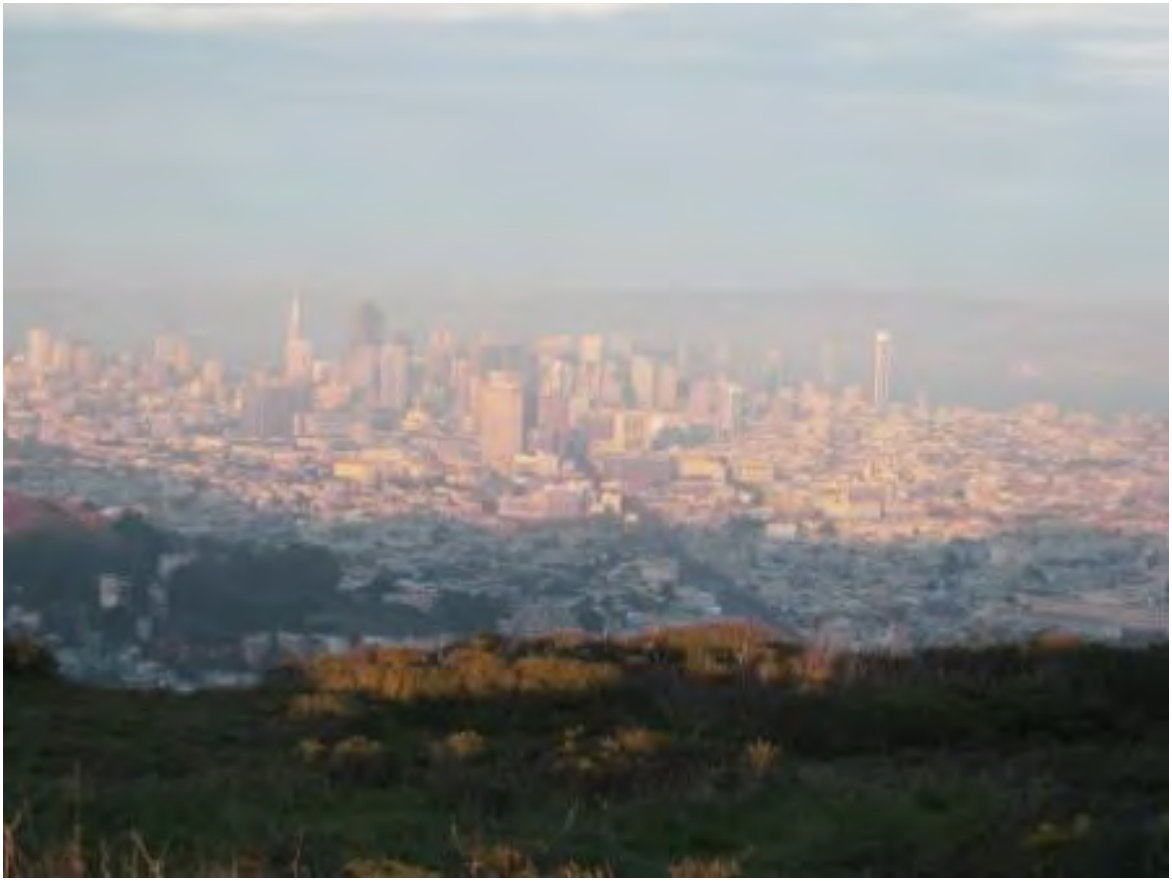
BAY AREA AIR QUALITY MANAGEMENT DISTRICT

STAFF REPORT – PARTICULATE MATTER

Proposed Amendments to Regulation 6, Rule 1: General Requirements

2017 Clean Air Plan, Control Measure SS31



Guy A. Gimlen
Principal Air Quality Engineer
March 2018

ACKNOWLEDGEMENTS

Air District staff members who contributed significantly to the development of this report and proposal:

Alexander Crockett, Esq., Assistant Counsel, Legal
Wayne Kino, Director, Compliance and Enforcement
Don VanBuren, Senior Air Quality Engineer, Compliance & Enforcement
Ed Giacometti, Air Program Supervisor, Compliance & Enforcement
Jeff Gove, Manager, Compliance & Enforcement
Paul Hibser, Air Program Supervisor, Compliance & Enforcement
Ron Carey, Senior Inspector, Compliance & Enforcement
Greg Solomon, Supervisor, Engineering
Brian Lusher, Senior Air Quality Engineer, Engineering
Jerry Bovee, Manager, Meteorology and Measurement
Chuck McClure, Air Program Supervisor, Meteorology and Measurement
Tim Underwood, Principal Air Quality Engineer, Meteorology and Measurement
Brad Kino, Senior Air Quality Engineer, Meteorology and Measurement
Luz Gomez, Manager, Community Engagement
David Ralston, Manager, Communications
Azibuike Abaka, Public Information Officer II, Community Engagement
Kristen Law, Staff Specialist I, Communications
Rosene Salmo, Staff Specialist I, Communications
Aneesh Rana, Public Information Officer II, Community Engagement

STAFF REPORT

Regulation 6, Rule 1: General Requirements

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

The Bay Area Air Quality Management District (Air District) staff is proposing amendments to Regulation 6, Rule 1: General Requirements (Rule 6-1), the Air District's general particulate matter emissions limitation rule. This Staff Report has been developed to provide the information supporting the proposed amendments to Rule 6-1 and is intended to provide the public with information on draft amendments to Rule 6-1 in advance of Public Hearing the Air District will hold in Spring 2018.

The Air District is also proposing a new over-arching regulation for Particulate Matter, Regulation 6: Common Definitions and Test Methods (Reg 6) to accompany revisions to Rule 6-1. The new proposed Regulation 6 would provide common definitions and test methods that apply to existing Regulation 6 rules and other source-specific particulate matter rules as they are developed in the future.

The proposed amendments to Rule 6-1 are part of a rule-making process to fulfill a commitment by the Air District's Board of Directors to review Regulation 6, Rule 1, identified as Stationary Source Measure SS31 in the Air District's 2017 Clean Air Plan. Since the 2010 Clean Air Plan originally identified amending Rule 6-1 as a Stationary Source Control Measure, Air District staff further committed to taking steps to address the Bay Area's particulate matter challenges in a November 2012 report entitled *Understanding Particulate Matter: Protecting Public Health in the San Francisco Bay Area*. These draft amendments to Regulation 6, Rule 1 begin to fulfill these important commitments to reduce particulate matter emissions and improve public health.

Staff proposes amendments to Rule 6-1 because the amendments are needed to ensure the Bay Area standards are as health-protective as possible; other air districts in California have more stringent particulate matter standards; and the Air District's general requirement particulate standards have not been updated in decades. Control technology is available that facilities can use to comply at a reasonable cost. Staff found no facilities with PM emissions quantified by source test that are affected by the amendments to Rule 6-1. As mid-sized and smaller particulate matter sources begin to conduct source tests, some may find a need to install controls. However, most of these sources currently have more stringent permit limits than those being proposed. Staff estimates no emission reductions from these sources.

In the workshop phase of this rule development effort, Air District staff drafted a new regulation to control particulate matter, Regulation 6, Particulate Matter, Rule 8: Bulk Material Storage and Handling (Rule 6-8). Draft new Rule 6-8 would focus on fugitive dust from bulk material storage and handling operations, a large source of particulate matter and a moderate source of fine particulates ($PM_{2.5}$). Fugitive dust is dust that is generated from active operations such as vehicle traffic, loading and unloading solid materials; grinding, screening, or transporting solids using conveyors; and wind erosion on solids during storage and/or handling operations.

Rather than continue to the separate development of draft new Rule 6-8, staff recognized that fugitive dust control requirements from bulk material storage and handling facilities best fits within general requirements, and has incorporated these requirements into the proposed amendments to Rule 6-1. The new section proposed for Rule 6-1 addresses fugitive dust from active operations and from wind erosion of storage piles, disturbed surfaces, and any other activities where the solids can be exposed to the wind by setting limits on any allowable fugitive dust plume, and by prohibiting any visible emissions of fugitive dust from traveling or carrying beyond the site property. In addition, significant bulk material spills must be cleaned up so they do not become a source of fugitive dust. Bulk materials include coke and coal storage and handling. Coke and coal are particularly troublesome solids because the dust from these products is black, visible, and particularly annoying if any particles fall onto adjoining property.

This proposed new section of Rule 6-1 will affect approximately 120 facilities that store and handle bulk materials, ten of which handle petroleum coke, and three facilities that store and handle coal. Approximately 40 of these facilities already have controls for fugitive dust, mostly water sprays. Wind breaks are a very effective method to control wind erosion that initiates fugitive dust plumes, particularly when bulk materials are actively conveyed from one place to another. Costs for wind screens and improvements to watering systems are relatively minor. Emission reductions are estimated to be 0.37 tons per day (tpd) of particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), with approximately 0.03 tpd of emissions being $PM_{2.5}$. Complaints from neighbors are expected to be reduced significantly. The new rule would reduce emissions of particulate matter in the Bay Area in a technically feasible and cost-effective manner, thereby improving public health and reducing nuisance dust deposited on nearby neighbors' property.

The Air District is proposing these amendments to Rule 6-1 as part of three proposals addressing fine particulate pollution. The three proposals include (i) a new Regulation 6 providing common definitions, expectation of monitoring emissions to remain in compliance, and test methods that apply generally to all of the particulate matter Rules under Regulation 6; (ii) amendments to Rule 6-1; and (iii) a new Rule 6-6: Prohibition of Trackout. More information about these related proposals can be found in their respective staff reports, which are being published concurrently with this report.

This Staff Report describes the review that staff has undertaken to analyze the various source categories addressed by Rule 6-1 and determine any significant emission reductions. Following this introduction and summary, Section II, Background refers to the parallel section in the Regulation 6 staff report supplemented with additional information regarding bulk material storage and handling. Section III, Proposed Requirements describes the specific requirements and emission limits, and rationale supporting each. Section IV, Emissions and Emission Reductions describes the expected emissions impacts. Section V provides estimated costs for implementation of Rule 6-1; assesses cost effectiveness of the emission reductions; summarizes the Socioeconomic Impacts on the affected industries, jobs market, and local economy; and covers the implementation impacts for the Air District. Section VI provides a discussion on how this rule fits into the existing structure of state and federal regulatory requirements. Section VII summarizes the environmental impacts, and references the California Environmental Quality Act analysis conducted for the amendments to Rule 6-1, in combination with new Regulation 6, and new Regulation 6, Rule 6: Prohibition of Trackout. A Negative Declaration is proposed as a result of the CEQA review. Section VIII describes the rule development and public participation process used to ensure all affected and interested parties participated in this rulemaking project. Section IX summarizes the findings required by the California Health and Safety Code to adopt an amended regulation, summarizes the staff conclusions, and lists the staff recommendations to the Board regarding Rule 6-1, and the Negative Declaration from the CEQA analysis. References are provided, and the associated CEQA Analysis, Socio-economic Analysis and Response to Comments are appendices to this staff report.

