the roads from the rumble grates and the wheel washers to the exits (leading to paved public roads) be paved. To be conservative, staff did not account for the ~~wheel washers, rumble grates, and pavement that are currently in use or soon to be installed as pavement that is~~ part of the Rule 403 compliance. Staff assumed that 1,200 ft² (60 feet long x 20 feet wide) of paved area would be necessary for the installation of each set of rumble grate and wheel washer (or ~~120,000~~ 109,200 ft² for ~~100~~ 91 sets). The distance of 60 feet long consists of 10 feet between the rumble grate and the wheel washer, 20 feet for the wheel washer, and 30 feet from the wheel washer to the exit.

According to All American Asphalt, approximately 12 lbs of asphalt would be consumed for each square foot of low quality paved road, and approximately \$50 would be charged for each ton of asphalt used (including labor, with the assumption that the ground is firm and does not need a lot of preparation). Staff estimated the tonnage of needed asphalt as follow:

$$12 \text{ lbs/ft}^2 \times (1 \text{ ton} / 2000 \text{ lbs}) \times \del{120,000} 109,500 \text{ ft}^2 = \del{720} 655 \text{ tons}$$

For facilities with rumble grates only:

PR 1157 requires that, at a minimum, washed gravel be applied on roads between the rumble grates and the exits leading to paved public roads. Staff did not account for the costs associated with washed gravel or paved roads since they are part of the Rule 403 compliance program.

Water Consumption

For wheel washers:

From the survey responses and the same methodology of scaling survey data for each category (i.e, aggregate, concrete batching, hot mix asphalt (HMA), concrete product, crushed miscellaneous base, and “other”), staff estimated that on the daily basis, a total of ~~12,859~~ 10,035 trucks from ~~92~~ 80 affected facilities would use wheel washers. Staff did not account for the number of trucks that are washed as part of the Rule 403 compliance. Based on the information on water consumption provided by NESCO (40 gals. of water per truck), staff estimated that PR 1157 would require approximately ~~514,360~~ 401,400 gals. of water per day for the wheel washers.

For storage piles:

Due to the fact that aggregate used for HMA must be dry, staff assumed that all operators of HMA facilities would use silos, bunkers, and/or chemical stabilizers for storage piles instead of water to minimize fugitive dust emissions. As a result, staff did not include storage piles at HMA plants in the water consumption estimates.

Based on the material tonnage data from the surveys and the assumptions of a 20 foot height and a pyramid shape with a square base for storage piles, staff estimated the surface area of piles to be watered for each category. Using the same methodology of scaling survey data and assuming that piles would be watered to a one inch depth per watering (or 3 inch depth per day), staff estimated that 1,798,170 tons of materials would require misting (watering) to comply with PR 1157. Using a water consumption factor provided by NESCO (5 gals. per minute, per 1,000 tons of throughput per hour of process or 0.3 gals. of water per 1,000 tons of materials processed), staff estimated that 539,451 gallons of water per day would be required for the storage piles (see Appendix A for detailed information on water consumption for storage piles). ~~Staff did not account for water that is currently consumed to stabilize the piles as part of the Rule 403 compliance. Using the assumption that 20% of the materials are currently stabilized with water to comply with Rule 403, staff estimated that additional 431,561 gals of water are needed to comply with PR 1157.~~

For loading/unloading/transferring activities and process equipment:

Based on the throughput data obtained from the surveys and the above water consumption factor (0.3 gals. of water per 1,000 tons of materials processed), staff estimated the water consumption for loading, unloading, and transferring activities, as well as for process equipment, such as conveyors, hoppers/surge bins, and screening equipment for each category (including HMA plants). Using the same methodology for scaling survey data, ~~and the assumptions that 20% of the materials are currently stabilized with water while being conveyed,~~ staff estimated that ~~375,245~~ 353,802 gals of water per day would be needed for these activities and process equipment to comply with PR 1157 (see Appendix A for detailed information on water consumption for process equipment). In the estimates, staff also assumed that all crushers and 50% of the screening equipment are either equipped with baghouses (to comply with BACT requirements) or are using dust suppressants to comply with the Rule 403. Therefore, staff accounted for 50% of the screening equipment but no crushers in the water consumption estimates. Staff assumed a cost of \$4 per 1,000 gals of water based on the default number obtained from the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. This unit cost is also consistent with the water costs available on the Metropolitan Water District website.

For watering paved roads at less active facilities (when sweeping are not required):
PR 1157 requires less active facilities (154 facilities) to water 100 feet of their paved roads on the days that sweeping is not conducted. With the assumption that the width of paved road is 20 feet, staff estimated that 308,000 ft² (100 ft x 20 ft x 154 fac.) or 34,222 yd² of paved road would need watering in a day. Based on the information

obtained from NESCO, staff assumed 1 gal of water would be needed to water 1 yd² of paved road. Staff also assumed that 2 waterings per week would be necessary. The following is the calculation of annual water consumption for this category:

34,222 yd²/d x 1 gal H₂O/yd² x 2 days/wk x 52 wks/yr = 3,559,088 gals/yr (or 13,689 gals/d)

Chemical Stabilizer Consumption

PR 1157 requires internal unpaved roads be stabilized with chemical stabilizer. Staff assumed that chemical stabilizer would also be used by HMA plants in addition to other controls to minimize fugitive dust emissions from storage piles.

For internal unpaved roads:

Based on the unpaved roads data obtained from the surveys and the same methodology for scaling survey data, staff estimated that a total of 5,535,870 ft² (184,529 ft long x 30 ft wide) of unpaved roads from 389 facilities would be stabilized with chemical stabilizers. Because unpaved roads for haul trucks usually exist at the aggregate and large facilities, staff assumed that all haul truck unpaved roads have been identified through the survey responses. As a result, staff only scaled up the data associated with internal roads used by other types of vehicles.

Using information obtained from Southwestern Seal Coating, Inc. (a vendor of Magnesium Chloride), staff assumed that a cost of 2 cents per ft² of treated area (including labor), and an application frequency of twice per year.

For storage piles at HMA plants:

Staff assumed that 50% of the piles at HMA plants have been stored in the silos and/or bunkers; therefore only 50% of the piles at those plants would need chemical stabilizer. Using the storage piles data obtained from the surveys and the same methodology of scaling survey data, staff estimated that 263,853 ft² of storage piles at 45 HMA plants would need chemical stabilizer. Staff also assumed that the entire surface areas of these piles would need to be treated 12 times per year.

Sweeping Internal Paved Roads:

Based on the survey responses and the same methodology of scaling survey data presented in Appendix B, staff estimated that 94 facilities would need to sweep their paved roads at the end of each work shift and 252 facilities would need to sweep their paved roads by the end of every other day due to their truck trips. Some of those affected facilities have indicated in the surveys that they currently sweep their paved roads. Based on such information and the scaling methodology, staff estimated that 38 facilities would need daily sweeping and 154 facilities would need less frequent sweeping (every other day) to comply with PR 1157.

For the daily sweeping category, staff assumed that each of the 8 aggregate facilities would need two hours of sweeping per day (based on their 2 work shifts per day) and each of the other 30 facilities would need 1 hour of sweeping per day. For the less

frequent sweeping category, staff assumed that each of the 154 affected facilities would need 1 hour of sweeping per day (minimum amount charged for the sweeping service). Staff assumed the cost of sweeping service to be \$80 per hour (including fuel, sweeper, and driver costs, based on information obtained from a sweeping service company).

Daily hours of sweeping required for 8 aggregate facilities:

$$2 \text{ hrs/d} \times 8 = 16 \text{ hrs/d}$$

Daily hours of sweeping required for 30 other facilities:

$$1 \text{ hr/d} \times 30 = 30 \text{ hrs/d}$$

Total weekly hours of frequent sweeping:

$$(16 \text{ hrs/d} + 30 \text{ hrs/d}) \times 5 \text{ days/wk} = 230 \text{ hrs/wk}$$

Total weekly hours of less frequent sweeping:

$$1 \text{ hrs/d} \times 154 \text{ fac} \times 3 \text{ days/wk} = 462 \text{ hrs/wk}$$

Total annual hours of sweeping for both categories:

$$(230 \text{ hrs/wk} + 462 \text{ hrs/wk}) \times 52 \text{ wks/yr} = 35,984 \text{ hrs/yr}$$

Water Trucks:

Staff assumed that on one day, a less active facility would need 1 hour of water truck rental at a cost of \$70/hr (including fuel, water truck, and driver costs) provided by Ron's Water and A&W Water Service. Staff assumed that these facilities would need to have water trucks for 2 times per week. The cost of the water trucks would be significantly less if the facilities elect to rely on the in-house watering techniques that do not require water trucks.

(B) Capital Costs

For wheel washers (WW)

Cost of 100 WW:

$$\text{\$40,000} \times 100 = \text{\$4,000,000}$$

Installation fees for 100 WW (20% of the capital cost):

$$\text{\$4,000,000} \times 0.2 = \text{\$800,000}$$

Total cost for 100 WW:

$$\text{\$4,000,000} + \text{\$800,000} = \text{\$4,800,000}$$

Cost of 91 WW and 91 Reclaimed Water Ponds associated with wheel washers:

$$(\text{\$40,000} + \text{\$10,000}) \times 91 = \text{\$4,550,000}$$

Installation fees for 91 WW and 91 Reclaimed Water Ponds (20% of the capital cost):

$$\text{\$4,550,000} \times 0.2 = \text{\$910,000}$$

Total cost for 91 WW and 91 Reclaimed Water Ponds:

$$\text{\$4,550,000} + \text{\$910,000} = \text{\$5,460,000}$$

For rumble grates (RB)

~~Cost of 397 RG:~~

$$\text{\$5,000} \times 397 = \text{\$1,985,000}$$

~~Installation fees for 397 RG (10% of the capital cost):~~

$$\text{\$1,985,000} \times 0.1 = \text{\$198,500}$$

~~Total cost for 397 RG:~~

$$\text{\$1,985,000} + \text{\$198,500} = \text{\$2,183,500}$$

Cost of 320 RG:

$$\text{\$5,000} \times 320 = \text{\$1,600,000}$$

Installation fees for 320 RG (10% of the capital cost):

$$\text{\$1,600,000} \times 0.1 = \text{\$160,000}$$

Total cost for 320 RG:

$$\text{\$1,600,000} + \text{\$160,000} = \text{\$1,760,000}$$

For misting systems

Cost of 311 misting systems:

$$\text{\$40,000} \times 311 = \text{\$12,440,000}$$

Installation fees for 311 misting systems (15% of the capital cost):

$$\text{\$12,440,000} \times 0.15 = \text{\$1,866,000}$$

Total cost for 311 misting systems:

$$\text{\$12,440,000} + \text{\$1,866,000} = \text{\$14,306,000}$$

For paving

$$(\text{\$50/ ton}) \times 729.655 \text{ tons} = \text{\$36,000 32,750}$$

Total Capital Costs for PR 1157:

$$\text{\$4,800,000} + \text{\$2,183,500} + \text{\$14,306,000} + \text{\$36,000} = \text{\$21,325,500}$$

$$\text{\$5,460,000} + \text{\$1,760,000} + \text{\$14,306,000} + \text{\$32,750} = \text{\$21,558,750}$$

(C) O & M Costs

Cost of water consumption for wheel washers:

$$(\$4/1,000 \text{ gals}) \times (\del{514,360} \underline{401,400} \text{ gals/day}) \times 260 \text{ (days/yr)} = \del{\$534,934} \underline{\$417,456/\text{yr}}$$

Cost of water consumption for storage piles:

$$(\$4/1,000 \text{ gals}) \times (\del{539,451} \underline{431,561} \text{ gals/day}) \times 260 \text{ (days/yr)} = \del{\$561,029} \underline{\$448,823/\text{yr}}$$

Cost of water consumption for unloading/loading/transferring activities and process equipment:

$$(\$4/1,000 \text{ gals}) \times (\del{375,245} \underline{353,802} \text{ gals/day}) \times 260 \text{ (days/yr)} = \del{\$390,255} \underline{\$367,954/\text{yr}}$$

Cost of watering paved road at less active facilities (when sweeping are not required):

$$\underline{\$4/1000 \text{ gals} \times 3,559,088 \text{ gals/yr} = \$14,236/\text{yr}}$$

Total Cost of Water Consumption for PR 1157:

$$\del{\$534,934 + \$561,029 + \$390,255} = \underline{\del{\$1,486,218/\text{yr}}}$$

$$\underline{\$417,456 + \$448,823 + \$367,954 + \$14,236 = \$1,248,469/\text{yr}}$$

Cost of chemical stabilizer for unpaved roads:

$$(\$0.02/\text{ft}^2) \times 5,535,870 \text{ ft}^2 \times (2/\text{yr}) = \$221,435/\text{yr}$$

Cost of chemical stabilizer for storage piles at HMA plants:

$$(\$0.02/\text{ft}^2) \times 263,853 \text{ ft}^2 \times (12/\text{yr}) = \$63,325/\text{yr}$$

Total Cost of Chemical Stabilizer for PR 1157:

$$\$221,435/\text{yr} + \$63,325/\text{yr} = \underline{\$284,760/\text{yr}}$$

~~For chutes (dirt skirts)~~

~~Cost of 2090 chutes:~~

$$\underline{\del{\$200 \times 2090 = \$418,000}}$$

Annual cost for sweeping:

$$\underline{\$80/\text{hr} \times 35,984 \text{ hrs/yr} = \$2,878,720/\text{yr}}$$

Annual cost for renting water trucks:

\$70/hr x 1 hr/d/fac x 2 days/wk x 52 wk/yr x 154 fac = \$1,121,120/yr

O/M Cost for wheel washers (10% of capital cost):

0.1/yr x \$4,550,000 = \$455,000/yr

O/M Cost for misting system (5% of capital cost):

0.05/yr x \$12,440,000 = \$622,000/yr

Total O & M Costs for PR 1157:

\$1,486,218/yr + \$284,760/yr + 418,000/yr = **\$2,188,978/yr**

\$1,248,469/yr + \$284,760/yr + \$2,878,720/yr + \$1,121,120 + \$455,000/yr + \$622,000/yr = **\$6,610,069/yr**

(D) Cost-effectiveness Analysis

Staff multiplied the total capital cost by a capital recovery factor (CRF) of 0.123 to annualize such cost, based on a 10-year period (the assumed equipment lifetime) and a 4 percent real interest rate assumption. Staff estimated the total annualized cost for PR 1157 as follow:

Total Annualized Cost = (Total Capital Cost x CRF) + O & M Cost

= 21,325,500 x 0.123) + \$2,188,978 = \$4,812,015

(21,558,750 x 0.123) + \$6,610,069 = \$9,261,795

Staff used the Discounted Cash Flow (DCF) method and the present value factor of 8.11 to compute the present value of the PR 1157 compliance cost over a 10-year period and with a 4 percent real interest rate. DCF cost-effectiveness was then calculated as follow:

$$\text{Cost-effectiveness} = \frac{\text{Capital Costs} + (\text{Annual O \& M Costs} \times 8.11)}{\text{Emission Reductions}_{\text{tons/yr}} \times 10 \text{ yrs}}$$

= $\frac{\$21,325,500 + (\$2,188,978 \times 8.11)}{18.2 \text{ t/d} \times 365 \text{ d/yr} \times 10 \text{ yrs}}$

= $\frac{\$21,558,750 + (\$6,610,069 \times 8.11)}{18.2 \text{ t/d} \times 365 \text{ d/yr} \times 10 \text{ yrs}}$

Cost-effectiveness = \$1,132/ton of PM10 reduction

~~Cost-effectiveness = \$588/ton of PM10 reduction~~

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires an assessment of incremental cost effectiveness for proposed regulations relative to ozone, CO, SO_x, NO_x, and their precursors. Incremental cost effectiveness is defined as the difference in control costs divided by the difference in emission reductions between the most stringent option compared with the next less costly control option. PR 1157 requirements are for the reduction of primary PM10 emissions; hence this statute is not applicable.