Staff recommends the Board of Directors adopt the proposed amendments to Regulation 6, Rule 1, and approve the associated CEQA Analysis Negative Declaration at the Public Hearing scheduled for Spring 2018.

The Air District invites all interested members of the public to review the proposed amendments to Rule 6-1 and this Staff Report, to provide comments on this proposal, and to participate in the Public Hearing. Air District staff will accept written comments, will respond to all comments received, and will present final proposals to the Air District's Board of Directors for their consideration. For further information in advance of the Public Hearing, please contact Guy Gimlen, Principal Air Quality Engineer, (415) 749-4734, ggimlen@baaqmd.gov.

II. BACKGROUND

Refer to the Background section of the staff report for new proposed Regulation 6, Section A for the broad review of all particulate matter sources in the Bay Area, including bulk material storage and handling. This background information provided the basis for the amendments to Rule 6-1, and discusses the recognition that most sources currently have more restrictive permit limits, so the more restrictive particulate matter standards result in very few if any emission reductions. That review also lead directly to the new section of Rule 6-1 addressing control of fugitive dust from bulk materials, including petroleum coke and coal storage and handling. Supplemental background information on petroleum coke and coal storage and handling is included here.

A. Industry / Source Description

There is potential for fugitive dust being emitted from any location that produces, handles or stores solid material, particularly where heavy truck and vehicle traffic are part of producing and selling these bulk materials. Bulk material is defined as any unpackaged sand, soil, gravel, aggregate, solid construction material, solid industrial chemical or other solid product less than two inches in length or diameter. Petroleum coke and coal handling facilities are included with bulk material sites.

1. Bulk Material Storage and Handling

Wind erosion at bulk material storage and handling facilities can create significant dust emissions, particularly when handling fine solids like gypsum, or even gravel and sand from rock quarries. Background on bulk material storage and handling is found in the Regulation 6 staff report, Section II.A.7: Opportunities for PM Emission Reductions. In addition, the Air District has received numerous complaints about coke dust and coal dust. Coke and coal loading / unloading and stockpiles are unique in that fugitive dust from these products is black and highly visible other more typical forms of dust.

PM Emissions from Petroleum Coke and Coal

Petroleum coke is a product of the oil refining process, converting residuum (the heavy asphaltic material from crude oil) into lighter gas oils and solid coke. Three of the five Bay Area refineries produce solid coke. The solid coke is formed in a large vessel called a coke drum, and removed from the drum with high pressure water. The solid coke usually falls into a pit, where it is scooped up, crushed to a manageable size, and conveyed to storage on a conveyor belt. Each refinery conveys, loads, and stores coke in stockpiles (either on-site or off-site). The solid coke may be loaded directly onto a truck and transported to a customer. Most petroleum coke is burned for fuel. One refiner also calcines a portion of their coke to produce a specialty product called calcined coke. One other refiner produces “fluid” coke, which has the consistency of black sand.

One cement manufacturer in Cupertino burns petroleum coke as fuel. Coke is transported to this facility by truck, offloaded via conveyor to a storage pile, and then fed into the process stream. Most of the coke produced in the Bay Area is shipped overseas. There are three coke shipping facilities, one located in the Richmond harbor, one in Pittsburg, and one in Benicia. Each of these shipping facilities receives solid coke by truck, off-loads it, conveys and stores it, then loads it onto ships. The facility in Richmond stores the coke in an open stockpile. The facility in Pittsburg is a state of the art facility, with enclosed off-loading, enclosed conveyors, and enclosed storage. The facility in Benicia is partially enclosed and handles fluid coke.

The Bay Area has two foundries that use coal as a raw material in the manufacturing process. One is in Oakland and the other is in Union City. Coal is received from out of state by railcar at each facility. One facility off-loads and conveys the coal to open storage, then scoops up coal as

needed to supply the manufacturing process. The other off-loads and conveys the coal to a series of silos where the coal is stored until used in the manufacturing process.

Coal dust is a concern throughout the transportation and handling process. Coal contains 2-5 wt. % silt (particles smaller than 70 microns), and the silt can create dust from wind erosion if not kept moist. Coal dust can be emitted from the open tops on railcars in transit. Additional silt is formed as coal jostles in the railcar but most of the coal dust silt is emitted from the railcar in the first few miles of travel. The Air District does not have authority to regulate rail transportation.

In addition, coal dust is a concern when off-loading the railcar into a hopper and conveyor system. Staff observed coal dust coming out of the top of the railcar during unloading, and coal dust surrounding the receipt hopper below the railcar. In addition, the facility that scoops up the coal to feed into the manufacturing processes had issues with coal spills into the vehicle path used to deliver the coal to the process equipment.

2. Pollutants and Emissions Sources

The pollutants of concern from bulk material sites are fugitive dust from the any of the solid materials being handled and stored, and any dust from vehicle traffic on unpaved roads within the site. Rock quarries, asphalt plants, construction sites, equipment storage yards that are not paved, landfills, and any industrial facility that handles solids has the potential to create dust that can add to the particulate load in the air, and that can impact neighbors.

3. Current Emissions Control Technology and Methods

As described in Background section of the staff report for new draft Regulation 6, Section A, the conventional controls for fugitive dust from bulk material storage sites include water trucks spraying water on stockpiles and roads, covers for stockpiles, limiting vehicles speeds on internal haul roads, water sprays for crushers, screens and conveyor belts, and cleanup of any spills.

B. Regulatory History

Refer to the Background section of the staff report for new draft Regulation 6, Section B for the broad review of Regulatory History.

C. Technical Review of Control Technologies

Refer to the Background section of the staff report for new draft Regulation 6, Section C for the broad review of control technologies. There are no new innovative technologies used for controlling fugitive dust from bulk material sites, but there are control technologies that are very effective that are currently under-utilized and can impact dust generation significantly. Wind screens are very effective, often more effective than using water to control dust. Staff strongly encourages use of wind screens rather than watering to control dust, particularly with the semi-constant drought that persists throughout California.

1. Wind Screens are Effective Dust Controls

Prevention of wind erosion for bulk materials, including coke and coal, is very similar to that needed for geologic fugitive dust:

- Minimize the surface area being exposed to wind erosion;
- Establish windbreaks, and limit work on windy days;
- Apply dust suppression measures including water fog or mist when needed;
- Limit traffic on surfaces with dusty silt, and limit vehicle speeds; and

- Prevent dirt, mud, and solids spills; and clean up any spills that have the potential to create dust immediately.

Staff observed the following areas of opportunity for better bulk material dust control:

- Protect locations where bulk materials are handled from wind erosion:
    - Unloading from a railcar or truck into a hopper that feeds a conveyor;
    - Unloading from a ship (this is seldom done, but uses a clamshell style scoop when it is done);
    - Conveyors are often up in the air and more susceptible to winds;
    - Conveyor transfer points (the transitions from the end of one conveyor onto another conveyor, or crusher or screening device);
    - Stockpiles; and
    - Loading onto trucks, railcars and ships.
- Reduce drop heights at conveyor transfer points, and drop heights onto stockpiles where the material is exposed to the wind;
- Prevent and cleanup spills that are subject to wind erosion; and
- Prevent bulk materials from migrating into vehicle traffic areas where it can be pulverized into silt, and entrained into the air from the turbulence of the vehicle traffic.

Staff visited most bulk material handling sites, and found each site (except the petroleum coke shipping facility in Pittsburg) needed improvements in a least two of the areas listed above.

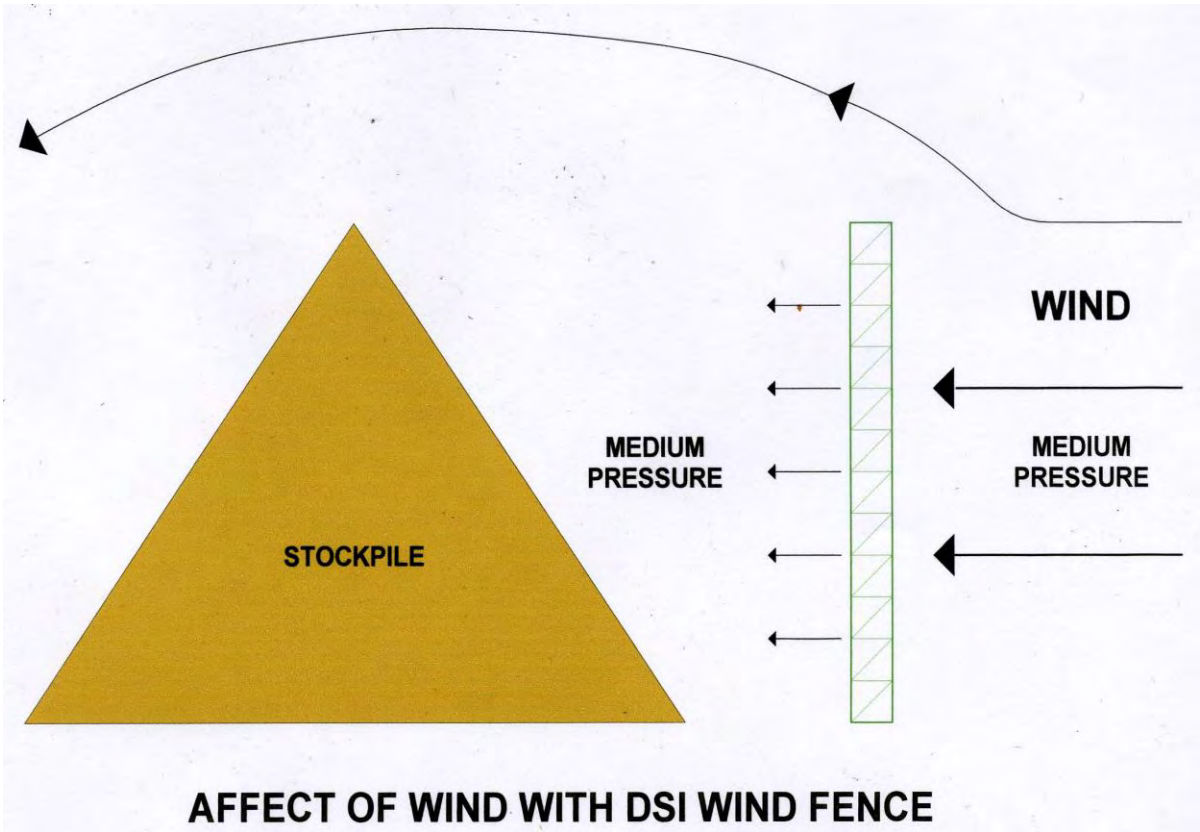
Figure II-1: Typical Wind Screen - constructed to protect a down-wind stockpile.

Wind barriers are very effective at reducing wind velocity and controlling wind erosion. Research on wind barrier design finds that the most effective designs[1] have 50 percent porosity (i.e. allows about half of the wind to blow through the wind screen), and the height of the windbreak should

[1] Windbreak Effectiveness for Storage-Pile Fugitive-Dust Control, Billman and Ayra, Department of Marine, Earth and Atmospheric Sciences, North Carolina State University.

be as high as the bulk material handling operation or stockpile that it protects. The windbreak should be placed a distance no more than its height upwind from the potential dust source. Wind screens are estimated to be 70 percent effective at reducing fugitive dust. Figure II-2 shows the impact a wind barrier has on wind velocity. This example is provided by Dust Solutions, Inc., a company that provides a wide variety of dust solutions, including water misters and wind barriers. Wind screens with porosity allow enough wind to blow through the screen preventing a low-pressure area on the downwind side that can create eddy currents the aggravate wind erosion.