CHAPTER V

PROPOSED RULE 1157

- ✓ Rule Summary
- ✓ Comparative Analysis
- ✓ Draft Findings
- ✓ Conclusion

RULE SUMMARY

PR 1157 was developed based on staff evaluation and input from the PR 1157 Working Group (consisting of AQMD staff, consultants, and representatives from the aggregate and related operations), the Southern California Rock Products Association (SCRPA), the Southern California Ready Mixed Concrete Association (SCRMA), the California Trucking Association, and the city of Irwindale. PR 1157 can be summarized as follows:

1. **General Performance Standards:**

- No ~~time-averaged or intermittent~~ dust emissions exceeding 20% opacity are allowed from any activity, equipment, storage pile, or disturbed surface area, based on an average of 12 consecutive readings, or
- No ~~instantaneous~~ five individual, consecutive dust emissions exceeding 50% opacity are allowed from any activity, equipment, storage pile, or disturbed surface area, or
- No dust plume exceeding 100 feet is allowed from any activity, equipment, storage pile, or disturbed surface area.
- No spillage is allowed on internal paved roads. Alternatively, all spillage shall be stabilized and be removed by the end of the day.
- Other spillage and carry-back shall be stabilized until removal.
- Sufficient dust suppressants (chemical and/or water) or other dust controls shall be used as necessary to comply with the first three performance standards.
- Specifications of gravel pad

2. **Compliance Dates:**

~~November 1~~December 3, 2005: for the implementation of wheel washers, rumble grates, ~~and~~ truck washers, and the 50% opacity limit. July 1, 2005: for all other requirements.

3. **Proposed Control Measures:**

- Loading, Unloading and Transferring:
 - ✓ ~~Existing operation: use~~ Apply dust suppressants or other dust control methods at each emission source during loading, unloading, or transferring activities as necessary.
 - ✓ ~~New operation: comply with best available control technology (BACT) required by the Executive Officer.~~
- Conveyor:
 - ✓ Apply dust suppressants or other dust control methods at the conveyor including all transfer points as necessary.
 - ✓ ~~Release the materials through a chute while dropping them to open storage piles.~~

- Crushing Equipment:
Utilize baghouses. Alternatively, apply dust suppressants or other dust control methods at the crusher including all discharge points during crushing activities as necessary.
- Screening Equipment:
 - Use enclosures and baghouses for outdoor screening equipment. Alternatively, apply dust suppressants or other dust control methods at the screening equipment including all discharge points during screening activities as necessary.
- Storage Piles:
 - ✓ Stabilize the entire surface area of the open piles. Alternatively, store the materials in a silo or a bunker; maintain at least two feet of freeboard; and stabilize the sides of the pile that are not surrounded by ~~concrete~~ non-porous walls (for bunkers).
 - ✓ Re-stabilize the disturbed areas of the piles at the end of each work ~~shift~~ day in which loading/unloading occurs.
 - ✓ No open storage pile greater than eight feet high is allowed within 300 feet of off-site occupied buildings or houses. Alternatively, utilize a water irrigation system to stabilize the entire surface of the piles.
- Internal Roads:
 - o Unpaved Roads for Haul Trucks:
 - ✓ Apply chemical stabilizers so that the surface is stabilized.
 - ✓ Post signs limiting haul trucks to these roads.
 - o Unpaved ~~Non-Haul Roads~~~~Roads for Other Trucks/Vehicles, Parking and Staging Areas:~~
 - ✓ Apply ~~dust suppressants~~ chemical stabilizers so that the surface is stabilized, or ~~large, washed gravel pad of six inch depth~~ a gravel pad that meets the specifications in the rule.
 - o Paved Roads:
 - ✓ Active facility/operation (with a minimum of 60 aggregate and/or mixer trucks on any day): sweep the internal paved roads by the end of each work shift.
 - ✓ Less active facility/operation (with less than 60 aggregate and/or mixer trucks on any day): sweep the internal paved roads by the end of every other work day. Apply water as necessary on the days that sweeping is not required.
 - ✓ Sweepers that are purchased after December 3, 2004 shall meet the criteria of PM10-efficient Rule 1186-certified sweepers.

- ✓ New operation: ~~water—and~~ sweep the roads with a Rule 1186-certified sweeper ~~by the end of each work shift.~~
 - ✓ ~~Existing operation: water and sweep the roads by the end of each work shift.~~
- Track-Out:
 - *All Facilities:*
 - ✓ All loads on aggregate trucks are leveled, maintained with at least 6 inches of freeboard, and either tarped or stabilized.
 - ✓ Post signs at the exits regarding requirements for load leveling, ~~and~~ freeboard maintenance, and tarping or stabilizing.
 - ✓ Install a rumble grate, a wheel washer, or a truck washer at no less than 30 feet from each exit, unless demonstrate the adequacy of a control system at shorter distance in preventing track-out.
 - ✓ Apply ~~large, washed~~ gravel pad ~~of at least 6 inch depth that meet the specifications in the rule~~ to roads from the rumble grate, wheel washer, or truck washer to public paved road (if such roads are not paved).
 - ✓ Ensure the proper use of rumble grate, wheel washer, or truck washer.
 - ✓ Post sign to restrict the speed limit to 5 miles per hour for using the above track-out control equipment.
 - ✓ Provide information regarding track-out to truck company and/or broker.
 - *New, Permanent Operations with Certain Criteria and ~~Large-or~~ Active Existing, Permanent Operations:*
 - ✓ Install both rumble grate and wheel washer at no less than 30 feet from each exit, unless otherwise exempt. Install rumble grate within 10 feet from the wheel washer.
 - ✓ Ensure the effectiveness and proper use of the rumble grate and the wheel washer.
 - ✓ Post sign to restrict the speed limit to 5 miles per hour for traveling over the rumble grate and wheel washer.
 - ✓ Pave the roads from the rumble grate and the wheel washer to the exits.
4. **Additional Requirements Triggered by Recurrent Violations:**
Existing operation located within 500 meters of a sensitive receptor or off-site occupied buildings, with three approved emission related violations of Rule 1157 in one calendar year starting from ~~August 1~~ December 3, 2005 would be required to:
- Submit an Emission Reduction Plan.
 - Include the following in the Emission Reduction Plan: (1) additional emission control measures sufficient to remedy the causes of the recurrent violations and prevent future violations, and (2) implementation schedule

- Revise a disapproved Emission Reduction Plan and re-submit it within 30 days of receipt of notice of disapproval

5. **Exemptions**

- Exemptions from Opacity and Dust Plume Limits
 - ✓ ~~Equipment maintenance activities that are scheduled at least 48 hours in advance~~
 - ✓ ~~Equipment breakdown, subject to Rule 403~~
 - ✓ The first 8 hours of the equipment of the new equipment initial start-up and the first 2 hours of the equipment start-up after a repair or after a maintenance activity scheduled at least 48 hours in advance
 - ✓ Blasting operations
 - ✓ During high winds, facilities will be exempt from the opacity and dust plume limits if all activities and/or process equipment are ceased. Hot mix asphalt and concrete batching facilities are exempt during high winds without ceasing operations directly related to their productions to support an on-going construction project.
- Internal unpaved non-haul roads are exempt from stabilization if they are used less than twice a day and other restrictions are applied.
- Scalping screens are exempt from the enclosure.
- Empty haul trucks traveling to and from maintenance areas may travel on stabilized internal unpaved non-haul roads
- Facilities are exempt from the use of chemical dust suppressants for internal unpaved roads if its use violates the rules and/or regulations of other agencies. Alternatively, water shall be used to stabilize the unpaved roads, providing that the operator notify the Executive Officer in writing 30 days prior to the use of water.
- Carry-back that is generated by the tunnel feed is exempt from the stabilization and removal requirements.
- Truck trimming areas are exempt from the stabilization and removal requirements.
- Facilities that do not generate truck trips are exempt from the requirements for track-out
- The following are not required a wheel washer:
 - ✓ Ready-mix and hot mix asphalt facilities that have their internal roads all paved. The facilities are instead required to have a rumble grate or a truck washer.
 - ✓ Facilities with less than 5 acres in land size and handle recycled asphalt and recycled concrete, provided the facility installs a rumble grate and applies a gravel pad that meets the specifications in the rule.
 - ✓ Facilities that pave a minimum of ¼ mile from the rumble grate to the facility exit leading to a paved public road.

- ✓ Infrequent mining operations, provided they install a rumble grate and apply a gravel pad that meets the specifications in the rule.
- Open storage piles where 90% of their volume contain materials that are larger than ½ inch are exempt from the Stabilized Surface Test methods, providing such piles meet the opacity and plume limits

COMPARATIVE ANALYSIS

As required by Health and Safety Code Section 40727.2, the purpose of this analysis is to identify and compare any other AQMD or federal regulations that apply to the same equipment or source type.

Currently, there are no federal regulations that specify the emission controls for equipment, processes, storage piles, internal roads, and track-out at the aggregate and related operations.

The aggregate and related operations are currently subject to AQMD Rule 403. While Rule 403 allows a choice of compliance options for general fugitive dust sources, PR 1157 specifies the emission control measures that go beyond Rule 403 requirements.

Comparison of PR 1157 and other Regulations/Rules

<u>Rule</u>	<u>Source</u>	<u>Emission Reductions / Limits</u>	<u>Averaging Procedures (Units), Work Practices, Operating Provisions</u>	<u>Monitoring, Recordkeeping, Reporting, Test Methods</u>
<u>AQMD 401</u>	<u>Any single source of emissions; would include exhaust stack emissions.</u>	<u>Prohibits excess visible emissions ⁽¹⁾</u>	<u>20 percent opacity can not be exceeded three minutes in any hour, cumulatively.</u>	<u>Test methods – Ringlemann chart or U.S. EPA Method 9</u>
<u>AQMD 402</u>	<u>Any source</u>	<u>Prohibits public nuisance caused by emissions of air contaminants ⁽²⁾</u>	<u>None</u>	<u>None specified.</u>
<u>AQMD 403</u>	<u>Any source</u>	<u>Prohibits excess visible emissions ⁽³⁾</u>	<ul style="list-style-type: none"> ▪ <u>20 percent opacity limit for fugitive dust resulting from vehicular movement, and no visible emissions crossing any property line</u> ▪ <u>Requires use of Best Available Control Measures (BACM)</u> ▪ <u>Prohibits exceeding 50 ug/m³ of PM10 for upwind/downwind sampling during any five hour period</u> ▪ <u>Prevent or remove trackout</u> ▪ <u>Special requirements for large operations</u> ▪ <u>Exemption for sources with Rule 1158 plans</u> 	<u>Test methods in Rule 403 Fugitive Dust Implementation Handbook</u>

- ⁽¹⁾ PR 1157 provides a lower limit for visible emissions than Rule 401. PR1157 would limit sources to no visible emissions in excess of 20% opacity (based on an average of 12 consecutive readings) or no four individual, consecutive readings in excess of 50% opacity, and in excess of 1 minute or 3 minutes within one hour depending on the test methods. In addition, PR 1157 would limit sources to no visible emissions in excess of 100 feet from any direction. Rule 401 limits visible emissions to Number 1 Ringlemann or 20% opacity in excess of three minutes within any hour.
- ⁽²⁾ PR 1157 requirements are applicable regardless of whether public complaints are filed. Rule 402 provisions are implemented primarily in response to public complaints
- ⁽³⁾ PR 1157 sets specific requirements for various pieces of equipment and/or activities in addition to the general performance standards. These performance standards are more stringent than Rule 403. In addition to the opacity threshold and the visible emission limit, the standards in PR 1157 also require good housekeeping at the facility to prevent track-out as well as visible dust emissions.

<u>AQMD 403.1</u>	<u>Any source</u>	<u>Prohibits excess visible emissions ⁽⁴⁾</u>	<u>Establishes special requirements (i.e., no agricultural tilling when wind speeds exceed 25 mph</u>	<u>Test methods in Rule 403.1 Fugitive Dust Implementation Handbook</u>
<u>AQMD 404</u>	<u>Any source</u>	<u>Prohibits discharge of particulate matter in excess of certain rates ⁽⁵⁾</u>	<u>Based on grains per cubic foot of air stream.</u>	<u>None specified.</u>
<u>AQMD 405</u>	<u>Any source</u>	<u>Prohibits discharge of particulate matter weight in excess of specified rates ⁽⁶⁾</u>	<u>Establishes maximum discharge rate (lbs./hr.) based on process weight per hour.</u>	<u>None specified.</u>
<u>EPA 40 CFR Part 60, Subpart OOO</u>	<u>New emission sources</u>	<u>Prohibits excess visible emissions ⁽⁷⁾</u>	<u>7 percent opacity limit for stacks; 10 percent opacity limits for conveyors; 15 percent opacity for crushers.</u>	<u>Test Methods - U.S. EPA Method 9</u>
<u>EPA 40 CFR Part 60, Subpart I</u>	<u>New emission sources and applicable to hot mix asphalt facilities.</u>	<u>Prohibits visible emissions and discharge of particulate matter in excess of certain rate ⁽⁸⁾</u>	<u>20 percent opacity or a 90 mg/dscm of PM limit</u>	<u>Test Method – U.S. EPA Method 9</u>

DRAFT FINDINGS

Before adopting, amending or repealing a rule, the AQMD shall make findings of necessity, authority, clarity, consistency, non-duplication and reference, as defined in Health and Safety Code Section 40727, and determine that there is a problem that the proposed rule will alleviate, as required by Health and Safety Code Section 40001(c). The draft findings are as follows:

Necessity - The AQMD Governing Board finds and determines that Proposed Rule 1157 - PM10 Emission Reductions from Aggregate and Related Operations is necessary in order to reduce PM10 emissions from this type of operation. This can be

⁽⁴⁾ Rule 403.1 is only applicable to Coachella Valley fugitive dust sources.

⁽⁵⁾ Fugitive dust sources subject to PR 1157 include both permitted and non-permitted sources. Rule 404 is used in conjunction with the AQMD's permitting system.

⁽⁶⁾ As mentioned, fugitive dust sources subject to PR 1157 include both permitted and non-permitted sources. Under Rule 405, stack emissions are addressed through the permit evaluation process.

⁽⁷⁾ PR 1157 provides a limit for visible emissions for existing emission sources. In general, new emission sources are required to comply with Subpart OOO. PR 1157 sets a 20% opacity limit for the transfer points where materials are dropped onto the open storage piles, and for activities such as loading/unloading/transferring. Subpart OOO does not cover the transfer points and exempt the dumping of materials where fugitive dust emissions are typically greatly generated.

⁽⁸⁾ As mentioned, PR 1157 provides the same limit for visible emissions as Subpart I. PR 1157 is applicable for existing emission sources, while Subpart I is applicable to new hot mix asphalt facilities

achieved through the application of feasible technology and will assist in accomplishing AQMP goals.

Authority - The AQMD Governing Board obtains its authority to adopt, amend or repeal rules and regulations from Health and Safety Code §§40000, 40440, 40463, and 40725 through 40728.

Clarity - The AQMD Governing Board finds and determines that Proposed Rule 1157, as written, takes into consideration public comments from persons affected by the rule, and as a result, can be easily understood by persons directly affected by it.

Consistency – The AQMD Governing Board finds and determines that Proposed Rule 1157 is in accordance with, and not in conflict with or contradictory to, existing statutes, court decisions, or federal or state regulations.

Non-Duplication – The AQMD Governing Board has determined that Proposed Rule 1157 does not impose the same requirements as any existing state or federal regulation, and the proposed rule is necessary and proper to execute the powers and duties granted to, and imposed on the AQMD.

Reference - In adopting these proposed amendments, the AQMD Governing Board references the following statutes which AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001, 40440 (a), and 40440 (b).

Problem - The AQMD Governing Board determines that there is a problem that Proposed Rule 1157 – PM10 Emission Reductions from Aggregate and Related Operations, will alleviate namely exceedences of PM10 standards and public nuisances, and the proposed adoption will promote the attainment or maintenance of state or federal ambient air quality standards.

CONCLUSION

The proposed rule reflects reasonable available control technology for the reduction of PM10 emissions from various equipment and processes, storage piles, internal roads, and track-out at the aggregate and related operations. The implementation of the rule as proposed is estimated to reduce 6,643 tons/year (18.2 tons/day) of PM10 at an overall cost-effectiveness of \$588 per ton of PM10 reduced.

CHAPTER VI

COMMENTS AND RESPONSES

COMMENTS AND RESPONSES

Implementation and Compliance Deadlines in the Rule

1. **Comment:** In the district's proposed rule, new facilities are subject to certain more stringent requirements than those applicable to existing facilities. District staff defines new facilities as those that *begin operation* after the adoption date of this proposed rule. Because of lead times for ordering and delivery of equipment, it is more reasonable to tie the definition of a new facility to the receipt of a district permit or a determination of completeness of an application. (SCRPA)

Response: Staff agrees with the commenter. The definitions of existing facility has been changed such that an existing facility is one that is operating or one whose application for a Permit to Construct has been deemed complete on or before ~~the adoption date of the rule~~ December 3, 2004. Similarly, a new facility is now defined as a facility that is not operating or who does not have an application deemed complete as of ~~the adoption date of the rule~~ December 3, 2004.

2. **Comment:** We propose that the rule be implemented at existing facilities within one year of its promulgation. (SCRPA)

Response: Staff has concluded that separate compliance dates are appropriate for the two general sets of requirements provided that the industry meets the performance standards at all times: These two sets of prescriptive requirements are as follows: (1) housekeeping and dust suppressant requirements and (2) equipment requirements such as rumble grates, wheel washers, and truck washers. Thus, staff has proposed that the housekeeping (such as sign posting) and suppressant application requirements be in place for all facilities subject to this proposed rule by July 1, 2005. Equipment such as wheel washers, rumble grates, and truck washers should be in place within one year of adoption of the proposed rule (by December 3~~November~~, 2005). This will give time for the large and small facilities to order equipment and have it in place for compliance with the rule requirements.

3. **Comment:** ~~Subparagraph (f)~~ The “bump up provision” of proposed Rule 1157 would require a facility operator to expend funds to modify and/or add equipment at its facility if the operator received three or more notices of violation issued by district personnel within any three calendar years for a specific source of emissions at the facility. The type of equipment modification would vary depending on the specific emission source. We oppose this provision, ~~known as the “bump up provision”~~ in its entirety and request that it be removed from the proposed rule. We are submitting legal arguments that are summarized as follows: (1) this provision would result in an unconstitutional denial of due process because there is no provision for a hearing on the costs of the additional controls. The bump up provisions equate a notice of violation with a finding of guilt with no opportunity to present other evidence and (2) this provision is inconsistent with and circumvents the Health and Safety Code regarding

SCAQMD authority to enforce air pollution regulations. (Curt Coleman for SCRPA/SCRMCA)

Response: Staff has re-drafted this bump up provision to require the facility/operation to submit an Emission Reduction Plan that includes: (1) additional emissions control measures sufficient to remedy the causes of the recurrent violations and prevent future violations, and (2) the implementation schedule.

Staff has also specified that the Emission Reduction Plan requirement only goes into effect upon having three approved violations that have been confirmed by settlement or judicial determination so a facility has an opportunity for a hearing on the violation.

Track out and Related Requirements

4. **Comment:** Section (d)(8)(A) of the proposed rule requires that the facility operator ensure that truck drivers level and cover (tarp) their loads prior to exiting the aggregate facility. There should be a standard for defining “leveling” and the district should reference the existing state motor vehicle code for leveling instead. Also, the exemption language in the rule should be changed to exempt 3/8” and larger rock, instead of ½ “and larger rock. (Ca. Dump Truck Owners Assn.)

The tarping requirement is a “huge financial burden” and may pose a risk to driver safety. (same as above)

Facilities and their operators cannot be burdened with enforcing local and state ordinances that govern truck drivers on public roads. This should be left up to the district or other law enforcement officials. (SCRPA)

Response: Staff has agreed to change the language ~~in section (d)(8)(A) of the proposed rule~~ to require facilities and operations to post signs at facility exits stating that loads must be leveled and ~~that drivers should~~ maintained a minimum of 6 inches of freeboard prior to entering public roads. ~~(subparagraph (d)(8)(B)).~~ However, EPA has recently indicated in a letter that the operator and/or the truck driver must ensure that loads are leveled, maintained with at least 6 inches of freeboard, and be either tarped or stabilized. Language to this effect has been inserted into the proposed rule (subparagraph (d)(8)(A). EPA Region IX has stated that the rule is not approvable without this language. See response to Comment No. 5 below for more detail.

Staff has also deleted the particle size and moisture thresholds due to broader comments from the industry. As a result, the exemption for 3/8” or larger rocks from the leveling requirement is no longer necessary.

5. **Comment:** The proposed rule requires the facility operator to ensure transport trucks have either covered or stabilized their loads. The California Vehicle Code has specific provisions for freeboard and/or load covering. Compliance is the responsibility of the truck operator and is monitored by the Highway Patrol or Local Law Enforcement. The operators of these facilities typically do not own or control these trucks. Only the truck operator has control over his vehicle. In addition, the rule contains no test method for evaluating stabilization of material that has been loaded in a truck. (SCRPA)

Response: As mentioned in the comment above, EPA has sent a comment letter on the rule asking for tarping or stabilization of aggregate material loads in the beds of trucks exiting facilities. EPA has stated that the proposed rule cannot be approved by the agency in the absence of this requirement. EPA states that “tarping or watering of truck loads addresses both windblown dust emissions as well as emissions from bulk materials that fall onto paved roads and are re-entrained by vehicle traffic.” Thus, staff has proposed the incorporation of similar language that EPA has approved in a bulk handling rule recently adopted by the San Joaquin Valley APCD. District staff has stated that the facilities **shall** post signs, **make space available to the drivers to tarp or wet their loads, and take some reasonable steps to comply with the requirement. In addition, the rule requires the operators to stabilize the loads if they’re not tarped or suitably covered by the drivers.**

The test for stabilization of the materials will be the opacity test method 9B found in Appendix B of the staff report for this proposal. The stabilization must be sufficient to meet the performance standards in (d)(8)(A) which are the opacity and plume distance standards.

- ~~5.6.~~ **Comment:** Your proposal requires that rumble grates and wheel washers be located within 30 feet of the exit to a public road. Compliance is not possible at small facilities where there simply is not enough room to provide such a separation between this equipment and the public road. (Irwindale Task Force)

Response: ~~Staff understands the problem with space at smaller aggregate processing facilities. Smaller and less active facilities are not required to install wheel washers but must have rumble grates.~~ The purpose of the 30 foot threshold of paved road requirement prior to each exit is to reduce the likelihood that dust will remain on the wheels and cause a track out of dirt onto a public roadway. Staff has re-drafted the language of this section to require that allow existing facilities must to demonstrate to the district, within 90 days of the adoption date of the rule, by July 1, 2005 that it is technically infeasible to be able to provide this separation distance and demonstrate that the applicable control equipment at a shorter distance will be adequate to prevent track-out. New facilities shall provide such demonstration no later than the beginning of its operation.

7. **Comment:** Many of our facilities have all of their internal roads paved and the opportunities for spills of aggregate materials are rare. These conditions are most commonly found at hot mix asphalt and concrete batching plants where the product is metered into enclosed trucks. Because of the generally high number of daily truck trips, these facilities are required under the proposed rule to have both a rumble grate and a wheel washer to prevent track out. We believe that regular sweeping of these paved roads is very effective and should be substituted for the wheel washer requirement. (SCRPA)

Response: Staff agrees that a limited exemption, only to the requirement for wheel washers, should be placed into the rule in subparagraph (h)(10) (A) for ready mix and hot mix asphalt plants **having all paved roads**. These facilities will still be required to have a rumble grate or a truck wash **that meets the specifications in the rule**, and they must perform regular sweeping as currently proposed under Section (d)(7)(C). Staff has also drafted a limited exemption from the wheel washer requirements, provided **a** facility handling recycled asphalt and concrete is limited in land size, and/or paves a minimum of ¼ mile from the rumble grate to the facility exit. (Subparagraphs (h)(10)(B) and (h)(10)(C).)

8. **Comment:** Facilities with a land size of less than 5 acres should be excluded from the requirement for a wheel wash even if their truck trips exceed 60 per day or their daily through put exceeds 750 tons per day. A one inch gravel pad and a rumble grate should be sufficient to prevent track out from the facility. (SCRPA)

What if existing facilities with a lot of truck traffic do not have room for a wheel washer system? These systems need room for silt ponds, settling basins and other support equipment. (Justice and Associates)

Response: Staff agrees in part. Even small facilities can create problems with track out to public roads and they are often located near to residences and office buildings. However, some facilities may not have enough space for these systems. Staff has provided a limited exemption from the wheel washer requirement for facilities of less than 5 acres in land size (subparagraph (h)(10)(B) and has inserted language in the same paragraph to limit the exemption to recycled asphalt and concrete facilities. The facility must install a rumble grate and a well-constructed gravel pad meeting the specifications in a new proposed section of the rule at subparagraph (d)(1)(E). This must be applied on the entire unpaved non-haul road leading to a paved road.

9. **Comment:** Why are you requiring that facilities with paved roads conduct such high frequency sweeping?. These may actually be a disincentive for facilities to pave their roads as a dust reducing strategy. (Justice and Associates)

Is sweeping required after short (i.e. 2 hour) work shifts? (SCRPA)

Response: Staff has modified their original proposal somewhat to accommodate the commenters' concern. The current staff proposal requires that facilities with less than 60 truck trips per day to sweep every other day. More active facilities will still be required to sweep at the end of each work shift (subparagraph (d)(7)(C)).

10. Comment: Due to the configuration of our site, the wheel washer and rumble grate are unnecessary. Our site is paved from the asphalt plant through the dispatch area to the major thoroughfares. There is over ¼ mile of paved road from the aggregate loading to our property line and over ½ mile of pavement between our property line and the public thoroughfares. There is minimal track out during the day. (Granite Construction Co.)

Response: Staff has concluded that paving of internal roads is an effective dust control method. Therefore, staff has modified the propose rule language to offer paving a minimum of ¼ mile ahead of the rumble grate to the facility exit as an alternative to the requirement for installation of a wheel washer (subparagraph (h)(10)(C)).