Figure II-2: Wind Barrier – from Dust Solutions, Inc.



Dust controls are similar during active dust generating operations. Dust control measures for active bulk material handling include:

- Provide wind barriers to prevent / minimize wind erosion, or enclose dusty material handling and storage areas.

Figure II-3: Wind Barrier surrounding a transfer point

Windbreaks on conveyors can be built or attached to the support structure for the conveyor, with adequate clean-out openings to accommodate conveyor spills. Conveyors may also need catch-pans to catch any small spills from conveyor operation. These catch-pans, however, are often difficult to retrofit onto an existing conveyor because the mechanical structure must be designed for the weight of the catch-pan plus any spills that may collect. Staff is not proposing to require catch-pans on conveyors because of this retrofit problem.

Fugitive dust from wind erosion is estimated based on wind speed above what is known as "the friction threshold velocity" (the wind speed required to get the first particle of fugitive dust into the air). Use of a wind screen reduces wind velocity by 50%. Average wind speed in the Bay Area during the dry summer season is typically about 10 mph with peak wind speed seldom over 20 mph, so wind screens can be up to 85% effective at controlling fugitive dust. Staff estimates that a combination of windscreens and judicious use of water fog and misting systems can control more than 90% of fugitive dust. However, since about one-third of bulk material handling facilities already use some combination of wind screens and water sprays, staff estimates that enhanced effort to control dust, particularly using wind screens, will be approximately 70% effective.

2. Judicious Water Use to Control Dust

In addition to wind screens, judicious use of water is the next most effective way to control dust. Water sprays and dust suppressants continue to be the most effective way to control dust from stockpiles and unpaved, unstabilized haul roads. Covers for stockpiles, and a low-silt gravel base for unpaved haul roads are effective and reduce water use.

In situations where active operations occur and fugitive dust is being generated, water fog and water mist are more effective at reducing dust. Rather than spraying significant volumes of water, fog and mist systems create small water droplets that are more effective at contacting small dust

particles. Most estimates of water fog and water mist systems indicate they are 10 – 20 times more effective at reducing fugitive dust per gallon of water. During this recurring drought in California, staff recommends water fog or mist systems, and recommends converting existing water spray systems to water fog/mist systems. These water fog systems can also be even more effective when a surfactant (typically a soap) is used to help the water contact and adhere to the solid particles of dust more easily.

Figure II-4: Use water fog or mist to control dust during active handling operations.

Figure II-5: Spray water fog and mist to keep disturbed surfaces damp during bulk material moving operations.

Staff estimates that water spray systems can control approximately 50 percent of fugitive dust generation, and water fog or water mist systems can be equally effective using less than 25 percent of the water used by water sprays.

Note the obvious concern about excessive use of water to control fugitive dust emissions, especially with the persistent recurring drought being experienced in California. This concern about water use drives the recommendation to use wind screens as a first approach to dust control, and to take advantage of the better effectiveness of water fog and water mist systems, rather than water sprays, water hoses, and water trucks. A complication of water fog and mist systems is that the fog or mist must be protected from the wind by an enclosure or a wind screen, because the fog or mist will be affected by the wind patterns.

3. Vehicle Traffic Controls

At many bulk material sites, vehicle traffic is the largest source of fugitive dust. Staff recommends the following control methods to prevent, and reduce dust from vehicles:

- Limit vehicle traffic to paved or stabilized surfaces;
- Limit vehicle speeds to less than 15 mph;
- Use barricades or barriers to prevent erosion of bulk materials onto the vehicle pathways where vehicles can pulverize the solids into fine particles; and
- Prevent dirt, mud and other solids from being tracked out or spilled onto paved roadways.

Staff has specifically not required these specific controls in the proposed rule language, because it is up to each bulk material site to use the controls that best fit their operations, as needed to prevent significant dust plumes and to prevent any visible dust plumes from being carried beyond the property line where the dust can impact neighbors.

III. PROPOSED AMENDMENTS

A. Purpose

This regulation limits the quantity of PM in the atmosphere by establishing limits on emission rates and concentrations from facilities with stacks and by establishing visible emission limits, including opacity standards for any source, including fugitive dust from bulk material storage and handling facilities.

B. Applicability

This is a general requirements rule, so it would apply to all sources of PM in the Bay Area. In addition, the general provisions in Regulation 1, and the common definitions and source test methods in Regulation 6 also apply to Rule 6-1 as cited in the rule. A proposed new section addresses fugitive dust from bulk material sites.

C. Exemptions

Rule 6-1 provides exemptions for sources that are subject to other source-specific rules addressing those operations. Section 6-1-110.1 exempts sandblasting operations because they are currently subject to the provisions of Regulation 12, Rule 4. Section 6-1-110.2 exempts outdoor fires because they are currently subject to the provisions of Regulation 5. Section 6-1-110.3 exempts wood-burning devices because they are currently subject to the provisions of

Regulation 6, Rule 3. Section 6-1-110.4 exempts metal recycling and shredding operations because they are currently subject to the provisions of Regulation 6, Rule 4.

Section 6-1-111 provides a limited exemption for explosive blasting operations that have been permitted by the California Division of Industrial Safety. It is very difficult to control dust during blasting operations. Staff has observed significant pre-watering of a blast site (for approximately 12 hours), yet there was very little impact on the resulting fugitive dust from the blast. This exemption applies to the blasting operations only. The storage and handling of bulk materials remain subject to the requirements of this rule.

Section 6-1-112 provides a limited exemption from new Section 307 regarding fugitive dust from bulk material handling, because Regulation 9-13-304 requires specific fugitive dust mitigation control measures. This section also provides a limited exemption to Section 6-1-310 (particulate matter concentration limits) and Section 6-1-311 (particulate matter weight limits) for Portland Cement manufacturing because these sources are subject to the specific requirements of Regulation 9, Rule 13.

Section 6-1-113 provides a limited exemption from the proposed more stringent amendments to Section 6-1-310 (particulate matter concentration limits), the proposed more stringent amendments to Section 6-1-311 (particulate matter weight limits), and from compliance testing required in Section 6-1-504 for commercial cooking, because these sources are subject to the provisions of Regulation 6, Rule 2. Similarly, salt processing operations are proposed to be exempt because pure (greater than 99 weight percent) salt air emissions to not have health consequences. Material Safety Data Sheet (MSDS) for salt cites no specific health impact limits.[2]

Staff considered a similar exemption for sugar processing operations, but found that the National Institute for Occupational Safety and Health (NIOSH) recommends no more than 5 mg/m^3 of exposure to sugar dust, so the limited exemption was not included in the rule language.

Section 6-1-114 also provides a limited exemption from the proposed more stringent amendments to Section 6-1-310 (particulate matter concentration limits) and the proposed more stringent amendments to Section 6-1-311 (PM weight limits), for combustion from fuel fired indirect heat exchangers (furnaces, heaters, boilers, etc.). Particulates from fuel combustion are generally the result of incomplete combustion, and the most practical method to control particulates is to install an oxidation system (either catalytic oxidation or afterburner) in the flue gas stream. Oxidation systems are currently Best Available Control Technology for new installations, but represent a significant alteration to an existing combustion flue gas stream, and can affect draft so induced draft fans are often necessary. Installation of any oxidation system is site specific and furnace/boiler specific, so beyond the scope of this general particulate control rulemaking project. Best Available Retrofit Control Technology that applies to these sources is “good combustion practice.” In addition, gas-fuel fired indirect heat exchangers are exempt from compliance testing required in Section 6-1-504. Liquid- and solid-fuel fired indirect heat exchangers remain subject to compliance testing required in Section 6-1-504 so additional information can be developed on these sources.

Section 6-1-115 provides a delayed compliance date for the more stringent TSP concentration limits in Section 6-1-310.2 for one specific facility. This facility is a sewage treatment plant that currently incinerates sludge. Source test data indicate the sludge incinerator may occasionally have difficulty meeting the more stringent TSP concentration limits. A delayed compliance date

[2] Morton Salt Safety Data Sheet: CAS Number 7647-14-5, MSDS Code 100

will give this facility time to identify controls that both satisfy the TSP limit and also address toxic emissions requirements in Rule 11-18.

One limited exemption that was considered and rejected was for situations where wind gusts exceed 25 mph. Fugitive dust is very difficult to control in high wind situations, and facilities can implement all feasible control measures to limit fugitive dust and still have visible emissions that can travel or carry beyond the property line. Rather than provide a specific exemption for such situations, staff proposes using the current method of allowing Compliance and Enforcement personnel to use their collective judgement and discretion regarding the degree to which the Air District enforces Section 6-1-307 during high wind situations. Enforcement inspectors will consider whether all feasible controls measures have been taken to control fugitive dust (wind screens, water mist, water or dust suppressants, and other measures identified in the Staff Report for Regulation 6, Attachment 1-5) during high wind events.

D. Definitions

The common definitions in Regulation 6 apply to Rule 6-1. In addition, Rule 6-1 provides definitions for "Exhaust Gas Volume" and "Process Weight Rate." These two definitions are used in setting PM emission limits.

"Exhaust Gas Volume" is defined as the volume of gas discharged from an emission point, adjusted to standard conditions (defined in Reg. 1-228) excluding any water vapor or steam.

"Particle" is defined because it is used in Section 6-1-305. It is defined as a minute quantity of solid matter or liquid droplet.

"Process Weight" is defined as total weight of all material going into a process operation, including solid fuels and any process air needed (generally for cooling), but excluding:

- Any liquid or gas fuels,
- Air that is not consumed as a reactant,
- Air that is used only for dilution, and
- Combustion air.

This definition of process weight is designed to include the volume of gases needed by the process, but excluding combustion products and excluding any dilution air.

"Regulated Bulk Material" site is defined as a bulk material site that produces, handles, loads, unloads, stores or uses more than 10 tons per year of bulk materials; and is subject to an authority to construct and/or permit to operate issued by the Bay Area Air Quality Management District. New draft more stringent limits on fugitive dust will apply regulated bulk material sites.

E. Emission Limits

Currently, Regulation 6, Rule 1: General Requirements Sections 6-1-301 and 302 establish a visible emissions limit from any source of no more than Ringelmann 1, or 20 percent opacity for no more than three minutes in any hour observation period (five percent of the time), using EPA Method 9. This requirement applies to all sources, except for those outlined in Sections 6-1-303 and 304. Other aspects of Sections 6-1-301 to 306 include minor edits for clarity. Reference to opacity sensing devices is deleted, because those references are now included in Regulation 6-602.