Applicability of the Rule: Related Operations

6.11. Comment: All references to particulate matter should reference and specifically define PM10 emissions since the proposed rule sets out to control PM10. (SCRPA)

Response: Staff has changed the purpose section of the rule to state that the purpose of the rule is to reduce PM10 emissions. PM10 is already defined in the proposed rule as particulate matter with an aerodynamic diameter smaller than or equal to 10 microns.

7.12. Comment: Our facility is constructing a major raw water conveyance facility in San Bernardino and Riverside counties. This is a tunneling operation. The wet spoils are conveyed to a temporary stockpile and then to dump trucks for transport to a nearby location to be used a fill material. No processing occurs. The spoils are used "as is." Is our facility subject to PR 1157? (Metropolitan Water District)

Response: This facility is not subject to PR 1157 but is subject to the requirements of Rule 403 that governs fugitive dust emissions from man-made fugitive dust sources. This tunneling operation cannot be characterized as an aggregate processing facility or a related operation because the materials are not processed in any way.

8.13. Comment: Our facility owns land that is a source of decomposed granite material that is spread on our unpaved roads. A bulldozer rips the granite from a hillside in a large pit. Due to the physical composition of the decomposed granite, very little dust is generated from the operation. The granite is stored in piles and

hauled away for use. The granite is used “as is”, and does not undergo further processing. It is our belief that this operation would not be subject to PR 1157. (Metropolitan Water District)

Response: Staff agrees. Staff examined samples of the granite and looked at pictures of the operation supplied by this commenter. This cannot be classified as an aggregate processing facility or related operation.

9.14. Comment: Does PR 1157 exempt grading operations that are excavating dirt, sand and rock? (Several commenters)

Response: These operations are exempt from PR 1157 but are subject to Rule 403, Fugitive Dust and as such, are subject to its requirements for preventing, reducing and mitigating fugitive dust emissions.

15. Comment: We operate a Class III landfill. The primary wastes that we landfill are residential and commercial non-hazardous wastes. We accept very limited quantities of construction debris, some of which are landfilled, along with green waste that are used as a state approved alternative daily cover. Does the staff agree that we are not subject to this rule? (LA County Sanitation District)

Response: Due to the unexpected and usually very small amount of construction debris received as part of the residential and commercial wastes, staff agrees that a Class III landfill should not be considered an inert landfill and therefore, is not subject to Rule 1157. Further conversation with the commenter also revealed that this operation does not process the aggregate materials that they receive except to crush some of the material to reduce the burden on the landfill before applying it as alternative daily cover. Commenter is reminded that the landfill does fall under the requirements of Rule 403 for controlling fugitive dust and track out.

16. Comment: We know of two facilities (Reliance II and Glen Oaks landfills) that accept construction/demolition debris that is currently off loaded and pushed into a pit to level the former pit. We are seeking an exemption from the wheel washer requirement in proposed Rule 1157. (Vulcan Materials Corp.)

Response: Staff has modified the proposal to remove the requirement that facilities with a land size of greater than 50 acres must have a wheel washer in addition to the rumble grate. Thus, if the truck trips exiting each of these facilities do not exceed 60 in any one day, these landfills would be required to have rumble grates that meet the specifications in the rule, but not wheel washers.

17. Comment: Section (d)(7)(B) requires unpaved non-haul roads to be chemically stabilized. Landfills receive materials from trucks in temporary loading areas that are regularly filled in and re-surfaced. These could be considered as roads but should not be subject to the chemical stabilizer requirement. (Vulcan Materials Co.)

Quarry areas/roads are often re-located and, therefore, should not be subject to the chemical stabilizer requirement. Please insert the word “permanent” in this section of the rule so that these loading areas are not required to be chemically stabilized. (Scott Cohen, consultant to SCRPA)

Response: Staff has determined that these are temporary loading areas and not roads. This interpretation applies to landfills where fill materials are dumped and to quarries where the ends of roads are actually operating and loading areas. It would not be appropriate, however, to insert the word “permanent” because this would be difficult to enforce.

18. **Comment:** I represent one small brick manufacturing facility who will be extremely burdened financially by the requirements of the proposed rule. The facility handles primarily clays with a moisture content >10%. The facility has a maximum of 10 truck loads of clay deliveries per day. The new requirements under PAR 1157 would require the addition of dust suppressants/mister systems, daily sweeper activities, rumble grates, application of chemical suppressants throughout their facility and additional recordkeeping. I urge you add an exemption into the rule for small operations based on truck traffic or include the language “as necessary to meet the performance standards in subparagraph (d)(1)(A)” in all sections of (d). (Mike Shaffer on behalf of Higgins Brick Co.)

Response: In subparagraph (d)(8)(C), staff has provided some additional flexibility in the proposed rule to account for facilities with fewer than 60 truck trips per day. Less active facilities are now required to have a rumble grate, or a wheel washer, or a truck washer instead of a combination of wheel washer and rumble grate. In addition, daily sweeping activity for internal paved roads has been modified in the proposal to require sweeping every other day if truck exits are less than 60 average truck trips on any one day.

Staff has also modified the specific requirement that companies stabilize the entire surface of the storage piles and has added language linking stabilization to the performance standards in (d)(1)(A). The facility, per the definition of “stabilized surface” found in the proposed rule, will have to demonstrate visual or other evidence of crusting for the pile to be considered stabilized.

19. **Comment:** Re-stabilizing storage piles should be on an “as needed basis.” (Granite Construction Co.)

Response: Re-stabilizing is only required for the disturbed areas of the piles where materials are moved in and out, and not for the entire surface of the piles. Once disturbed, those areas of the piles don’t have the crusting needed to sustain wind, and therefore, need to be re-stabilized. Staff has modified its proposal, however, from requiring re-stabilization at the end of each work shift to the end of each workday.

20. **Comment:** Watering/flushing at our Indio site is far more effective in controlling dust than sweeping and is performed more often than sweeping. The performance standards as outlined in Rule 1157 and Rule 403 must be maintained at all times and are sufficient to insure compliance without the forced use of specified mobile equipment. (Granite Construction Co.)

Response: Staff disagrees. Water applied on paved roads is not as effective as sweeping (60% v. 75%). With sweeping, dirt is picked up by either mechanical or vacuum sweepers, while water only sets aside or temporarily suppresses dirt. In addition, excessive water that is not clean might also violate rules/regulations regarding stormwater run off.

Feasibility of Control Technology

~~10.~~21. **Comment:** Requiring enclosed conveyors and telescopic chutes at aggregate processing facilities should be removed from the rule. Telescopic chutes are not used in this industry because they are unsafe, technically infeasible and very costly. Enclosed conveyors result in minor emission reductions at excessive costs and present a safety hazard to employees who may have to enter these enclosures in very high temperatures to repair the equipment. There are other means that are more cost-effective for this industry. (SCRPA)

Response: Staff appreciates the information supplied by the industry to support their conclusions and has removed these requirements from the rule. Through conversations with vendors of telescopic chutes, for example, staff confirmed that these chutes are only used in the coke processing facilities and that the chutes would not be capable of handling the heavier loads posed by the aggregate materials. Staff also confirmed through actual field observations that conveyors could be effectively controlled through the use of dust suppressants at key points in the conveying process.

~~11.~~22. **Comment:** Haul truck end dumps discharge within 3 feet of the ground surface and offer no advantages over bottom dump trucks in reducing emissions. Therefore, district staff should remove requirements that bottom dump trucks be used exclusively for dumping materials and that these only dump to grizzlies. Many operations often require unloading directly to stockpiles due to space limitations. This will not be possible with this requirement. (SCRPA)

Response: Staff agrees after visiting a number of facilities where end dump haul trucks and bottom dump trucks are in use. It is clear that bottom dump trucks cannot be used to build stockpiles and that controlling moisture content and sufficient application of dust suppressants should be able to control emissions during unloading, loading and transferring of aggregate materials.

12.23.**Comment:** The proposed rule contains a set of strict performance standards but then also specifies the controls to be used at each source of emissions. This industry believes that we should have the flexibility to select the types of controls for each source that we believe are the most effective. What difference should it make in our selection of control technologies if we are able to meet the performance standards such as opacity and maximum dust plume distance? ~~(most members of~~ Irwindale Task Force)

Response: Staff agrees in part with the commenter. Staff has discussed this with district enforcement personnel and has decided to require, in the proposed rule, that the following ~~processes~~ be controlled as necessary to meet the performance standards in subparagraph (d)(1)(A): (1) Loading, unloading and transferring; (2) conveyors; (3) crushers, ~~and~~ (4) screening equipment, ~~and~~ (5) storage piles. In all cases, specific controls are still identified when appropriate. The proposed rule requires:

- (1) dust suppression *or other dust control methods* for existing facilities for loading, unloading and transferring operations to the extent necessary to meet the performance standards. Best Available Control Technology is required for these sources at new facilities;
- (2) dust suppression or other dust control measures at the conveyors including the transfer points to the extent necessary to meet the performance standards or other dust control methods. ~~For dropping materials to a storage pile, the facility is required to use chutes at the discharge point of the conveyors;~~
- (3) baghouse, or dust suppression ~~and~~ or other dust control measures at the crusher including all discharge points to the extent necessary to meet the performance standards or the operator may use a baghouse; and
- (4) enclosed screening that is equipped with a baghouse, or dust suppression or other dust control methods at the screening equipment including all discharge points to the extent necessary to meet the performance standards; ~~and, or the operator may use a baghouse.~~
- (5) stabilization of the entire surface of the piles to the extent necessary or application of other dust control measures. Re-stabilization of disturbed areas of the piles at the end of each workday

24. **Comment:** Significant problems (are) associated with the feasibility and effectiveness of chutes (on conveyor discharge points.) Conveyor frames/trusses cannot withstand the weight of any durable chute and would need to be supported from the ground. Chutes incur significant wear and tear and are easily damaged. A water spray system will achieve the same PM control. (Granite Construction Co. and others)

Response: Staff has deleted the requirement for chutes from the proposal.

25. **Comment:** Recent heavy rains have raised concern by some industry representatives that the use of chemical stabilizers on unpaved roads near the

facility exits creates unusually “sticky mud” that increases track out of dust to public roads.

Response: Staff finds no evidence to support these conclusions. Staff contacted chemical stabilizer manufacturers and many facilities with experience in regularly applying these stabilizers and have concluded that facilities can avoid these problems in the future as they gain more experience in their proper application and use. In addition, some stabilizers are more resistant to moisture than others so facilities should try a number of options for chemical stabilization.

Costs

26. Comment: The proposed requirement for sweeping internal paved roads at the end of each work shift present significant expenses, both capital and operating. There may not be enough contract sweepers to accommodate all of (us) at this frequency and we may have to buy our own equipment. We should be offered the option of sweeping or watering. (3M)

Response: Inspection staff in the field who are very familiar with these operations believe that frequent watering and sweeping significantly reduce dust emissions particularly on internal roads where there is frequent truck traffic. Staff has modified the proposal, however, to require, for less active facilities, that they sweep internal paved roads every other day. This should allow facilities to reduce costs and should ease industry’s concern of not having enough sweepers. ~~Work shifts are defined in paragraph (C)(52).~~

27. Comment: We believe that the District has underestimated the cost and number of rumble grates that will be required for each facility. The capital cost for wheel washers should be more like \$100,000 and should include wash water ponds. (SCRPA, Justice and Associates)

Cost data is not presented in an understandable manner (Granite Construction Co.)

Response: The cost for the rumble grates and wheel washers are provided by vendors. The references are stated in the draft staff report. Staff agrees to include the cost of the ponds for reclaim water in the cost analysis.

Staff has described the methodology for cost estimates in great detail. Staff has also addressed all assumptions which included data scaling methodology and unit cost data with references.

28. Comment: Substantial costs for sweeping have not been included and the effectiveness of sweeping. ~~as a function of frequency have not been evaluated.~~ (Several commenters)

Response: Staff agrees to include the additional costs for sweeping that will be incurred as a result of Rule 1157 in the cost analysis for this rule instead of making the assumption that all sweeping is part of Rule 403 compliance.

29. Comment: The addition of water to certain products will result in increased combustion emissions, particularly NOx from dryers at hot mix asphalt plants and result in elevated moisture content in all finished product resulting in additional truck trips in order to haul the same volume of material. Costs associated with the additional fuel required for drying, reduced production rate required to process wetter material, and resources required to move the extra water have not been included. (SCRPA, United Rock)

Response: Staff disagrees. Proposed Rule 1157 does not require a minimum moisture content level. Instead, staff proposes to allow operators of aggregate and related facilities to apply the dust control methods that they believe will be the most effective for the process and only to the extent necessary to meet the performance standards in the proposed rule. Therefore, water does not need to be added to rock dust. The facility can store these materials in a bunker and use chemical suppressants or other dust controls methods to meet the performance standards, and thus avoid having to dry the aggregate materials.

30. Comment: We do not understand the results presented in Table 3 of the staff report. This table indicates that a substantial portion of the compliance costs will be born by the concrete industry, and this conflicts with our prediction of the fiscal impacts of the rule because (the materials) being processed is typically wetter than at other types of facilities. Sufficient data was not in the report to allow us to analyze the results presented in Table 3 and we request additional data that was used in preparing the report. (SCRPA)

Response: In the draft socio-economic analysis report, staff indicates a high compliance cost for concrete batching because this industry has the largest population (100 facilities). Staff agrees to include other factors and better assumptions to appropriately refine the projected compliance cost for this industry.

31. Comment: Chemical dust suppressants are unnecessary and add to our expenses by approximately \$45,000 per year. There will be little or no PM reduction from this requirement. There are established rules, including Rule 403 and nuisance laws that have strict guidelines and significant penalties for non-compliance that will adequately regulate unpaved roads within an aggregate facility. (Granite Construction Co.)

Response: Staff disagrees. Based on staff analysis, chemical dust suppressant is expected to achieve an 80% control efficiency (if it is applied according to the manufacturer's guidance) at a low cost (2 cents per square foot of treated area.)