Staff considered altering the language defining the opacity observation period from "any hour" to "any sixty-minute period." However, regarding facilities with Continuous Emissions Monitors (CEMs), the District Manual of Procedures, Volume V, Section 8.3.2 specifically identifies "clock

hour" when determining any excess emission. Staff received feedback after the workshops indicating that several facilities rely on this interpretation in control of soot-blowing functions, and in calculations of CEM monthly summaries and excesses. Staff recommends leaving the opacity observation period definition as "any hour."

Section 6-1-307 requires Regulated Bulk Material Sites to meet a more stringent fugitive dust plume requirement of no more than 10% opacity (equivalent to Ringelmann 0.5), that does not linger in the air for more than a cumulative three minutes in any 60-minute observation period (five percent of the time) and that is not larger than five feet long, five feet high, or five feet wide. This significance threshold is designed to allow a reasonable or small dust plume that may occur from vehicle traffic, some active operation on solid materials, or minor puffs of dust from the wind. However, if the plume becomes taller than a person or wider than a car, the 10 percent opacity and three minutes in any 60-minute observation period limits apply.

In addition, Section 6-1-307 prohibits any visible dust plume from traveling or being carried by the wind beyond the property line of the site. Visible emissions are determined by EPA Method 22, which is based on whether the particulate plume is visible or not. This limit is established to be sure dust is not leaving the site and impacting neighbors.

Section 6-1-307 also requires any bulk material spill that is more than 12 inches high or covers an area of more than 25 square feet must be cleaned up by the end of the workday, unless the spill is stabilized or protected by a wind screen to prevent fugitive dust.

Section 6-1-310 establishes Total Suspended Particle (TSP) concentration limits that apply to facilities with a stack or vent with sufficiently regular geometry so that both flow volume and contaminant concentrations can be measured.

Section 6-1-310.1 retains the current limit of 343 milligrams/dry standard cubic meter (0.150 grains/dry standard cubic foot (gr/dscf)).

Section 6-1-310.2 establishes emission limits for any source where the Potential to Emit (defined in Regulation 2-1-217) is greater than 1,000 kilograms/year (approximately six lbs per day). Emission limits are provided in a table, ranging from 0.150 to 0.0100 gr/dscf, depending on volume of Exhaust Gas Rate. These emission limits are equal to limits currently in place in the South Coast Air Quality Management District (South Coast) Rule 404, and have been achieved in practice. Section 6-1-310.2 goes into effect July 1, 2020.

Section 6-1-310.3 defines adjustments needed to standardize emissions concentrations, namely 12 volume percent carbon dioxide (CO_2) for incinerators and salvage operations, or six volume percent oxygen (O_2) for heat transfer operations.

Section 6-1-311 establishes TSP weight limits that apply to facilities with a stack or vent with sufficiently regular geometry so that both flow volume and contaminant concentrations can be measured.

Section 6-1-311.1 retains the current table of limits, but clarifies the exact range of process weight for each emission limit. Limits range from 1.8 to 40 lbs per hour.

Section 6-1-311.2 establishes emission limits for any source where the Potential to Emit (defined in Regulation 2-1-217) is greater than 1,000 kilograms per year(kg/yr) (approximately six lbs per day). Emission limits are provided in a table, ranging from 1.0 to 30 lbs per hour depending on process weight rate. These emission limits are equal to limits currently in place in the South Coast

Rule 405, and have been achieved in practice. Similarly, Section 6-1-311.2 goes into effect July 1, 2020.

Sulfuric acid manufacturing plant acid mist emissions were not studied in the scope of this rule development project. Section 6-1-320 for Sulfuric Acid Manufacturing Plans has minor clarifications. TSP limits in Sections 6-1-310 and 311 continue to apply to sulfuric acid manufacturing plants. Review of sulfuric acid manufacturing plant source tests indicates these plants easily meet these emissions limits.

Sulfur recovery unit acid mist emissions were not studied in the scope of this rule development project. Section 6-1-330 for Sulfur Recovery Units has minor revisions for clarification. TSP limits in Section 6-1-310 and 311 continue to apply to sulfuric recovery units. Review of sulfur recovery unit source tests indicate these units easily meet these emissions limits.

F. Administrative Requirements

The monitoring requirement in Regulation 6-102 applies.

Section 6-1-402 provides an Alternate Source Test Frequency from the source testing requirements in Section 6-1-504 and 505. The APCO will consider applications for reducing source test frequency based on actual test results.

G. Monitoring and Records

Sections 6-1-501 – 503 have minor clarifications.

Section 6-1-504 defines TSP compliance testing requirements, based on the extent of the TSP emissions. Compliance testing is required for any facility with TSP emissions greater than 2,000 kilograms per year (approximately 12 lbs per day). Testing frequency ranges from annually for facilities emitting more than 16,000 kg/yr to once every five years for facilities emitting 2,000 – 8,000 kg/yr.

Similarly, Section 6-1-505 defines sulfur trioxide (SO_3) / acid mist compliance testing requirements, based on the extent of the acid mist emissions. Compliance testing is required for any facility with acid mist emissions greater than 2,000 kg/yr (approximately 12 lbs per day). Testing frequency ranges from annually for facilities emitting more than 16,000 kg/yr to once every five years for facilities emitting 2,000 – 8,000 kg/yr.

Section 6-1-506 establishes the requirements for regulated bulk material site monitoring of fugitive dust visible emissions. These facilities are not expected to have a person certified to assess plume opacity; but they are expected to establish a management system to monitor sources and operations with the potential to generate fugitive dust, and take corrective actions if there is any indication that fugitive dust is becoming significant. These sites are not asked to make a "compliance determination." Rather, they are asked to pay attention to the potential for fugitive dust, and take corrective actions if fugitive dust appears to become significant.

Each regulated bulk material site is required to monitor sources and active operations for fugitive dust visible emissions when the potential for dust is high due to wind conditions and/or work activities as follows:

- Monitor the nature and extent of fugitive dust visible emissions from each potential source or operation using simple observation of the emission, with the sun (or artificial light) positioned behind the observer:

    - Observe each source that is located within 1,000 feet of the site property line when the wind is blowing from the source toward the property line – at least twice each workday; and
    - Observe all sources at least once each workday.
    - Petroleum coke, calcined coke and coal operations are required to monitor during daylight hours only, since black dust is virtually impossible to see at night.
- The APCO may specify the monitoring and frequency of monitoring if needed.
- Document the date, time, and sources and operations monitored each workday.
- Maintain records in electronic or log book format for two years and make these records and any other photographic or video records of fugitive dust the site may have available to the Air District upon request.
- Air District enforcement will occur through the normal process of site visits including visual observations and records reviews, and may be adjusted based on conditions found.

Monitoring is required during active operations regardless of when the workday starts or ends. Visible emission limits are in effect day and night, and subject to enforcement action by the District. Lighting at each facility varies, so monitoring at night is more difficult.

Any individual that monitors fugitive dust plumes is not expected to be proficient in either EPA Method 9 or EPA Method 22. However, when observing sources with the potential to create fugitive dust, they are expected to position themselves with the sun (or artificial light) behind them, as this is the positioning required in EPA Method 9.

H. Manual of Procedures

Section 6-1-601 affirms that the common test methods in Regulation 6 apply to this rule, including the test methods used to assess fugitive dust visible emissions.

Section 6-1-602.1 defines the test method for TSP as EPA Method 5 or an approved alternate method as described in Regulation 6-603.

Section 6-1-602.2 defines the test method for acid mist as EPA Method 8 or an approved alternate.

I. Comparative Analysis

Proposed amendments to Rule 6-1 bring it up to date with the most stringent regulations in California. TSP concentration and weight limits meet or exceed the most stringent in South Coast, San Joaquin Valley, and Sacramento Metro air districts.

Requirements for regulation bulk material storage and handling are analogous and more stringent that South Coast Rule 403 and Rule 403.1, and San Joaquin Valley Unified Air Pollution Control District (San Joaquin Valley) Rule 8031. Section 6-1-307 is performance based requiring plumes no greater than 10 percent opacity, where the South Coast and San Joaquin Valley rules require specific particulate control plans or specific control measures provided as options to control fugitive dust to less than 20 percent opacity (Ringelmann 1).

Acid mist limits for sulfuric acid manufacturing and sulfur recovery units equal those in the other air districts. Draft compliance testing requirements strengthen this rule. Source test methods are clarified.

IV. EMISSIONS and EMISSIONS REDUCTIONS

Table IV-1 summarizes the emissions and emission reductions anticipated from the draft amendments to Rule 6-1.

Table IV-1: Estimated Emissions Reductions from Draft Amendments to Rule 6-1:

Source Categories	TSP (tpd)	PM_{10} (tpd)	$PM_{2.5}$ (tpd)
Current Emissions: Other Industrial / Commercial Processes	16.7	9.83	5.78
Estimated Emission Reductions	0.45	0.37	0.03
Percent Reduction	2.7%	3.8%	0.5%

Current PM emissions estimates from the 2011 Emission Inventory total 174.2 tons per day (tpd) of TSP, 105.6 tpd PM_{10}, and 46.31 tpd $PM_{2.5}$. The emissions addressed by these proposed amendments are from the target category of "Other Industrial / Commercial Processes."

A. Summary of Estimated Emission Reductions

The proposed more stringent TSP limits will impact only one moderate source of PM emissions. Most Bay Area source's PM limits have been established through permit conditions when the source was installed or modified. The general nature of the TSP limits in Rule 6-1 require that they apply to all PM sources, so they are less restrictive than the permit conditions that may be applied to any specific source. As a result, no emission reductions are expected to be realized from the proposed more stringent TSP limits.

One source, the Central Contra Costa Sanitary District sludge incinerator, is expected to install controls to address toxic air contaminant (TAC) emissions within the next several years to meet the requirements in Rule 11-18. These controls will also reduce TSP emissions by approximately 16 lb/day (three tons per year). However, such controls are not cost effective for a relatively minor three tons per year TSP reduction. In addition, the timeframe required for most public owned treatment works to install controls is a total of six years for budgeting, financing, design, installation and startup. Section 6-1-114 provides this facility a delayed compliance period of seven years from adoption to give the facility adequate time to address toxics and TSP emissions.

While developing possible amendments for Rule 6-1, staff identified Bay Area Rapid Transit (BART) four maintenance yards that each have BART car-cleaning facilities as having potential for significant PM emission reductions. However, staff discovered that the existing abatement systems (roto-clone wet scrubbers) were not accounted for in the existing emissions inventory. BART car-cleaning facilities are currently in compliance with the more restrictive emission limits in Rule 6-1.

The proposal contains more stringent TSP limits that may also impact two additional facilities: a bottle manufacturing facility in Oakland, and a facility in Santa Rosa that manufactures paper tape used to join and smooth two sections of wallboard. The glass manufacturing facility in Oakland is shut down with no plans to re-open. The current emissions performance from the paper tape manufacturer is estimated, with no supporting source test information available. Additional source tests are needed to determine whether additional controls will be required, and whether those controls would be cost effective. Based on these uncertainties, no emission reductions from these two facilities are included in this summary.

As affected facilities perform compliance source testing, some additional sources may be affected by the amendments to Rule 6-1. Cost effective control options are available for almost all types of sources.

Bulk Material Sources with more than six lbs per day TSP emissions

There are 72 facilities with 134 sources of more than six lbs per day of TSP emissions. Forty- four of these sources are already equipped with water spray systems, and the other 90 of these sources do not currently appear to have any dust controls. Staff estimates that the 44 sources may elect to upgrade their existing water sprays to water fog or water mist systems to reduce water use, but this will not significantly reduce emissions. Staff estimates that the remaining 90 sources will be controlled with wind screens, transfer point shrouds, and loading / unloading chutes. Some judicious use of water fog and water mist systems may be necessary in locations where it is difficult to fit wind screens or shrouds. Staff expects that less than half of the 90 sources will require supplemental water fog or sprays along with wind screens. In addition, staff estimates that only half of these sources will actually install controls, because the facilities will be able to improve their operations to meet the 10 percent opacity requirements. Emissions reductions are estimated based on only 45 sources adding additional emissions control. Staff assumes wind screens/shrouds and loading chutes are 70 percent effective, resulting in emission reductions of 0.37 tpd of PM_{10}, and 0.03 tpd of $PM_{2.5}$.

Bulk Material Sources with two to six lbs per day TSP emissions

There are 72 facilities with 123 sources of TSP emissions ranging from two to six lbs. per day (some of these facilities also have sources with greater than 6 lbs per day of TSP emissions). Forty of these sources are already equipped with water spray systems, and the other 83 of these sources do not currently appear to have any dust controls. Staff estimates that some of the 40 sources with water sprays may be upgraded to water fog or water mist systems to reduce water use, but will not significantly reduce emissions. Staff estimates that the remaining sources will likely not be controlled with wind screens, transfer point shrouds, and loading/unloading chutes. Current emissions of two – six lbs per day may be small enough to meet the visible emissions performance objective of ten percent opacity without installing additional controls. Staff assumes no additional emissions reductions from these sources.

V. ECONOMIC IMPACTS

A. Cost Effectiveness

Proposed amendments to Rule 6-1 TSP concentration limits, and TSP weight limits are consistent with the requirements and emission limits that have been demonstrated in practice, as South Coast, San Joaquin Valley, and Sacramento Metro air districts have had similar regulations in place for several years. Control technologies that have been “achieved in practice” can be required as best available control technology (BACT) without having to make a cost effectiveness determination.[3] In addition, since these more stringent TSP limits do not appear to trigger installation of any emission controls, no cost effectiveness analysis is required.

Central Contra Costa Sanitary District solid sludge incinerator is the only facility that would be required to meet the more stringent TSP concentration limits. An improved wet scrubber is estimated to cost $17,000,000 in capital cost, and $2,200,000 annualized costs including capital amortization, operating and maintenance costs. Emission reductions are only three tons per year, so any controls required specifically for PM do not appear to be cost effective. CCC Sanitary District staff indicate that they anticipate installing controls to address TAC emissions and expect

[3] BAAQMD Engineering Procedure: New or Updated BACT Determinations, December 19, 2006

PM emission reductions to be a side-benefit. Staff has excluded PM emission reductions from CCC Sanitary District because they are not a direct result of amendments to Rule 6-1.

The proposed more stringent TSP limits may also affect a facility in Santa Rosa that manufactures paper tape used to join and smooth two sections of wallboard. The current emissions performance from the paper tape manufacturer is estimated at 117 lbs per day. If these emissions are verified with a source test, additional controls are cost effective in reducing emissions. Staff estimates that a baghouse could be added downstream from the existing cyclone, reducing PM emissions by at least 90 percent and resulting in emission reductions of 105 lbs per day. A baghouse is estimated to cost $315,000 in capital cost, amortized to $45,000 per year plus additional utility and maintenance costs of $50,000 per year. Total annual costs of $95,000 per year for a reduction in 13.7 tons per year of PM results in a cost effectiveness of $6,900 per ton of reduced TSP. This is well within the normal range for cost effectiveness.

Staff found no additional facilities with PM emissions quantified by source test that are affected by the amendments to Rule 6-1. As mid-sized and smaller particulate matter sources begin to conduct source tests, some may find a need to install controls. However, most of these sources currently have more stringent permit limits than those being proposed. Staff estimates no emission reductions from these sources.

Proposed new Section 6-1-307 will affect 72 facilities, with 134 sources with PM emissions currently estimated to exceed 6 lbs per day of TSP. Eighteen of these facilities already have water spray abatement in place, so staff assumes each facility will make minor improvements to the existing systems and be able to meet the requirements of this draft new requirement. Fifty-four of these facilities, with 90 sources may require controls. The sources have a wide range of scale for processing and handling bulk materials. The scope of the controls is directly set by the specific bulk handling operation involved, and the size of the bulk material handling facilities. Section 6-1-307 may affect another 72 facilities with 123 sources with PM emissions currently estimated to range from two to six lbs per day of TSP. However, staff estimates PM emissions less than six lbs per day will not exceed the draft opacity limit.

Attachment 2, Table 2-1 describes each of the 90 sources that will potentially require controls. Emission reduction estimates assume half of these 90 sources will find ways to meet the opacity limit and other requirements without having to install significant controls. Staff assumes that only half of the facilities will actually install the controls shown in Table 2-1. Total estimated costs to control 45 sources is $866,000 in capital costs, and $206,000 in annual costs. Expected emission reductions are 747 lbs per day of PM_{10} (136 tons per year).

Water Use and Cost

Five water fog systems are recommended in Table 2-1. Each of these water fog systems is anticipated to use 624,000 gallons of water per year, totaling 3,120,000 gallons of incremental water use. Thirty-four water mist systems are recommended in the table above. Each of these water mist systems is anticipated to use 312,000 gallons per year, totaling 10,608,000 gallons of incremental water use. Total incremental water use for the proposed wind screens, and judicious use of water is 13,728,000 gallons per year. Staff assumes all five of these water fog systems will be installed. Total cost for 13,728,000 gallons of water at $0.01 per gallon is $137, 280 per year.

Total costs to control fugitive dust visible emissions from bulk material handling is estimated to be $206,000 + $137,280 = $343,280 per year. Emission reductions are estimated to be 136 tons per year. Cost effectiveness for these controls is estimated to be $2524 per ton of reduced PM_{10}. The poorest cost effectiveness is found for two controls: $13,968 per ton for a water fog system at a quarry operation, and $10,303 per ton for a stockpile windscreen at a second quarry operation. These cost effectiveness levels are within normal acceptable ranges for PM reductions.

Source Test Costs

Proposed amendments to Rule 6-1 explicitly require compliance testing of permitted sources ranging from annually to once every five years, depending on the extent of the emissions. The estimated cost to conduct an appropriate compliance source test is $3,000 – 5,000. The estimated costs to modify sample ports to conduct these tests, if necessary, are estimated to cost less than $10,000. Staff estimates approximately 50 sources will require source testing annually, 60 sources will require source testing biennially, and 250 sources will require source testing every five years. Staff estimates no more than 50 sources will require sample port modifications.

B. Incremental Cost Effectiveness

There are no controls required directly from amendments to the TSP concentration limits and TSP weight limits proposed for Rule 6-1, so no cost effectiveness analysis, and no incremental cost effectiveness analysis are required.

Each regulated bulk material storage and handling site will determine what controls are needed to limit fugitive dust plumes to meet the 10 percent opacity for significant plumes (greater than five feet high, five feet long, five feet wide). The next more stringent requirement would be to require any fugitive dust plume to meet the 10 percent opacity requirement. This requirement would include any small dust plume (from a wind current on a stockpile, or from the wheel of a truck driving down an unpaved road). Staff did not recommend this limit because of the concern that the more stringent limit would cause many facilities to use excessive water to control dust. The degree of stringency is based on concern about water use rather than a concern about incremental cost effectiveness.

C. Socioeconomic Impacts

The Air District contracts with an independent consultant to conduct a Socioeconomic Analysis of potential economic impacts from the proposed amendments to Rule 6-1. After staff received additional input during the workshop process, a final draft proposal and staff report have been used to finalize the Socioeconomic Analysis. The Socioeconomic Analysis is included in the final proposal, posted for public review and comment at least 30 days before the Public Hearing. At the Public Hearing, the Air District Board of Directors will consider the final proposal, and public input before taking any action on the amendments to Rule 6-1.

The Socioeconomic Analysis concludes that control costs are less than significant, will not impact small businesses, and will not lead to job reductions.

D. District Impacts

An exemption for small stationary sources with potential to emit either TSP or PM_{10} emissions at less than 1,000 kg per year may create additional work for Air District permit engineers. Facilities that have permitted sources currently estimated to have emissions less than 2,000 kg per year may wish to take advantage of the proposed exemption by challenging the current estimating techniques and/or EPA AP-42 Emission Factors used. Permit engineers may be asked to review the current PM emissions factors, which can take approximately one hour of engineering time for each source.

Air District Meteorology and Measurement Division resources will be needed to consult with each permitted source to ensure each source has the proper sample ports, equipment and access

facilities needed to conduct the required source test. Staff anticipates the source test section will fit this work into their normal day-to-day work, with no impact on personnel requirements or costs.

Compliance and Enforcement inspectors will not see any increase in workload because they currently have responsibility for inspecting regulated bulk material sites. Compliance and Enforcement currently conducts planned inspections of bulk material sites and permitted disturbed surface sites as part of their annual coverage of all permitted facilities.

Compliance and Enforcement has trained its inspectors to use an existing physical object, or traffic cone or other device of a known size to establish a frame of reference when assessing whether a plume is larger than five feet. The inspectors will likely take a picture of the plume to document its size, while conducting the opacity assessment to determine opacity. Inspectors have been equipped with tape measures to measure the area of a bulk material spill. Costs for these tape measures totaled $700 at $10 each for 70 inspectors.

Compliance and Enforcement will need to determine to what extent, and when they may want to implement EPA ALT-082, the digital camera technique that can be used to measure opacity as an alternate to EPA Test Method 9.

VI. REGULATORY IMPACTS

Regulatory impact analysis is required by H&SC Section 40727.2, comparing the proposal to other Air District, State and federal rules addressing the same sources. The following table provides this regulatory impact analysis.

Amendments to Regulation 6, Rule 1: H&SC Section 40727.2 Regulatory Analysis

Section	**Description** (paraphrased)	Comparable State or Air District Provision	Comparable Federal Provision	Discussion
101	Description / Purpose	Consistent with SCAQMD 401 SCAQMD 1157, 1158 SJVUAPCD 4101 SMAQMD 401		
102	Applicability of General Provisions	From Regulation 6		
110	Exemption: Activities Subject to Other Rules	Consistent with Non-duplication requirements		
111	Limited Exemption: Blasting Operations	Consistent with SCAQMD 1157 SJVUAPCD 8021		
112	Limited Exemption: Portland Cement Manufacturing	Consistent with Non-duplication requirements		
113	Limited Exemption: TSP Concentration and Weight Limits	Consistent with non-duplication for commercial cooking, Unique exemption for pure salt and sugar, No controls readily available for combustion		Pure sugar and salt are readily adsorbed into humans, with very little health impact. Combustion controls out of scope for this rule-making.
114	Limited Exemption: TSP Concentration Limit	Unique situation for one specific facility		Delayed compliance date.
200	Definitions	Consistent with SCAQMD 102, 401 SJVUAPCD 1020, 4101 SMAQMD 101, 401		
300	Standards / Emission Limits			
301-306	Visible Emissions Limits	Consistent with SCAQMD 401 SJVUAPCD 4101 SMAQMD 401		20% opacity or Ringelmann 1 is consistent throughout California
307	Regulated Bulk Material Site fugitive dust visible emissions limits	SCAQMD Rule 403 SCAQMD Rule 1157 SCAQMD Rule 1158 SJVUAPCD Rule 8011		Consistent with Regulation 6 control measures cited in Reg 6 Staff Report, Attachment 1-5.