32. **Comment:** The Staff report assumption that chemical stabilizer costs \$0.02 per square foot is too low, and we will be providing additional information on the actual cost for stabilizers. In addition, costs related to surface preparation including grading and application of road base need to be included. (SCRPA)

Response: Staff contacted vendors of chemical stabilizers to determine the cost per square foot and we have not received information that disputes our estimates to date. Costs for surface preparation and grading are not appropriate to include as these activities would be done in the absence of the rule as part of regular road maintenance.

33. **Comment:** The staff report and analysis overestimate emission reductions and underestimates costs resulting in a cost of control of \$588 per ton. If emission reductions are overestimated by a factor of 4 and costs are underestimated by a factor of 2, cost effectiveness will increase to over \$4,000 per ton.

Response: Staff disagrees in part. The emission baseline inventory and the estimated emissions reduction were developed based on the survey results collected from participating facilities and the emission factors from AP-42. The survey is considered the best available tool for staff because the survey form was developed with the industry's input and consent. Staff also excluded all wet materials from the estimates despite their moisture content. Staff has revised the cost analysis to include costs for sweeping and reclaim water ponds. The new revised cost-effectiveness is estimated to be \$1,132 per ton of PM10 reduced.

34. **Comment:** Water costs do not appear to include capital cost of water trucks, rainbird systems or other distribution methods or labor cost, which will be substantial. (SCRPA)

Response: As stated, staff has revised the cost analysis to include costs for sweeping, water trucks, and reclaim water ponds. Cost for the rainbird system was not included, instead staff has accounted for the cost of the misting system, which is capable of delivering dust suppressant to storage piles.

Test Methods

35. **Comment:** The District has proposed a totally new and untested method for measuring compliance with the standards set forth in PR 1157. (SCRPA)

Response: This District included a set of test methods (EPA Method IX for stack emissions and two variations of this method, Time Averaged and Intermittent) in the draft staff report released in the Set Hearing package on October 1. These methods do contain an option, not found in other district rules, to measure significant short-term emissions at 50% opacity, but this is not new. The 50%

option is used by Clark County, Nevada and is encouraged for use here by EPA as part of a comprehensive regional dust control strategy.

Recent discussions with SCRPA representatives led staff to make further adjustments to the 50% standard and the test method and staff has made certain implementation commitments in cooperation with the affected industry as described below.

Staff has inserted clarifications in the method to make it more understandable by all parties. Specifically, staff has clarified the test method to clearly define the activities subject to the 50% standard and to state that no more than one Notice of Violation can be issued for that one activity. Staff is also recommending to the Governing Board, as part of this proposal, not to submit this 50% opacity requirement as part of the State Implementation Plan and as such, proposes that this standard be enforced locally and not be enforced by the federal EPA. Finally, because of the industry's lack of familiarity with this standard, violations of the new standard of 50% will not be counted as a trigger for the submission of the compliance plan under Paragraph (g), Additional Requirements Triggered by Recurrent Violations. Staff has also extended the compliance date for this standard from July 1, 2005 to December 3, 2005.

Staff intends to work closely with the industry before the public hearing on the proposal to explain the methods and how they will be used in the field so that the industry understands how to monitor their own facilities and how to avoid violations of the proposed performance standards. An implementation guidance document will be issued following rule adoption and training will be conducted as part of the Rule 403 training programs.

36. **Comment:** Inspectors will be allowed to take intermittent opacity readings without any certification required. The method is described as 2 readings, 5 seconds apart, at 50% opacity within an hour, would constitute a violation. This is arbitrary and will result in greatly increasing violations that are not merited. (Granite Construction Co., SCRPA)

Response: Staff disagrees. The SCAQMD Opacity Test Methods #9B indicates that the intermittent method can only be conducted by an individual who is a California Air Resources Board (CARB) certified Visible Emission Evaluation (VEE) observer, and that qualification and testing requirements for a CARB-certified VEE observer can be obtained from the AQMD. The test method also requires 12 consecutive readings (5 second interval) be taken within the same period of observation but must not exceed 1 hour. However, the test method also states that at any time, the ~~observations~~-observations/readings can be stopped if there are five (5) individual, consecutive readings of 50% or greater opacity. This method is designed to detect failures in applying control such that short-term but significant discharges occur.

Staff modified the proposed minimum number of readings of greater than 50% opacity needed to trigger a violation to allow additional flexibility. The commenter should reference the answer to Comment No. 34 above for more details on the current staff proposal.

Exemptions

13.37.Comment: Recycled asphalt facilities stockpile material that is delivered to the facility from contractors that are breaking up and removing old asphalt from roadways. The material is very oily and comes in large pieces. This material is not ground up and then stockpiled prior to processing. There are no fine materials. It is unlikely that any of this material will become airborne even in high winds. This industry is asking that an exemption be provided for recycled asphalt pavement operations. (Ca Rock Products Association)

Response: Staff deleted the particle size and moisture thresholds due to broader comments from the industry as a whole. This change to the exemption section of the rule should satisfy the commenter’s concerns because the requirement for dust suppressants only applies as necessary to meet the performance standards. If the recycled asphalt does not emit dust, it does not need to have dust suppressants applied. It is important to note that construction and demolition debris and the processing of these materials can create dust and staff’s proposal does not exempt these operations from the track out requirements of the proposed rule.

14.38.Comment: Stockpile loading and trimming areas at aggregate facilities are used to adjust the loads from the trucks as they are preparing to leave the facilities. If a driver has loaded more materials than the driver has ordered from the facility, the load will then be trimmed and the excess material will be temporarily stockpiled near to the facility exit. These materials will be removed by the end of the day and returned to the stockpiles. The surface areas are continually being disturbed and the proposed rule should treat this area similarly to a “disturbed surface area” in the rule where controls are not required. (SCRPA)

Response: Staff agrees only in part. Stockpile loading areas should not be exempt because of the potential for dust emissions in these heavily traveled areas. Suppressants can easily be applied in these areas by water and chemical suppressant trucks in between loading events. However, staff agrees that the truck trimming areas should be proposed for an exemption and has changed the language to reflect this decision.

15.39.Comment: Fire breaks are often required by local fire departments and these should be added to the definition of “disturbed surface area.” It is not always possible to maintain these breaks in a stable condition because normal stabilization techniques are not able to be used on them. Many of these are located off company property as well. (SCRPA)

Response: Staff disagrees. Fire breaks can cause fugitive dust problems and facilities must stabilize those piles on their property in accordance with the rule requirements.

40. **Comment:** Equipment at aggregate facilities must be started up at the beginning of a work week. This situation should be treated like a malfunction or new equipment start-up and should be exempt for the start-up period. (3M)

There is no exemption for daily start up where small amounts of material that has been on the plant system overnight has dried. (Granite Construction Co.)

Response: Staff disagrees. With proper maintenance and careful operation of controls, normal start-ups should be able to be accomplished without exceeding the performance standards.

- 16-41. **Comment:** The proposed rule exempts aggregate and related operations from certain performance standards during high wind situations provided that they cease operation during this period. This poses a serious problem for ready-mix operations because they must finish their orders for a highway construction job. The construction job cannot stop in the middle of the day's paving project because of a production stoppage during high winds at the ready-mix plant. The rule proposal should be adjusted to account for this need. (Several commenters)

Response: Staff understands the problem posed by the commenter. Thus, the exemption section of the proposed rule has been re-drafted to provide that if qualified, ready-mix the operators can continue to produce and deliver their product on high wind days and will not be required to meet opacity and visible dust plume requirements of the rule. This limited provision affects ready-mix and hot mix asphalt operations, and the loading and transport of aggregate materials to supply these facilities when a continuous pour of a construction project has commenced during a period of high winds.~~only~~. No other type of aggregate ~~operations~~facility will be able to continue to operate and still be exempt from these performance standards during high winds. ~~This exemption applies only to those portions of the operation dedicated to producing ready-mix product.~~

Operators should be aware that they can continue all operations as long as they meet the performance standards.

- 18-42. **Comment:** Staff's proposed rule contains an exemption in Section (h)(1) for aggregate materials that have a moisture content on the particle surface of 7% or greater and for materials that are larger than ½ inch sieve. We submitted an analysis supporting a moisture content for exempt material of 1.5% for material greater than a #4 mesh sieve and 3% for material smaller than a #4 mesh sieve. This is consistent with (EPA) AP-42 guidance. Adding additional moisture will result in increased NOx for the asphalt operations as energy is expended to dry the

material. We do not believe a moisture content requirement greater than 3% will result in (NO_x) emission reductions that meet the District BACT guidelines. While it may seem intuitive that moisture in excess of 3% will result in significant emission reductions, the technical data does not support this conclusion. (SCRPA)

Response: Staff has reviewed the referenced technical data and has determined that the exemption for moisture and silt content is not necessary provided that all processes and activities be required to meet the strict performance standards found in Section (d)(1). Thus, staff has removed the exemption altogether and has inserted rule language requiring that controls be applied to the extent necessary to meet the (d)(1) general performance standards such as opacity and minimum dust plume distance. In doing so, the facilities will be given more flexibility to apply dust suppressants and other dust control methods when these are needed to prevent excess emissions.

43. **Comment:** There are a number of operations that do not transport aggregate materials off-site in trucks. One facility uses a barge and the other facility uses a 3 mile long conveyor system to transport the materials. The rule should exempt these 2 facilities from the track out requirements of Section (8). (Vulcan Materials Corporation)

Response: Staff agrees and has proposed a limited exemption for facilities that do not use aggregate trucks to transport materials to public roads.

44. **Comment:** Our company owns landfills that receive construction and demolition debris. This debris is off-loaded and pushed into a large pit as fill. We should be exempt from the proposed rule for the same reasons as that exemption for a Class III landfill that also handles inert material as small part of their overall operation. (Vulcan Materials Corporation)

Response: Vulcan's landfill facility is exempt from the wheel washer requirement if the number of truck trips exiting the facility on any one day does not exceed the threshold stated in the proposed rule. The proposed rule oversees inert landfills because of the potential for dust to be emitted as this debris is crushed and moved around. Staff believes that it is reasonable to require that these landfill operators use dust suppression or other dust control methods. However, staff intends to re-visit this issue during implementation of the rule to determine if additional requirements should also apply to Class III landfills.

45. **Comment:** There should be an exemption from the wheel washer requirement for permanent mining sites that are used infrequently. Each site is over 50 acres and thus, falls into the same category for "track-out" as the large sites in current Rule 1157 draft. The cost for wheel washers and rumble grates are prohibitive. Low cost methods are available for controlling track out and should be an option. Commenter suggests an exemption for mine sites with a history of being active on

an average of less than 25% of working days and instead be required to use a 1” gravel pad or pave no less than 100 ft. from the entrance of the site and will use a rumble grate. (Granite Construction Co.)

Response: Staff has modified the proposal to remove the requirement that facilities with a land size of greater than 50 acres must have a wheel washer in addition to the rumble grate. Thus, if the truck trips exiting each of these facilities do not exceed 60 in any one day, the facility would be required to have rumble grates, but not wheel washers at their truck exits. For active mine sites (with 60 or more truck trips in any one day), but used infrequently (less than 52 days per year over the past three years from December 3, 2004, or based on the average of a rolling 3 year period after December 3, 2004, the rule requires the installation of a rumble grate and a well-constructed gravel pad meeting the specifications in (d)(1)(E).

Other Comments (including comments on the draft staff report itself)

~~19.46.~~**Comment:** The report entitled “Environmental Effects of Gravel Mining in Irwindale, CA.”, which was prepared for the offices of Congresswoman Hilda Solis and Congressman Henry Waxman, should not be used as a technical report on which to base the requirements of PR 1157. If this report is referenced in the staff report that accompanies PR 1157, then we ask that a letter from 7 members of the House of Representatives be included as well in the staff report. (SCRPA)

Response: The referenced report, dated December 12, 2002, concludes that environmental regulators should gather more data on the air pollutant emissions, and the air quality impacts of gravel mining and processing operations. It also concluded that some regulatory requirements do not currently apply to gravel mines.

This report served as a valuable impetus for our subsequent studies of emissions and control technology but did not provide technical information on which to base our conclusions with respect to emissions inventory, air quality data, control technology and its cost-effectiveness. Staff conducted an independent study as part of the development of the specific control measure for aggregate and cement manufacturing operations in the 2003 Air Quality Management Plan and its subsequent rule development efforts.

~~However, b~~Because the report is referenced in the staff report for this proposed rule, staff has included a copy of the referenced letter in its administrative records file that is maintained for this proposed rule. In addition, on page 1-7 of the staff report, staff has noted that it has received the letter from Congressman Jerry Lewis and 6 other U.S. Congressmen and has quoted key facts from this important letter.

47. **Comment:** The AQMD has not taken into account existing engineering and source test data for stationary sources. (SCRPA)

Response: Staff relied on AP-42 emission factors and survey data from many of the facilities subject to the rule to determine uncontrolled emissions from the processes.

48. **Comment:** The Staff Report assumes that only 20% of the emission sources are controlled as they exist today. We believe strongly that more than 20% of these sources are controlled when you take into account the requirements of NSR and Rule 403. (SCRPA)

Response: Staff knows that many of the aggregate facilities subject to this rule have instituted voluntary controls at the processes such as storage piles, conveyors, crushers, unpaved roads and other sources at their facilities. This is not true for most facilities and the purpose of PR 1157 is to require controls that go beyond Rule 403. While a small fraction of the permitted equipment may have gone through NSR, many of the emission sources are not subject to permitting, and thus, are exempt from the NSR evaluation. Incidentally, the sources that are not subject to the NSR evaluation happen to be the most significant contributors to the emissions inventory. Furthermore, staff assumed a 90% and 50% control efficiency respectively for crushers and screeners. Based on survey results and staff observations, the majority of these equipment are equipped with baghouses or filter bags.

49. **Comment:** The discussion of air quality in the “Background Information” section of the draft staff report should provide citations for the health information presented. (SCRPA)

Response: Staff has modified the staff report to include additional citations.

50. **Comment:** In the “Background and Legal Authority” section of the draft staff report, staff should provide a review of federal requirements that are applicable to these sources including federal ambient air quality standards, State Implementation Plans, the National Environmental Policy Act, New Source Review and New Source Performance Standards and Best Available Control Technology. NSPS uses units of PM, not PM10. Similarly, there should be a review of state requirements including the ambient air quality standards and the California Environmental Quality Act. (SCRPA)

Response: Staff believes that these requirements are adequately addressed in the draft staff report and Environmental Assessment. Neither document addresses the National Environmental Policy Act (NEPA) because PR 1157 is not a federal project or supported with federal funding. Nor does either document address new source review because new source review applies to new permits or permit modifications. PR 1157 does not require new permits or permit modifications

directly. Facilities that choose to modify their permits or apply for new permits will undergo new source review during the permitting process.

51. **Comment:** Rule 403 discussion does not include performance standards or test methods. This information needs to be added. (SCRPA)

Response: Staff has added this information to the discussion of Rule 403 in the draft staff report.

52. **Comment:** The draft staff report states that from year 2000 to year 2004, the district issued 33 notices to comply and 35 notices of violation. This does not indicate that our industry is made up of “bad operators.” Furthermore, industry believes that outside factors affected the results and that the difference between upwind and downwind concentrations is not wholly attributable, if at all, to fugitive dust from activities at the facilities being measured. These NOVs are being contested. We are not a public nuisance or a problem. It is important to re write this section to indicate that these notices are not “validated NOVs.” (SCRPA)

Response: The referenced notices were issued based on monitoring data and inspector **observations** of activities that violated rules 401 and 403. The report indicates that the notices have not yet been settled. However, staff has added a sentence to this paragraph of the report that indicates that many facilities are applying adequate dust control methods. Since these violations are not violations of Rule 402, governing public nuisance, staff has re-titled this section to a more appropriate title, **“Compliance issues”**.

53. **Comment:** Staff should cross-check the baseline emission inventory presented in the staff report for permitted stationary sources (e.g. conveyors, crushers, screens, etc.) with the permit system and Annual Emissions Reporting database to ensure that the three are somewhat consistent. (SCRPA)

Response: Staff relied on recent surveys of the facilities and actual telephone follow up to determine the most current process information. Information found in the permit and Annual Emission Reporting is useful but not complete for purposes of rule development.

54. **Comment:** We have requested sanitized (i.e. facility identity removed) copies of the survey forms to allow for independent analysis of the data that staff has used to support the staff report and emission calculations. (SCRPA)

Response: Staff has provided adequate information to the commenter to assist him with his independent analysis of the data used by staff. Prior to the surveys, staff has assured participating facilities that only general throughput and emissions by industry will be published. However, staff will provide a comprehensive spreadsheet of emissions data from facilities that are members of

the requesting association and will be pleased to go over in more detail the surveys following Board action in January, 2005. If we find it necessary to update the emissions inventory for this industry, staff will forward this information to district staff who are responsible for updating the AQMP inventory.

- 55. Comment:** Industry believes that the survey data should have been analyzed more accurately (to) determine the (emissions) inventory, not utilized to produce results consistent with a political opinion and to promote rule development as it appears the AQMD has done. At the very least, AQMD has not taken into account existing engineering and source test data for stationary sources. (SCRPA)

Response: Staff strongly disagrees with the conclusions of the commenter. Staff utilized the best engineering data available from AP 42 and verified many of the surveys through on-site visits and follow up phone calls. We would encourage the commenter to submit the engineering and source test data that he is referring to for evaluation by staff.

- 56. Comment:** Staff used the wrong emission factors and existing control efficiencies to estimate conveyor emissions from a single permitted facility to be 77 tons per year. This equipment is permitted by AQMD and according to the calculation methods used by AQMD engineering, emissions are actually on the order of 5.6 tons per year for all of the stationary sources in that plant, some of which are conveyors. This represents an overstatement of at least 1,375%. (SCRPA)

Response: Staff strongly disagrees. Staff used the AP-42 emission factor for open conveyors and the survey results provided by the facility to calculate the emissions generated. As explained to the commenter, the emissions must be based on the number of transfer points (usually, it is the same number as the conveyors). The 77 tons are the estimated emissions from more than 20 transfer points.

- 57. Comment:** In calculating stockpile and other emissions, staff used a conversion factor for volume to weight of aggregate material of 1.5 tons per cubic foot. The correct conversion factor is 1.5 tons per cubic yard or 0.05 tons per cubic foot. A cubic yard contains 27 cubic feet. (This indicates) that the results could be off by a factor of 27 or more. (SCRPA)

Response: In the calculation, conversion factors of 27 cubic feet per cubic yard and 1.5 tons of aggregate per cubic yard were used to convert the cubic feet data provide in the survey to the tonnage of the pile. However, there was a typographical error in the footnotes of Appendix A-3 that staff has corrected.

58. **Comment:** The US EPA and several California air districts believe that maintaining three percent(3%) moisture control in aggregate during processing (i.e. by stationary equipment) will result in (satisfactory) emission control. In AP 42 US EPA notes the highest moisture content of any material tested was 2.88% and assigns an emission factor of 0.000048 pounds of PM10 per ton processed. This is the result of A-rated source tests and should be irrefutable. (Please explain why staff) used an equation from a related but non-applicable AP-42 section on material handling (Section 13.2.4). (SCRPA)

Response: Staff acknowledges that San Diego APCD considers materials with 3% moisture as wet materials; however, support document and background information for this decision **are** not available. The footnotes of EPA AP-42 only indicates the moisture content of materials before and after the application of wet suppressant, and does not indicate that 3% moisture content is a criteria for sufficient dust control. In addition, due to the low rating of the tests (E rated), EPA also states that “visual **observations** from each source under normal operating conditions are probably the best indicator of which emission factor is most appropriate. Plants that employ substandard control measures as indicated by visual **observations** should use the uncontrolled factors....”

59. **Comment:** Watering is not included as an available control technology. Misting is not the same as watering. (SCRPA)

Response: Watering is definitely included as an available control technology in that it is considered a dust suppressant, and dust suppressants are discussed in the staff report as available control technology.

60. **Comment:** Regarding stockpiles, the calculations (water estimates) appear to assume that all material in stockpiles at a facility are in one pile. This assumption results in underestimation of the surface area of stockpiles and therefore underestimation of water that will be required to control stockpile emissions. (SCRPA)

Response: Due to limited data from survey results (mostly storage piles are reported in tonnage and without pile dimensions and shapes), staff has no choice but to make the best reasonable assumptions as presented in the staff report.

APPENDIX A

ASSUMPTIONS AND CALCULATIONS

Appendix A-1 - BASELINE EMISSIONS

The following methodology and assumptions were used to estimate PM10 baseline emissions from aggregate and related operations:

1. PM10 Annual Emissions from Loading/Unloading Activity:

$$E = (\text{Daily throughput} \times \text{\#days/year} \times EF / 2000) \times CF$$

Where:

E: PM10 annual emissions, t/y

EF: PM10 emission factor, lbs/t

CF: control factor = 1- control efficiency

- For the aggregate, CMB, and HMA categories, $EF_{\text{aggregate}} = 0.0011 \text{ lbs/t}$ (AP-42, Chapter 13.2.4., Equation 1, Jan. 1995). This emission factor was also used to estimate emissions from hoppers/surge bins and conveyors.
- For the CB, CP, and “other” categories: 50% of the throughput was assumed for aggregate and 50% was assumed for sand. This assumption and the following emission factors were also used to estimate emissions from hoppers/surge bins and conveyors.
 $EF_{\text{aggregate}} = 0.0033 \text{ lbs/t}$ (AP-42, Chapter 11.12, Table 11.12-2, Oct. 2001)
 $EF_{\text{sand}} = 0.00099 \text{ lbs/t}$ (AP-42, Chapter 11.12, Table 11.12-2, Oct. 2001)
- CF = 80%, with the assumption that control efficiency of current level of watering/misting is 20%. This control efficiency was applied to all activities and equipment, unless indicated otherwise.

2. PM10 Annual Emissions from Hopper/Surge Bin:

$$E = (\text{Hourly throughput rate} \times \text{Annual operating hours} \times EF / 2000) \times CF$$

3. PM10 Annual Emissions from Conveyor Transfer Point:

$$E = (\text{Hourly throughput rate} \times \text{Annual operating hours} \times EF / 2000) \times CF \times N$$

Where:

N: number of transfer points

4. PM10 Annual Emissions from Crusher:

$$E = (\text{Hourly throughput rate} \times \text{Annual operating hours} \times EF / 2000)$$

Where:

- For the aggregate, CMB, and HMA categories, it was assumed that 50% of the crushing activity was tertiary crushing and 50% was fines crushing, and that all crushers met BACT requirements.
 $EF_{\text{Tertiary crushing, controlled}} = 0.00054 \text{ lbs/t}$ (AP-42, Chapter 11.19.2, Table 11.19.2-2, August 2004)

$EF_{\text{Fine crushing, controlled}} = 0.0012 \text{ lbs/t}$ (AP-42, Chapter 11.19.2, Table 11.19.2-2, August 2004)

- For the CP category, it was assumed that all crushers met BACT requirements

$EF_{\text{crusher, controlled}} = 0.00059 \text{ lbs/t}$ (AP-42, Chapter 11.3, Table 11.3-1, Aug. 1997)

5. **PM10 Annual Emissions from Screening Equipment:**

$$E = (\text{Hourly throughput rate} \times \text{Annual operating hours} \times EF / 2000) \times CF$$

Where:

- For the aggregate and CMB categories, it was assumed that 50% of the screening activity was screening and 50% was fines screening.

$EF_{\text{Screening}} = 0.0087 \text{ lbs/t}$ (AP-42, Chapter 11.19.2, Table 11.19.2-2, August 2004)

$EF_{\text{Fines screening}} = 0.072 \text{ lbs/t}$ (AP-42, Chapter 11.19.2, Table 11.19.2-2, August 2004)

$CF = 50\%$ with the assumption that control efficiency of current level of watering/misting is 50%. This control factor was also applied to CP facilities.

- For the CP category, $EF = 0.53 \text{ lbs/t}$ (AP-42, Chapter 11.3, Table 11.3-1, Aug. 1997)
- For the HMA category, it was assumed that all screening equipment are controlled

$EF_{\text{controlled}} = 0.0098 \text{ lbs/t}$ (AP-42, Chapter 11.1, Table 11.1-1, March 2004)

6. **PM10 Annual Emissions from Milling Equipment:**

$$E = (\text{Hourly throughput rate} \times \text{Annual operating hours} \times EF / 2000)$$

Where:

It was assumed that all milling equipment was controlled. $EF_{\text{controlled}} = 0.0032 \text{ lbs/t}$ (AP-42, Chapter 11.3, Table 11.3-1, August 1997)

7. **PM10 Annual Emissions from Silo:**

$$E = \text{Annual throughput} \times EF / 2000$$

Where:

- It was assumed that 85% of the throughput was for cement and 15% was for fly ash, and that all silos had baghouses or equivalent controls

$EF_{\text{cement, controlled}} = 0.00034 \text{ lbs/t}$ (AP-42, Chapter 11.12, Table 11.12-2, Oct. 2001)

$EF_{\text{fly ash, controlled}} = 0.0049 \text{ lbs/t}$ (AP-42, Chapter 11.12, Table 11.12-2, Oct. 2001)

8. PM10 Annual Emissions from Truck Mix Loading:

$$E = \text{Annual throughput} \times EF / 2000$$

Where:

Annual throughput = aggregate throughput + cement and fly ash throughput

- It was assumed that $EF_{\text{controlled}} = 0.051 \text{ lbs/t}$ (AP-42, Chapter 11.12, Table 11.12-2, Oct. 2001)

9. PM10 Annual Emissions from Asphalt Load-Out:

$$E = \text{Annual throughput} \times EF / 2000$$

Where:

- $EF = 0.5 \times 0.0003 \text{ lbs/t}$ (AP-42, Chapter 11.1, Equation 11.1.1.5, March 2004)

10. PM10 Annual Emissions from Open Storage Pile:

$$E = (\text{Annual throughput} \times EF / 2000) \times CF$$

Where:

- $EF_{\text{active/inactive}} = 0.5 \times 0.33 \text{ lbs/t}$ (AP-42, Chapter 11.19.1, Table 4-1, April 1995). Active emissions were based on 8 to 12 hours of activity per 24-hour period, five active days per week, and included wind erosion, vehicle traffic, and material handling. Inactive emissions were emissions from wind erosion during inactive periods.

11. PM10 Annual Emissions from Internal Unpaved Road:

$$E = VMT \times k \times (S/12)^a \times (W/3)^b \quad (\text{AP-42, Chapter 13.2.2, Equation 1 a, December 2003})$$

Where:

VMT: annual vehicle miles traveled

$$VMT = (\text{road length (ft)} \times \# \text{ truck trips/day} \times \# \text{ days/yr}) \times 1 \text{ mile}/5280 \text{ ft}$$

$$k = 1.5 \text{ lbs/VMT} \quad (\text{AP-42, Chapter 13.2.2, Table 13.2.2-2, December 2003})$$

$$a = 0.9$$

$$b = 0.45$$

S: surface material silt content, %.

- For the aggregate facilities, $S_{\text{Haul road}} = 8.3$, $S_{\text{Non-haul road}} = 10$. For other facilities, $S_{\text{Haul road}} = 7.1$, $S_{\text{Non-haul road}} = 4.8$ (AP-41, Chapter 13.2.2, Table 13.2.2-1, December 2003)

W: mean vehicle weight, tons.

- It was assumed that $W_{\text{haul truck}} = 100 \text{ t}$, $W_{\text{loaded haul truck}} = 150 \text{ t}$, $W_{\text{unloaded non-haul truck}} = 5 \text{ t}$, and $W_{\text{loaded non-haul truck}} = 30 \text{ t}$.
- It was also assumed that 50% of the vehicles were loaded and 50% were unloaded.

12. PM10 Annual Emissions from Paved Roads (Track-Out Emissions):

$$E = \text{VMT} \times k \times (sL/2)^{0.65} \times (W/3)^{1.5} \quad (\text{AP-42, Chapter 13.2.1, Equation 1, December 2003})$$

Where:

$k = 0.016 \text{ lbs/VMT}$ (AP-42, Chapter 13.2.1.1, Table 13.2-1.1, December 2003)

$sL = 1.45 \text{ g/m}^2$ (Source test on silt loading conducted by Catalina Pacific Concrete Company, July 2004)

W : mean vehicle weight, tons

- It was assumed that $W_{\text{loaded}} = 30 \text{ t}$ and $W_{\text{unloaded}} = 5 \text{ t}$.
- It was also assumed that 50% of the vehicles were loaded and 50% were unloaded.