		SJVUAPCD Rule 8031		SCAQMD Rule 1157 requires no visible emissions > 100 feet which could be more stringent, or less stringent than the limit of the property line.
310	PM Concentration Limits	Consistent with SCAQMD 404 SJVUAPCD 4201 SJVUAPCD 4203 SMAQMD 404		Equal to most stringent in California
311	PM Weight Limits	Consistent with SCAQMD 405 SJVUAPCD 4202 SMAQMD 405		Equal to most stringent in California
320	Sulfuric Acid Manufacturing	Consistent with BAAQMD 12-6 SCAQMD 469 SJVUAPCD Rule 4802	40 CFR Part 60: Subpart H EPA-450/2-77-019	Acid mist controls out of scope for this rule-making.
330	Sulfur Recovery Units	Consistent with BAAQMD 9-1 SCAQMD 468	NSPS 40 CFR 60 Subpart J, Ja	Acid mist controls out of scope for this rule-making.
400	Administrative Requirements	Monitoring from Regulation 6		Monitoring required to ensure compliance.
500	Monitoring and Records	Consistent with BAAQMD Reg 1 SCAQMD 404, 405 SJVUAPCD 4201, 4202 SMAQMD 404, 405 SJVUAPCD Rule 8011		Demonstration of compliance requirements added. Consistent monitoring and records requirements.
600	Manual of Procedures	Consistent with EPA Source Test Methods 5, 8, 9, 22, 201a, 202, 203a,b,c	Consistent with EPA Source Test Methods 5, 8, 9, 22, 201a, 202, 203a,b,c	Source test methods added.

VII. ENVIRONMENTAL IMPACTS

A. Review of Potential Environmental Impacts Under CEQA

The Air District contracts with an independent consultant to conduct a California Environmental Quality Act (CEQA) analysis of potential environmental impacts of the new Regulation 6, and draft amendments to Rule 6-1. The consultant has made an initial assessment of any environmental impacts based on proposed new Regulation 6 and proposed amendments to Rule 6-1, and this staff report. In addition, the CEQA analysis has also been conducted on the proposed new Rule 6-6: Prohibition of Trackout. The CEQA analysis, attached as Appendix B, combines the analysis to review all impacts of the proposed new Regulation 6, proposed amendments to Rule 6-1 and Rule 6-6 together all as one project, so that the cumulative impact of these proposals can be considered.

The CEQA analysis shows that no significant environmental impacts are expected, and a Negative Declaration has been prepared. The CEQA Negative Declaration will be included with the final proposals, posted for public review and comment at least 30 days before the Public Hearing. At the Public Hearing, the Air District Board of Directors will consider the final proposals, and public input before taking any action on the new Regulation 6, amendments to Rule 6-1, and new Rule 6-6.

VIII. RULE DEVELOPMENT / PUBLIC PARTICIPATION PROCESS

A. Rule Development Process

The Air District's 2010 Clean Air Plan addressed PM, including significant health impacts associated with PM, and was approved on September 15, 2010. The 2010 Clean Air Plan included Stationary Source Measure SSM 6: General Particulate Matter Emission Limitation. In addition to developing amendments to Rule 6-1 to satisfy SSM 6, staff started work on this rule-making project in April 2010 by reviewing the entire inventory of PM emissions and identified source categories where PM (particularly $PM_{2.5}$) emissions are significant, the Air District has authority, and potential for substantial PM reductions are available.

The proposed amendments to Rule 6-1 are part of a rule-making process that began with the 2010 Clean Air Plan and continues to address a commitment by the Air District's Board of Directors to review Regulation 6, Rule 1, identified as Stationary Source Measure SS31 in the Air District's 2017 Clean Air Plan. Since the 2010 Clean Air Plan originally identified Rule 6-1 as a Stationary Source Control Measure, Air District staff further committed to taking steps to address the Bay Area's PM challenges in a November 2012 report entitled *Understanding Particulate Matter: Protecting Public Health in the San Francisco Bay Area*. These proposed amendments to Regulation 6, Rule 1 begin to fulfill these important commitments to reduce PM emissions and improve public health.

Staff based the proposed amendments to Rule 6-1 on the 2011 emissions inventory. Staff identified the source categories to be considered during review of potential amendments, and identified the largest sources in each category. Staff selected 55 of the largest permitted stationary sources, and visited each one to more fully understand each facility's business, each unique emissions source, and discuss potential control techniques

available to reduce PM emissions. In addition, concerns about the lack of information regarding particle size distribution, possible sources of condensable PM, and potential secondary PM formation were discussed. Staff visited eight facilities that store and handle petroleum coke and coal to ensure the unique issues with these solids were incorporated into the rule development process. Staff used the information from these visits to develop the proposed amendments to Rule 6-1, an overarching Regulation 6 that applies to all Regulation 6 rules, and new draft Rule 6-6: Prohibition of Trackout; and to estimate the emission reductions that could be achieved by implementing these draft rule changes.

Staff conducted eight workshops throughout the Bay Area from January 30 – February 8, 2017. These workshops were conducted in parallel with open house forums for the 2017 Clean Air Plan. Many stakeholders voiced concern that the PM workshops were diminished by being scheduled with the Clean Air Plan Open Houses, and the combined open house / workshop format prevented staff from making a formal presentation regarding the preliminary drafts of each rule or engaging in direct questions / answers. Others felt the personal interaction with staff regarding the preliminary drafts for each rule provided better opportunity for genuine discussion, including questions / answers.

Comments received after the workshops provided additional input regarding the process used for outreach to the wide variety of affected parties. Many indicated that they had not heard about the workshops at all, or only at the last minute. Since some stakeholders considered the Public Outreach and Consultation process described below in Section B less effective than a workshop focused specifically on the rules, staff will mail Public Hearing notices to each Air District permitted facility with any significant PM emissions, and mail Public Hearing notices to additional facilities with similar Standard Industrial Classification (SIC) codes or North American Industry Classification System (NAICS) codes from a business database used by the Socioeconomic Analysis contractor called InfoUSA, including construction firms.

Proposed new Regulation 6 will provide the foundational regulation for current PM rules, and potential future source specific PM rules. Proposed new Regulation 6 rule language, proposed amendments to Rule 6-1 and this accompanying staff report are the next step in the rule development process to further address PM emissions. Staff anticipates that proposed new Regulation 6, and proposed amendments to Rule 6-1 will be considered together at a Public Hearing in Spring 2018. Proposed new Rule 6-6: Prohibition of Trackout and its associated staff report may also be considered at that Public Hearing.

A CEQA Analysis has conducted on the proposed new Regulation 6, proposed amendments to Rule 6-1, and proposed new Rule 6-6 as one project, so that cumulative impact of these three rule development projects can be considered. The Socioeconomic Analyses for each project were done separately.

B. Public Outreach and Consultation

In analyzing the inventory of PM emissions and source categories where PM (particularly $PM_{2.5}$) emissions are significant, where the Air District has authority, and the potential for substantial PM reductions, staff consulted with the following interested and affected parties:

Businesses	Governmental Agencies
Morton Salt – Newark	CALTRANS District 4 - Oakland
Cargill – Newark	Bay Area Regional Water Quality Board - Oakland

Criterion Catalysts - Pittsburg	North Coast Regional Water Quality Board – Santa Rosa
CertainTeed Gypsum – Napa	Bay Area Rapid Transit – Richmond Maintenance Yard
Maxwell House – San Leandro	Alameda County
C & H Sugar – Crockett	Contra Costa County
Con Agra – Oakland	Marin County
CEMEX – Oakland	Napa County
CEMEX – Clayton	Santa Clara County
Strategic Materials – San Leandro	San Francisco City & County
Dutra Materials – San Rafael	San Mateo County
Superior Supplies – Santa Rosa	Solano County
Granite Rock – Redwood City	Sonoma County
Hanson Aggregates – Clayton	Central Contra Costa Sanitary District
Bodean / Mark West Quarry – Santa Rosa	City of Hayward
PABCO Gypsum – Redwood City	City of Napa
Georgia Pacific Gypsum - Antioch	City of Oakland
Syar – Napa	City of San Jose
Syar – Santa Rosa	City of San Rafael
Syar – Vallejo	City of Santa Rosa
Soiland Quarry - Cotati	
Langley Hill Quarry - Woodside	**Industry Associations**
Granite Construction – Santa Clara	Association of Building Contractors
Granite Construction – San Jose	Associated Roofing Contractors of the Bay Area Counties
Willowbrook Feeds – Petaluma	California Asphalt Pavement Association
Hunt & Behrens – Petaluma	Construction Industry Air Quality Coalition
Owens-Corning – Santa Clara	Northern California Engineering Contractors
Owens-Brockway - Oakland	
Waste Management – San Leandro	
Zanker Road Material Processing – San Jose	
Waste Management - Altamont	
Redwood Landfill	
Guadalupe Landfill	
Ox Mountain Landfill – Half Moon Bay	
Clover Flat / Upper Valley Resources	
Potrero Hills Landfill	
Stavin	
McGuire & Hester Construction - Oakland	
Ghilotti Bros. Construction – San Rafael	
Universal Building Services – Richmond	
Statewide Sweeping – Milpitas	
Levin Richmond Terminal	
Lehigh Cement	
Phillips 66 Coker	
Phillips 66 Coke Calciner	
Shell Coker	
Tesoro Coker	

Valero Fluid Coker	
APS West	
Carbon Inc.	

These discussions led to a review of the Storm Water Pollution Prevention Plan (SWPPP) Best Management Practices, and the suggestion that any proposed requirements should be consistent with SWPPP requirements.

As described above, feedback indicates that outreach was could be been more robust. In light of this, Public Hearing notices will be mailed to all Air District permitted facilities with significant PM emissions and to all entities with similar Standard Industrial Classification (SIC) codes or North American Industry Classification System (NAICS) codes from a business database used by the Socioeconomic Analysis contractor called InfoUSA, including construction firms.

Public Hearings are the next step in these rulemaking processes. Air District staff will publish the Public Hearing package for proposed new Regulation 6: Common Definitions and Test Methods; and proposed amendments to Regulation 6, Rule 1: General Requirements. Air District staff will accept written comments, will respond to all comments received, and will present final proposals to the Air District's Board of Directors for consideration. Response to comments is included as Appendix A of this staff report.

IX. CONCLUSION / RECOMMENDATIONS

Pursuant to the California Health and Safety Code section 40727, before adopting, amending, or repealing a rule the Board of Directors must make findings of necessity, authority, clarity, consistency, non-duplication and reference. This section addresses each of these findings.

A. Necessity

"'Necessity' means that a need exists for the regulation, or for its amendment or repeal, as demonstrated by the record of the rulemaking authority." H&SC section 40727(b)(1).

Proposed amendments to Regulation 6, Rule 1: General Requirements are needed to update emission limits that have not been reviewed for more than two decades, and to clarify compliance testing requirements and test methods. Proposed new Section 6-1-307 applies to bulk material storage and handling that are currently permitted by the Air District, and is needed to address the significant PM emissions from the source category of Other Industrial and Commercial Processes. Bulk Material Storage and Handling addresses a broad cross-section of these sources. Section 6-1-307 requires more stringent control of fugitive dust visible emissions, specific monitoring, and cleanup actions if fugitive dust is excessive. The Bay Area is not yet in attainment for either PM_{10} or $PM_{2.5}$ California Ambient Air Quality Standards.

B. Authority

"'Authority' means that a provision of law or of a state or federal regulation permits or requires the regional agency to adopt, amend, or repeal the regulation. H&SC section 40727(b)(2)."

The Air District has the authority to adopt this rule under Sections 40000, 40001, 40702, and 40725 through 40728.5 of the California Health and Safety Code.

C. Clarity

"'Clarity' means that the regulation is written or displayed so that its meaning can be easily understood by the persons directly affected by it." H&SC Section 40727(b)(3)

Proposed amendments to Regulation 6, Rule 1 are written so that their meaning can be easily understood by the persons directly affected by them. Further details in the staff report clarify the proposals, affected emission sources, compliance options, and administrative requirements for the industries subject to this rule.

D. Consistency

"'Consistency' means that the regulation is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations." H&SC Section 40727(b)(4)

The proposed new rule and amendments to the existing rule are consistent with other Air District rules, and not in conflict with state or federal law.

E. Non-Duplication

"'Nonduplication' means that a regulation does not impose the same requirements as an existing state or federal regulation unless a district finds that the requirements are necessary or proper to execute the powers and duties granted to, and imposed upon, a district." H&SC Section 40727(b)(5)

Amendments to Rule 6-1 are non-duplicative of other statutes, rules or regulations. To the extent duplication exists, such duplication is appropriate for execution of powers and duties granted to, and imposed upon the Air District.

F. Reference

"'Reference' means the statute, court decision, or other provision of law that the district implements, interprets, or makes specific by adopting, amending, or repealing a regulation." H&SC Section 40727(b)(6)

Implementing, interpreting or making specific the provisions of the California Health and Safety Code Sections 40000, 40001, 40702 and 40727.

The proposed rules have met all legal noticing requirements, have been discussed with the regulated community and other interested parties, and reflect consideration of the input and comments of many affected and interested stakeholders.

G. Recommendations

Air District staff recommends adoption of amendments to Regulation 6, Rule 1: General Requirements and adoption of the CEQA Negative Declaration.

REFERENCES

1. BAAQMD 2010 Clean Air Plan, September 15, 2010
2. BAAQMD Regulation 5: Open Burning
3. BAAQMD Regulation 6, Rule 2: Commercial Cooking Equipment
4. BAAQMD Regulation 6, Rule 3: Wood Burning Devices
5. BAAQMD Regulation 12, Rule 4: Sandblasting
6. BAAQMD Board Resolution 1390
7. BAAQMD Advisory Council, Ultrafine Particles: Ambient Monitoring and Field Studies presentation, 2/8/2012
8. BAAQMD Advisory Council, Ultrafine Particles: Ambient Monitoring and Field Studies presentation, Philip M. Fine, SCAQMD, 2/8/2012
9. BAAQMD Advisory Council, Concentrations of Ultrafine Particles and Related Air Pollutants on and Near Roadways and Other Urban Microenvironments presentation, Eric Fujita, Desert Research Institute, Reno, NV, 2/8/2012
10. EPA Stationary Source Control Techniques Document for Fine Particulate Matter, October 1998
11. EPA Test Methods 5, 5B, 5F, 9, 17, 22
12. EPA Test Methods 201A, 202, 203A, 203B, 203C
13. EPA RACT/BACT/LAER Clearinghouse
14. EPA AP42, Fifth Edition, Volume 1, Chapter 13: Miscellaneous Sources, 13.2
15. EPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures; EPA-450-92-004; September 1992.
16. California Health and Safety Code, §41700
17. California Health and Safety Code, §40000, §40001, §40702, §40725 - 40728,
18. California Air Resources Board - CALIFORNIA EMISSION INVENTORY AND REPORTING SYSTEM (CEIDARS), Particulate Matter (PM) Speciation Profiles, 7/28/2009
19. South Coast Air Quality Management District, Rules 401, 403, 403-1, 404, 405, 444, 445, 1105-1, 1112-1, 1133-1, 1137, 1155, 1156, 1157, 1158, 1186, 1186-1
20. San Joaquin Valley Air Pollution Control District, Rules 4101, 4103, 4106, 4201, 4202, 4203, 4303, 4901, 8011, 8021, 8031, 8041, 8051, 8061, 8071, 8081
21. San Joaquin Valley Air Pollution Control District, Draft Staff Report, BACM Amendments to Regulation VIII (Fugitive PM_{10} Prohibitions), 9/27/2001
22. San Joaquin Valley Air Pollution Control District, Draft Staff Report – Appendix C, Cost Effectiveness Analysis of Regulation VIII (Fugitive PM_{10} Prohibitions), 9/27/2001
23. Sacramento Air Quality Management District, Rules 401, 403, 404, 405, 406, 407, 409, 417, 421
24. Maricopa County, Arizona Regulation III, Rule 310: Fugitive Dust from Dust-Generating Operations
25. Maricopa County, Arizona Quick Reference Dust Control Guide
26. Northeast States for Coordinated Air Use Management, Assessment of Control Technology Options for BART-Eligible Sources, March 2005
27. California Water Resources Control Board, Construction Storm Water Program, http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml

28. 2009-0009-DWQ Construction general permit *(effective July 1, 2010)*
29. California Storm Water Quality Association, Storm water Best Management Practice Handbook Portal: Construction

Attachment 1: Cost Estimates for Various Dust Controls
Attachment 2: Cost Estimates for Specific Bulk Material Storage and Handling Facilities

APPENDICES

A. Comments and Responses
B. Socioeconomic Analysis
C. CEQA Documents

Attachment 1: Cost Estimates for Various Dust Controls

Costs of Controls for Bulk Material Handling

Wind screens can be used to shield almost any bulk material stockpile, handling equipment, or loading/unloading operations. Wind screens around stockpiles are most effective if they are at least as high as the pile, and extend beyond each edge of the pile. Wind screens can also be used to protect bulk material handling equipment (crushers, conveyors, transfer points, screen, and loading facilities from wind erosion. The following provide the cost estimates for various wind screen equipment:

- Wind Screens for stockpiles
  - 100-foot section of 10-foot high fencing estimated to cost $15 - $40 / foot, or $3,000 capital[1]
  - Slats or nylon mesh to provide proper porosity costs up to $5/foot[2]
  - Estimated costs for construction and foundations equals double the cost of materials
  - Total capital for 100 feet of 10-foot high wind screen is $70/foot, equaling $7,000 capital, amortized to $1,050 per year
  - Estimated cost for 100-foot section of 20-foot high wind screen is $140 / foot, equaling $14,000 capital, amortized to $2,100 per year
  - Estimated cost for 100-foot section of 30-foot high wind screen is $280 / foot, equaling $28,000 capital, amortized to $4,200 per year
  - Can control erosion down-wind for approximately eight – 10 times the height of the barrier.
  - Total cost for a 10 feet tall stockpile requires 100 feet of windscreen – with capital costs of $7,000, amortized to $1,575 per year
  - Total cost for a 20 feet tall stockpile requires 200 feet of windscreen – with capital costs of $28,000, amortized to $4,200 per year
  - Total cost for a 30 feet tall stockpile requires 300 feet of windscreen – with capital costs of $84,000, amortized to $12,600 per year
- Wind Screens for conveyors
  - Typical conveyor is about 100-foot long
  - Must erect a wind screen on at least one side (preferably the upwind side) of the conveyor
  - Design check to be sure structural integrity is adequate - $2,000
  - Materials costs for stainless steel wire mesh screen - $1,500[3]
  - Additional structural steel to reinforce stainless mesh - $500[4]
  - Labor to install – roughly equal to materials costs - $2,000
  - Total costs – $6,000 capital, amortized to $900 per year
- Wind Screens for conveyor transfer points
  - 4-sided 4ft X 4ft stainless steel mesh for wind screen - $250
  - 4 sided 4ft X 4ft plastic shrouds - $150

---

[1] An 8'-12' tall commercial-grade chain-link fence to enclose a residential tennis or basketball court can cost $15-$40 or more a foot. Production Fence Works in Georgia estimates average cost for an 8' high, 60'x100' fence around a single tennis court with a single walk-in gate at $9,200.

[2] Because of its open weave, a chain-link fence is transparent. To make it more opaque, metal, wood or vinyl privacy slats can be woven into the mesh. The slats can be purchased separately, at a cost of $1-$2 or more per foot of fencing, or a chain link fence with built-in privacy or a fabric screen can cost $6-$40 a foot ($600-$4,000 for 100'; $1,800-$12,000 for 300') depending on the type of materials, whether installation in included, and the height, gauge and mesh of the fence.

[3] http://www.twpinc.com/wire-mesh-material/stainless-steel/16-mesh-t316-stainless-35

[4] https://www.onlinemetals.com/merchant.cfm?pid=2&step=4&showunits=inches&id=3&top_cat=1

    - Structural steel supports – $200
    - Labor to install – roughly equal to materials costs – $600
    - Total cost for each transfer point shroud – $1,200 capital, amortized to $180 per year
- Wind Screens for crushers, screening equipment, and loading and unloading facilities
    - Three-sided 4 ft. X 10 ft. stainless steel mesh for wind screen – $500
    - Structural steel supports - $400
    - Labor to install – roughly equal to materials costs – $900
    - Total cost for each transfer point shroud - $1,800 capital, amortized to $270 per year

Loading and unloading bulk materials usually involved a front-end loader or a clamshell style scoop. Wind screens are useful during these operations, but additional efforts are needed to control the dust during the drop of material from the front-end loader or clamshell. Dropping more slowly helps, but a delivery chute to control the fall of the material is very effective, combined with a shroud around the chute to protect it from wind. The following are the estimated costs for these facilities:

- Portable Solids Transfer Chutes and Shrouds
    - Very similar to wind screen for crushers and screening equipment, but must be portable to adjust to wind direction and loading requirements.
    - Cost of portable loading chute with adjustable base – $10,000, amortized to $1,500 per year.
    - Cost of shroud with portable base to shelter loading/unloading operations – $5,000, amortized to $750 per year.