**Appendix A-2 – ASSUMPTIONS AND METHODOLOGY FOR SCALING
SMALLER, ACTIVE FACILITIES THAT NEED WHEEL WASHERS
AND RUMBLE GRATES**

The following assumptions and methodology were used to estimate the number of smaller, active facilities that need wheel washers (WW) and rumble grates (RG):

of facilities need WW and RG = (# of facilities need WW and RG / # of facilities response to survey) x 100 x # of facilities in the universe

For CB Plants:

$$(9/47) \times 100 \times 100 = 19$$

For HMA Plants:

$$(14/26) \times 100 \times 45 = 24$$

For CP Plants:

$$(3/25) \times 100 \times 152 = 18$$

Appendix A-3 Water Estimates for Storage Piles

Operation Type	Open Storage Pile - Dry (t)	Pile Volume (cf)	Base area (sf)	Side Length (ft)	1/2 Side Length (ft)	Slant height (ft)	Lateral area (ft ²)	Material Volume (ft ³)	Material Weight (ton)	Water consumption (gal)	Ave. Water Consumption (gal) by Category
A	141,854	94,569	14,185	119	60	63	14,964	3,741	5,612	1,683	
A	1,429,203	952,802	142,920	378	189	190	143,718	35,930	53,894	16,168	
A	1,135,294	756,863	113,529	337	168	170	114,327	28,582	42,872	12,862	
A	2,500	1,667	250	16	8	22	680	170	255	77	
A	5,000	3,333	500	22	11	23	1,025	256	384	115	
A	1,696,250	1,130,833	169,625	412	206	207	170,423	42,606	63,909	19,173	
A	362,033	241,355	36,203	190	95	97	36,995	9,249	13,873	4,162	
A	1,429,203	952,802	142,920	378	189	190	143,718	35,930	53,894	16,168	
A	10,166	6,777	1,017	32	16	26	1,631	408	612	183	
A	30,000	20,000	3,000	55	27	34	3,715	929	1,393	418	
A	50,000	33,333	5,000	71	35	41	5,745	1,436	2,154	646	
A	91,889	61,259	9,189	96	48	52	9,957	2,489	3,734	1,120	
A	480,800	320,533	48,080	219	110	111	48,873	12,218	18,328	5,498	
A	1,140	760	114	11	5	21	442	111	166	50	
A, CS	17,180	11,453	1,718	41	21	29	2,388	597	895	269	
A, CS	2,275	1,517	228	15	8	21	645	161	242	73	
A,C,CS	431,263	287,509	43,126	208	104	106	43,919	10,980	16,470	4,941	
A	24,104	16,069	2,410	49	25	32	3,109	777	1,166	350	
A	155,475	103,650	15,548	125	62	65	16,328	4,082	6,123	1,837	
A	234,781	156,521	23,478	153	77	79	24,265	6,066	9,099	2,730	
A	167,688	111,792	16,769	129	65	68	17,551	4,388	6,581	1,974	
Sub-Total										90,497	338,616.53
CB	109,722	73,148	10,972	105	52	56	11,745	2,936	4,404	1,321	
CB	1,204	802	120	11	5	21	455	114	171	51	
CB	1,072	715	107	10	5	21	428	107	160	48	
CB	5,778	3,852	578	24	12	23	1,122	280	421	126	
CB	5,750	3,833	575	24	12	23	1,118	280	419	126	
CB	1,946	1,297	195	14	7	21	591	148	222	66	
CB	3,000	2,000	300	17	9	22	755	189	283	85	
CB	52	35	5	2	1	20	92	23	34	10	
CB	444	296	44	7	3	20	270	68	101	30	

Appendix A-3 (Continued)
Water Estimates for Storage Piles

Operation Type	Open Storage Pile - Dry (t)	Pile Volume (cf)	Base area (sf)	Side Length (ft)	1/2 Side Length (ft)	Slant height (ft)	Lateral area (ft ²)	Material Volume (ft ³)	Material Weight (ton)	Water consumption (gal)	Ave. Water Consumption (gal) by Category
CB	440	293	44	7	3	20	269	67	101	30	
CB	1,968	1,312	197	14	7	21	595	149	223	67	
CB	460	307	46	7	3	20	275	69	103	31	
CB	1,433	956	143	12	6	21	500	125	187	56	
CB	7,483	4,989	748	27	14	24	1,326	331	497	149	
CB	533	356	53	7	4	20	297	74	111	33	
CB	1,474	983	147	12	6	21	508	127	190	57	
CB	4,800	3,200	480	22	11	23	999	250	375	112	
Sub-Total										2,401	5,108.91
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	68,000	45,333	6,800	82	41	46	7,558	1,889	2,834	850	
CMB	68,000	45,333	6,800	82	41	46	7,558	1,889	2,834	850	
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	65,741	43,827	6,574	81	41	45	7,331	1,833	2,749	825	
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	37,326	24,884	3,733	61	31	37	4,461	1,115	1,673	502	
CMB	34,000	22,667	3,400	58	29	35	4,123	1,031	1,546	464	
CMB	35,185	23,457	3,519	59	30	36	4,244	1,061	1,591	477	
CMB	53,704	35,802	5,370	73	37	42	6,118	1,530	2,294	688	
CMB	35,185	23,457	3,519	59	30	36	4,244	1,061	1,591	477	
Sub-Total										8,381	13,968.42
CP	1,650	1,100	165	13	6	21	540	135	202	61	
CP	24	16	2	2	1	20	63	16	23	7	
CP	190,000	126,667	19,000	138	69	72	19,784	4,946	7,419	2,226	
CP	1	1	0	0	0	20	13	3	5	1	
CP	86,400 cf	86,400	12,960	114	57	60	13,737	3,434	5,151	1,545	
CP	81,360	54,240	8,136	90	45	49	8,900	2,225	3,338	1,001	

Appendix A-3 (Continued)
Water Estimates for Storage Piles

Operation Type	Open Storage Pile - Dry (t)	Pile Volume (cf)	Base area (sf)	Side Length (ft)	1/2 Side Length (ft)	Slant height (ft)	Lateral area (ft ²)	Material Volume (ft ³)	Material Weight (ton)	Water consumption (gal)	Ave. Water Consumption (gal) by Category
CP	7296 cf	7,296	1,094	33	17	26	1,717	429	644	193	
CP	7,000	4,667	700	26	13	24	1,269	317	476	143	
CP	8510 cf	8,510	1,277	36	18	27	1,916	479	719	216	
Sub-Total										5,393	33,220.91
CS	692469 cu ft	692,469	103,870	322	161	162	104,667	26,167	39,250	11,775	
A, CS	236,806	157,870	23,681	154	77	79	24,467	6,117	9,175	2,753	
CS	13,440,000 cf	13,440,000	2,016,000	1,420	710	710	2,016,800	504,200	756,300	226,890	
CS	720 cf	720	108	10	5	21	429	107	161	48	
CS	389000 cf	389,000	58,350	242	121	122	59,145	14,786	22,179	6,654	
										248,120	
HMA	5,556	3,704	556	24	12	23	1,094	274	410	123	0.00
HMA	20,000	13,333	2,000	45	22	30	2,683	671	1,006	302	0.00
HMA	478,600	319,067	47,860	219	109	111	48,653	12,163	18,245	5,474	0.00
HMA	30,000	20,000	3,000	55	27	34	3,715	929	1,393	418	0.00
HMA	1,389	926	139	12	6	21	491	123	184	55	0.00
HMA	560,412	373,608	56,041	237	118	120	56,836	14,209	21,313	6,394	0.00
HMA	593	395	59	8	4	20	314	78	118	35	0.00
HMA	593	395	59	8	4	20	314	78	118	35	0.00
HMA	1,111	741	111	11	5	21	436	109	164	49	0.00
HMA	3,863	2,576	386	20	10	22	876	219	329	99	0.00
HMA	1,000	667	100	10	5	21	412	103	155	46	0.00
HMA	11,667	7,778	1,167	34	17	26	1,797	449	674	202	0.00
HMA	11,111	7,407	1,111	33	17	26	1,736	434	651	195	0.00
HMA	9,722	6,481	972	31	16	25	1,581	395	593	178	0.00
HMA	3,333	2,222	333	18	9	22	803	201	301	90	0.00
HMA	835,630	557,087	83,563	289	145	146	84,359	21,090	31,635	9,490	0.00
HMA	980,000	653,333	98,000	313	157	158	98,797	24,699	37,049	11,115	0.00
Sub-Total										0	0.00

Appendix A-3 (Continued)
Water Estimates for Storage Piles

Operation Type	Open Storage Pile - Dry (t)	Pile Volume (cf)	Base area (sf)	Side Length (ft)	1/2 Side Length (ft)	Slant height (ft)	Lateral area (ft ²)	Material Volume (ft ³)	Material Weight (ton)	Water consumption (gal)	Ave. Water Consumption (gal) by Category
O	2,556	1,704	256	16	8	22	689	172	258	77	
O	10,240	6,827	1,024	32	16	26	1,639	410	615	184	
O	2,000,000	1,333,333	200,000	447	224	224	200,798	50,200	75,299	22,590	
Sub-Total										22,852	148,536.05
										Total	539,450.82

Slant height (ft) = $[(\frac{1}{2} \text{ side length})^2 + (\text{height})^2]^{1/2}$
 where: height = 20 ft

Lateral area (ft²) = $\frac{1}{2}$ perimeter x slant height

Material weight (tons) = lateral area (ft²) x depth (ft) x conversion factor
 where: conversion factor = 1.5 tons/yd³ of aggregates
 depth = 3 inches (or 0.25 ft)

Water consumption (gals.) = material weight (tons) x water consumption factor
 Where: water consumption factor = 0.3 gals H₂O/ton material

Appendix A-4
Water Estimates for Process Equipment

Operation Type	Truck Ldg/Unldg - Dry (t/d)	Water for Ldg/Unldg (gal)	Water for Ldg/Unldg (gal) for PR 1157
A	5,830	1,749	
A	6,066	1,820	
A	11,000	3,300	
A	1,100	330	
A	1,050	315	
A	5500, wt material	0	
A	1100, all wet	0	
A	864	259	
A	6,066	1,820	
A	3,878	1,163	
A	1,298	389	
A	72	22	
A	3,600	1,080	
A	wet material	0	
A	6	2	
A	2,328	698	
A, CS	7,000	2,100	
A, CS	450	135	
A,C,CS	2,000	600	
A	19,671	5,901	
A	21,990	6,597	

Appendix A-4 (Continued)
Water Estimates for Process Equipment

Operation Type	Truck Ldg/Unldg - Dry (t/d)	Water for Ldg/Unldg (gal)	Water for Ldg/Unldg (gal) for PR 1157
A	22,488	6,746	
A	15,534	4,660	
Subtotal		39,687	45,174
CB	590	177	
CB	768	230	
CB	706	212	
CB	1,060	318	
CB	3,736	1,121	
CB	2,748	824	
CB	978	293	
CB	549	165	
CB	712	214	
CB	660	198	
CB	164	49	
CB	1,372	412	
CB	660	198	
CB	1,108	332	
CB	1,442	433	

Appendix A-4 (Continued)
Water Estimates for Process Equipment

Operation Type	Truck Ldg/Unldg - Dry (t/d)	Water for Ldg/Unldg (gal)	Water for Ldg/Unldg (gal) for PR 1157
CB	792	237	
CB	1,240	372	
CB	633	190	
CB	960	288	
CB	880	264	
CB	719	216	
CB	1,682	505	
CB	1,122	337	
CB	1,042	313	
CB	899	270	
CB	1,000	300	
CB	1,302	391	
CB	320	96	
CB	1,286	386	
CB	1,095	329	
CB	677	203	
CB	2,172	652	
CB	409	123	
CB	589	177	
Subtotal		10,822	23,025
CMB	605	182	
CMB	735	221	
CMB	374	112	
CMB	586	176	
CMB	555	167	

Table A-4 (Continued)
Water Estimates for Process Equipment

Operation Type	Truck Ldg/Unldg - Dry (t/d)	Water for Ldg/Unldg (gal)	Water for Ldg/Unldg (gal) for PR 1157
CMB	460	138	
CMB	79	24	
CMB	825	248	
CMB	240	72	
CMB	245	74	
CMB	437	131	
CMB	420	126	
CMB	584	175	
CMB	1,293	388	
CMB	584	175	
Subtotal		2,407	4,011
CP	5	2	
CP	427	128	
CP	160	48	
CP	102	31	
CP	107	32	
CP	60	18	
CP	59	18	
CP	3,974	1,192	
CP	63	19	
CP	20	6	
CP	850	255	
CP	195	59	
CP	610	183	
CP	675	203	
CP	328	98	

Table A-4 (Continued)
Water Estimates for Process Equipment

Operation Type	Truck Ldg/Unldg - Dry (t/d)	Water for Ldg/Unldg (gal)	Water for Ldg/Unldg (gal) for PR 1157
CP	880	264	
CP	1,045	314	
CP	227	68	
CP	90	27	
CP	103	31	
CP	219	66	
CP	360	108	
CP	46	14	
CP	10	3	
CP	67	20	
Subtotal		3,205	19,743
CS	4,808	1,442	
A, CS	1,292	388	
CS	2,500	750	
CS	9,688	2,906	
CS		0	
Subtotal		5,486	0
HMA	1,346	202	
HMA	1,122	168	
HMA	1,429	214	
HMA	1,161	174	

Table A-4 (Continued)
Water Estimates for Process Equipment

Operation Type	Truck Ldg/Unldg - Dry (t/d)	Water for Ldg/Unldg (gal)	Water for Ldg/Unldg (gal) for PR 1157
HMA	2,308	346	
HMA	580	87	
HMA	600	90	
HMA	1,235	185	
HMA	5,081	762	
HMA	800	120	
HMA	1,080	162	
HMA	640	96	
HMA	720	108	
HMA	1,800	270	
HMA	1,440	216	
HMA	1,096	164	
HMA	1,295	194	
HMA	650	98	
HMA	1,100	165	
HMA	3,000	450	
HMA	1,000	150	
HMA	800	120	
HMA	1,800	270	
HMA	10,900	1,635	

Table C-4 (Continued)
Water Estimates for Process Equipment

Operation Type	Truck Ldg/Unldg - Dry (t/d)	Water for Ldg/Unldg (gal)	Water for Ldg/Unldg (gal) for PR 1157
HMA	1,885	283	
HMA	497	75	
Subtotal		6,805	11,777
O	375	113	
O	1,285	385	
O	118	35	
O	8	2	
Subtotal		536	3,482
			107,213
			375,245

APPENDIX B

OPACITY TEST METHODS No. 9B

- ✓ EPA Method 9
- ✓ Time Averaged Method
- ✓ Intermittent Emissions Method

Opacity Test Methods

EPA Method 9 – Visual Determination of the Opacity of Emissions from Stationary Sources (specific to the time specified in AQMD Rule 401, Visible Emissions)

Time Averaged Method

Note: This method can only be conducted by an individual who is a California Air Resources Board (CARB) certified Visible Emission Evaluation (VEE) observer. Qualification and testing requirements for a CARB-certified VEE observer can be obtained from the AQMD.

This procedure is identical to EPA's Method 9 except for the data-reduction procedures, which provide for averaging times other than 3 minutes. This method is applicable to continuous sources of visible emissions for compliance determination with opacity requirements of Rule 1157.

~~This procedure is for evaluating continuous fugitive dust emissions and is for the determination of the opacity of continuous fugitive dust emissions by a qualified observer. Sources of continuous fugitive dust emissions sources for aggregate and related operation include, but are not limited to, conveyor transfer points, and activities that produce emissions continually without interruption such as, conveyORIZED screening and crushing activities that produce emissions continuously during operations such as earthmoving, grading, and trenching. Emissions from these types of continuous uninterrupted activities are considered continuous even though speed of the activity may vary and emissions controls may be in-place may be controlled to 100%, producing no visible emissions, during parts for all or a portion of the operation. The qualified observer should do the following:~~

Position:

Stand at a position at least twenty (20) feet from the fugitive dust source in order to provide a clear view of the emissions with the sun oriented in the 140° sector to the back ~~and 140° to the front. Consistent as much as possible with~~ While maintaining the above requirements, make opacity ~~observations/observations/readings~~ from a position such that the line of sight is approximately perpendicular to the plume and wind direction. Make opacity observations/readings at the point of greatest opacity in the portion of the plume. Focus observations/readings to one discrete source that generates PM, not the entire operation. The observer may follow the fugitive dust plume generated by mobile earth moving equipment, as long as the sun remains oriented in the 140° sector to the back. As much as possible, do not include more than one plume in the line of sight at one time.

Field Records:

Record the name of the site, location of dust generating operation, type of operation, type of equipment in-use and activity, fugitive dust source type (e.g., earthmoving, grading,

~~trenching~~), method of control used, if any, observer's name, certification data and affiliation, and a sketch of the observer's position relative to the fugitive dust source. Also, record the time, estimated distance to the fugitive dust source location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), observer's position relative to the fugitive dust source, and color of the plume and type of background on the visible emission observation when opacity ~~observations/readings~~ are initiated and completed.

Observations:

Make opacity observations/~~readings~~, to the extent possible, using a contrasting background that is perpendicular to the line of sight. Make opacity ~~observations observations/readings~~ at a point just beyond where material is no longer being deposited out of the plume (normally three (3) feet above the surface from which the plume is generated). The initial observation should begin immediately after a plume has been created above the surface involved. Do not look continuously at the plume, but instead observe the plume momentarily at 15-second intervals, first at zero second and then at fifteen seconds. ~~For fugitive dust from earthmoving equipment, make opacity observations at a point just beyond where material is not being deposited out of the plume (normally three (3) feet above the mechanical equipment generating the plume).~~

Recording Observations:

Record the opacity ~~observations-observations/readings~~ to the nearest 5% every fifteen (15) seconds on an observational record sheet. Each momentary observation/~~reading~~ recorded represents the average opacity of emissions for a fifteen (15) second period. If a multiple plume exists at the time of an observation, do not record an opacity ~~observation/reading~~. Mark an "x" for that reading. If the equipment generating the plume travels outside of the field of observation, resulting in the inability to maintain the orientation of the sun within the 140° sector or if the equipment ceases operating, mark an "x" for the fifteen (15) second interval reading. Readings identified as "x" shall be considered interrupted ~~observations/readings~~. If at any time there are five (5) individual, consecutive observations/readings of 50% or greater opacity, stop the opacity observations/readings. Within one hour, no more than one NOV can be issued by the AQMD staff for one emission source.

Data Reduction for Time-Averaged Method:

For each set of twelve (12) or twenty four (24) consecutive ~~observations/readings~~, calculate the appropriate average opacity. Sets shall consist of consecutive observations/~~readings~~, however, ~~observations/readings~~ immediately preceding and following interrupted readings shall be deemed consecutive and in no case shall two sets overlap, resulting in multiple violations.

Intermittent Emissions Method

Note: This method can only be conducted by an individual who is a California Air Resources Board (CARB) certified Visible Emission Evaluation (VEE) observer.

Qualification and testing requirements for a CARB-certified VEE observer can be obtained from the AQMD.

This procedure is identical to EPA's Method 9 except for the data-reduction procedures, which provide for averaging times other than 3 minutes. This method is applicable to intermittent sources of visible emissions for compliance determination with opacity requirements of Rule 1157.

~~This procedure is for evaluating intermittent fugitive dust emissions. This procedure is for the determination of the opacity of intermittent fugitive dust emissions by a qualified observer.~~ Intermittent fugitive dust emissions sources for aggregate and related operations include, but are not limited to, activities that produce emissions randomly such as non-conveyorized screening, loading, unloading, and transferring of materials where random emissions are predominantly produced. This test method shall also be used to determine the opacity of PM emissions from inactive storage piles when disturbed by wind gusts, and visible PM emissions generated by vehicles while traveling on unpaved roads and unpaved parking lots. include activities that produce emissions intermittently such as screening, dumping, and stockpiling where predominant emissions are produced intermittently. The qualified observer should do the following:

1. For Storage Piles, Screening, and Loading/Unloading/Transferring Activities:

Position:

Stand at a position at least twenty (20) feet from the fugitive dust source in order to provide a clear view of the emissions with the sun oriented in the 140° sector to the back and 140° to the front. ~~Consistent as much as possible with~~ While maintaining the above requirements, make opacity ~~observations~~ observations/readings from a position such that the line of sight is approximately perpendicular to the plume and wind direction. Do not include more than one plume in the line of sight at one time.

Field Records:

Record the name of the site, ~~fugitive dust source type (e.g., pile, material handling, transfer, loading, sorting),~~ location of dust generating operation, type of operation, type of equipment in-use and activity, method of control used, if any, observer's name, certification data and affiliation, and a sketch of the observer's position relative to the fugitive dust source. Also, record the time, estimated distance to the fugitive dust source location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), observer's position relative to the fugitive dust source, and color of the plume and type of background on the visible emission observation when opacity readings are initiated and completed.

Observations:

Make opacity observations, ~~to the extent possible,~~ using a contrasting background that is perpendicular to the line of sight. Identify the initial fallout zone within the plume. Make an opacity observation/reading at the maximum point of the entrained fugitive dust plume ~~observations~~ observations/readings at a point located just

beyond ~~the initial fallout zone where material is no longer being deposited out of the plume (normally approximately~~ three (3) feet above the surface from which the plume is generated).

✓ For the 20% opacity:

Make two ~~observations~~observations/readings per plume per activity at the same point that occurs within your field of view, beginning with the first observation/reading at zero (0) seconds and the second observation/reading at five (5) seconds. Activities might occur at different sources within your field of view (i.e., loading, unloading activities associated with more than one storage pile). The zero (0) second observation/reading should begin immediately after a plume has been created above the surface involved. Do not look continuously at the plume but, instead, observe the plume briefly at zero seconds and then at five seconds.

✓ For the 50% opacity:

Make no more than two observations/readings per plume for one discrete activity or source (not the entire operation) that is generating visible PM emissions (i.e., loading, unloading activities associated with one storage pile), beginning with the first observation/reading at zero (0) seconds and the second observation/reading at five (5) seconds until five (5) observations/readings are completed. The zero (0) second observation/reading should begin immediately after a plume has been created above the surface involved. Do not look continuously at the plume but, instead, observe the plume briefly at zero seconds and then at five seconds.

Recording Observations:

Record the opacity ~~observations~~observations/readings to the nearest 5% on an observational record sheet. Each momentary observation recorded represents the average opacity of emissions for a five (5) second period.

Repeat the ~~Observations~~observations/readings and the ~~r~~Recording ~~Observations~~observations/readings listed above in this procedure until you have recorded a total of 12 consecutive opacity readings. This will occur once six intermittent plumes consisting of two readings per plume on which you are able to take proper readings have been observed. The 12 consecutive readings must be taken within the same period of observation but must not exceed 1 hour. ~~Observations~~Observations/readings immediately preceding and following interrupted ~~observations~~observations/readings (double plume over, line of sight impeded by traversing traffic) can be considered consecutive.

Average the 12 opacity ~~observations~~observations/readings together. If the average opacity observation/reading equals 20% or lower, the source is in compliance with the averaged method opacity standard described in the Rule 1157. At any time, stop

the observations/readings if there are five (5) individual, consecutive observations/readings of 50% or greater opacity. Within one hour, no more than one NOV can be issued by the AQMD staff for one emission source.

2. For Vehicles Traveling on Unpaved Roads and Unpaved Parking Lots:

The purpose of this test method is to estimate the percent opacity of PM emissions caused by vehicle movement on the unpaved roads and unpaved parking lots.

Position:

Stand at least 16.5 feet from the fugitive dust source in order to provide a clear view of the emissions with the sun oriented in the 140° sector to the back and 140° to the front. While maintaining the above requirements, make opacity observations/readings from a position such that the line of sight is approximately perpendicular to the plume and wind direction. Focus observations/readings to a discrete portion of the unpaved road or unpaved parking lot where fugitive dust plume is generated. Do not include more than one plume in the line of sight at any one time.

Field Records:

Record the name of the site, dust source type, dust source location, method of control used, if any, observer's name, certification data and affiliation, and a sketch of the observer's position relative to the fugitive dust source. Also, record the time, estimated distance to the fugitive dust source location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), observer's position relative to the fugitive dust source, and color of the plume and type of background on the visible emission observation when opacity observations/readings are initiated and completed.

Observations:

Make opacity observations, to the extent possible, using a contrasting background that is perpendicular to the line of sight. Make opacity observations/readings approximately 3 feet above the surface from which the plume is generated. Note that the observation/reading is to be made at only one visual point (one discrete location) upon generation of a plume, as opposed to visually tracking the entire length of a dust plume as it is created along the surface. Make two observations/readings per vehicle passing through such discrete location, beginning with the first reading at zero second and the second reading at five (5) seconds. The zero-second observation/reading should begin immediately after a plume has been created above the surface involved. Do not look continuously at the plume, but, instead, observe the plume briefly at zero second and then, at five seconds.

Recording Observations:

Record the opacity observations/readings to the nearest 5% on an observational record sheet. Each momentary observation/reading recorded represents the average

opacity of emissions for a five (5) second period. Record the vehicle types (mid-size passenger car, heavy-duty truck, etc.) and the approximate speeds the vehicles are traveling when readings are taken.

Repeat the observations/readings and the recording observations/readings listed above in this procedure until a total of 12 consecutive opacity observations/readings are recorded. This will occur once six vehicles have driven on the source in your line of observation for which you are able to take proper readings. The 12 consecutive observations/readings must be taken within the same period of observation but must not exceed 1 hour. Observations/readings immediately preceding and following interrupted observations/readings (vehicle travels in front of the path, plume doubled over, etc) can be considered consecutive. Average the 12 opacity readings together. If the average opacity reading equals 20% or lower, the source is in compliance with the opacity standard described in the Rule 1157.

At any time, stop the observations/readings if there are five (5) individual, consecutive readings of 50% or greater opacity. This will occur once three vehicles have driven on the source in your line of observation for which you are able to take proper readings. Within one hour, no more than one NOV can be issued by AQMD staff for one emission source (the unpaved road or unpaved parking lot).

Instantaneous Method

~~Note: This is an EPA approved procedure for evaluation of Fugitive Dust Emissions. This procedure is for the instantaneous determination of the Opacity of Fugitive Dust Emissions by a California Air Resources (CARB) certified visible emissions evaluation (VEE) observer. The certified observer should do the following:~~

Position:

~~Stand at a position at least twenty (20) feet from the fugitive dust source in order to provide a clear view of the emissions with the sun oriented in the 140° sector to the back. Consistent as much as possible with maintaining the above requirements, make opacity observations from a position such that the line of sight is approximately perpendicular to the plume and wind direction. The observer may follow the fugitive dust plume generated by mobile earth moving equipment, as long as the sun remains oriented in the 140° sector to the back. As much as possible, do not include more than one plume in the line of sight at one time.~~

Field Records:

~~Record the name of the site, fugitive dust source type (e.g., earthmoving, grading, storage pile, material handling, transfer, loading, sorting), method of control used, if any, observer's name, certification data and affiliation, and a sketch of the observer's position relative to the fugitive dust source. Also, record the time, estimated distance to the fugitive dust source location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), observer's position~~

~~relative to the fugitive dust source, and color of the plume and type of background on the visible emission observation when opacity readings are initiated and completed.~~

~~Observations:~~

~~Make opacity observations, to the extent possible, using a contrasting background that is perpendicular to the line of sight. Make opacity observations at a point just beyond where material is no longer being deposited out of the plume (normally three (3) feet above the surface from which the plume is generated).~~

~~Recording Observations:~~

~~Record the opacity observations to the nearest 5%~~

~~Data Reduction for Instantaneous Regulations:~~

~~Evaluate all observations for conformance with the instantaneous regulation.~~