Two other control methods are useful in preventing dust plumes – control vehicle traffic within the facility, and clean up any spills. The following are the estimated costs for these facilities:

- Truck Traffic Control
    - Signs restricting traffic to certain areas – less than $5,000 capital
    - Speed limit signs – less than $5,000 capital
    - Barriers to prevent erosion of bulk material into traffic lanes – less than $10,000 capital
    - Management time needed to enforce speed limits – normally no incremental costs.
- Bulk Material Spill Cleanup
    - Manual cleanup – $75/hour for worker and hand-tools. One hour per day, 200 dry workdays - $15,000 per year
    - Regenerative PM_{10} efficient street sweeper - $400,000 capital, amortized to $60,000 per year, plus $150,000 per year for fuel and operator.

Capital is amortized based on 7 percent interest, 15-year life, 1 percent taxes, 1 percent insurance, and typical 2 percent maintenance costs – resulting in an approximate15 percent annual cost of capital.

Estimated costs of water fog, and water misting systems is as follows:

- Water
    - Cost of water - $4-$7 per 100 cubic feet (758 gallons) equates to approximately $0.01per gallon
    - Water Mist systems (Micro-Cool) is an industrial version of those used to cool Palm Springs open air patios:

        - $15,000 for pump, filters and piping system
        - Plastic tubing to deliver mist to desired locations - $1,000
        - Portable water supply – 1-inch galvanized piping at $10 per foot[5] - $5,000
        - Amortized capital costs - $3,150 per year
        - Water use ~ 100 gallons per hour – say 60 hours per week, 52 weeks per year = 312,000 gallons per year at a cost of $3,120
        - Total costs to provide mist for a typical conveyor belt system - $6,270 per year
    - Water Fog systems for a stockpile
        - (Dust Boss, or Buffalo Monsoon) are large air blowers with air mist systems surrounding the flow of air:
        - $25,000 for pump, filters and piping system
        - Portable water supply – 1-inch galvanized piping at $10 per foot - $5,000
        - Amortized capital costs - $4,500 per year
        - Power – 5 HP - use 2 hours per day, 5 days per week, 52 weeks per year = 9,698 kWh = $2,242.50 per year
        - Water use ~ 20 gallons per minute – use 2 hours per day, 5 days per week, 52 weeks per year = 624,000 gallons per year at a cost of $6,240.00 per year
        - Total cost - $12,992.50 per year

For reference, below are estimated costs for the typical watering system currently used at most construction sites, landfills, and bulk material handling facilities:

- Water Spray systems for a stockpile
    - Similar to golf course sprinkler systems[6]
    - $15,000 for 150 feet of piping, 4 sprinklers, and controller
    - $10,000 for installation and infrastructure
    - Amortized costs - $3,750 per year
    - Water use approximately 10,000 gallons per day – 5 days per week, 52 weeks per year = 2,600,000 gallons per year at a cost of $26,000.00
    - Total cost - $29,7250 per year
- Firehose for watering specific locations
    - 1 ½" firehose – approximately 40 gpm[7]
    - Cost of firehose and nozzle – $300
    - Worker to direct the firehose – $25/hour, 2 hours per day, 5 days per week, 52 weeks per year = $13,000
    - Water use approximately 40 gallons per minute – use 2 hours per day, 5 days per week, 52 weeks per year = 1,248,000 gallons per year at a cost of $12,480 per year
    - Total costs – $25,480 per year
- Water truck for roads and can be used to water stockpiles:
    - Truck - $150,000 amortized to $22,500 per year
    - Truck operator and fuel – $75,000 per year
    - Water – 5,000-gallon truck, 2 deliveries per day to keep roadways stabilized – use 5 days per week, 52 weeks per year = 2,600,000 gallons per year at a cost of $26,000 per year

[5] http://www.discountsteel.com/items/Galvanized_Steel_Pipe.cfm?item_id=172&size_no=11
[6] http://store.rainbird.com/sprinklers.html?impact_inlet=166
[7] http://www.elkhartbrass.com/files/aa/downloads/catalog/catalog-f6-T.pdf

        - Total costs – $123,500 per year
- Dust Suppressants
    - Costs for surfactants are much higher than water.
    - However, surfactants are assumed competitive with water when the stockpile or disturbed area will be left stabilized for an extended period.

Attachment 2: Cost Estimates for Specific Facilities

Table 2-1: Estimated Cost of Bulk Material Handling Facilities controls

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
Granite Rock	MINERL> Storage, contained, Rock	Stone			Wind screen or shroud for storage PLUS Water mist system			
United States Pipe & Foundry	MTGL/SEC> Storage, Slag, 5 days/wk.	Slag			Wind screen for stock pile			
Berkeley Asphalt	MINERL> Storage, contained, Gravel/sand	Sand/gravel			Wind screen or shroud for storage			
Syar Industries, Inc	MINERL> Screening, Gravel/sand	Sand/gravel			Wind screen for screener			
Syar Industries, Inc	MINERL> Screening, Gravel/sand	Sand/gravel			Wind screen for screener			
Syar Industries, Inc	MINERL> Screening, Gravel/sand	Sand/gravel			Wind screen for screener PLUS Water mist system			
Syar Industries, Inc	MINERL> Screening, Gravel/sand	Sand/gravel			Wind screen for screener PLUS Water mist system			
PABCO Gypsum	MINERL> Grinding, Gypsum, 8 tons/hr max	Gypsum			Wind screen for grinder PLUS Water mist system			
ConAgra, Inc	FOOD/AG> Shipping & receiving	Wheat - grain			Wind screen or shroud for loading/unloading			
Granite Rock	MINERL> Storage, contained, Rock	Stone			Wind screen or shroud for storage			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
CEMEX Construction Materials	MINERL> Screening, Rock, 340 tons/hr max	Stone			Wind screen for screener PLUS Water mist system			
CEMEX Construction Materials	MINERL> Mining/quarry, stockpiling	Stone			Wind screen for stock pile			
CEMEX Construction Materials	MINERL> Mining/quarry, Rock	Stone			Water fog system			
Hanson Aggregates	MINERL> Storage, open, Rock	Stone			Wind screen for stock pile			
Levin Richmond Terminal	MISC-HDLG> Material handling	Other Materials - other/not spec			Wind screen and shroud for handling			
Levin Richmond Terminal	MISC-HDLG> Material handling	Other Materials - other/not spec			Wind screen and shroud for handling			
Levin Richmond Terminal	MINERL> Storage, open, Multi-material	Coke			Wind screen for stock pile			
Levin Richmond Terminal	MISC-HDLG> Material handling	Iron ore			Wind screen and shroud for handling PLUS Water mist system			
Levin Richmond Terminal	MISC-HDLG> Material handling	Iron ore			Wind screen and shroud for handling PLUS Water mist system			
Levin Richmond Terminal	MINERL> Storage, open, Multi-material	Iron ore			Wind screen for stock pile			
Levin Richmond Terminal	MISC-HDLG> Material handling	Iron ore			Wind screen and shroud for handling			
Levin Richmond Terminal	MISC-HDLG> Material handling	Coke			Wind screen and shroud for handling			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
Levin Richmond Terminal	MISC-HDLG> Material handling	Coke			Wind screen and shroud for handling			
Brenntag Pacific	MISC-HDLG> Storage, Potash, 5 days/wk.	Potash			Wind screen for stock pile			
Right Away Redy Mix	MINERL> Conveying, Gravel/sand	Sand/gravel			Wind screen for conveying and transfer points PLUS Water mist system			
Redwood Landfill	MISC-HDLG> Grinding, 80 tons/hr max	Wood - other/not spec			Wind screen for grinder PLUS Water mist system			
Superior Supplies	MINERL> Storage, contained, Concrete	Concrete			Wind screen or shroud for storage PLUS Water mist system			
Superior Supplies	MINERL> Storage, contained, Concrete	Concrete			Wind screen or shroud for storage PLUS Water mist system			
Soiland Co	MINERL> Mining/quarry, stockpiling	Stone			Wind screen for stock pile			
Hunt And Behrens	FOOD/AG> Conveying/transferring	Grains - feed			Wind screen for conveying and transfer points			
Hunt And Behrens	FOOD/AG> Conveying/transferring	Grains - feed			Wind screen for conveying and transfer points PLUS Water mist system			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
Hunt And Behrens	FOOD/AG> Conveying/transferring	Grains - feed			Wind screen for conveying and transfer points PLUS Water mist system			
Hunt And Behrens	FOOD/AG> Conveying/transferring	Grains - feed			Wind screen for conveying and transfer points PLUS Water mist system			
Central Concrete Supply	MINERL> Loading/unloading, Concrete	Concrete			Portable shroud and chute for loading/unloading			
Central Concrete Supply	MINERL> Storage, contained, Gravel/sand	Sand/gravel			Wind screen or shroud for storage PLUS Water mist system			
Central Concrete Supply	MINERL> Conveying, Gravel/sand	Sand/gravel			Wind screen for conveying and transfer points PLUS Water mist system			
Marin Sanitary Service	MISC-HDLG> Material handling	Waste material - other/not spec			Wind screen and shroud for handling PLUS Water mist system			
Syar Industries Inc	MINERL> Conveying, Rock, 160 tons/hr max	Stone			Wind screen for conveying and transfer points PLUS Water mist system			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
Syar Industries Inc	MINERL> Loading, feed/surge/weigh bins	Sand/gravel			Wind screen and shroud for loading PLUS Water mist system			
Syar Industries Inc	MINERL> Screening, Gravel/sand	Sand/gravel			Wind screen for screener			
Syar Industries Inc	MINERL> Screening, Gravel/sand	Sand/gravel			Wind screen for screener PLUS Water mist system			
Syar Industries Inc	MINERL> Screening, Gravel/sand	Sand/gravel			Wind screen for screener PLUS Water mist system			
City of Berkeley, Dept. of Public Works	Misc. MINERL, 560 tons/hr max, 7 days/wk.	Waste material - other/not spec			Water fog system			
Sugar City Building Materials	Misc. MINERL, Gravel/sand	Sand/gravel			Wind screen and shroud for handling			
CEMEX Construction Materials	MINERL> Storage, contained, Gravel/sand	Sand/gravel			Wind screen or shroud for storage PLUS Water mist system			
CEMEX Construction Materials	MINERL> Concrete batching, Concrete	Concrete			Wind screen and shroud for handling PLUS Water mist system			
Davis Street SMART	MISC-HDLG> Material handling	Waste material - other/not spec			Wind screen and shroud for handling PLUS Water mist system			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
CEMEX Construction Materials	MTGL/SEC> Storage, Cement, 5 days/wk.	Cement			Wind screen and shroud for handling			
Langley Hill Quarry	MINERL> Mining/quarry, stockpiling	Stone			Wind screen for stock pile			
Langley Hill Quarry	Misc. MINERL, Rock, 200 tons/hr max	Stone			Water fog system			
CEMEX Construction Materials	MINERL> Storage, contained, Gravel/sand	Sand/gravel			Wind screen or shroud for storage PLUS Water mist system			
CEMEX Construction Materials	Truck Loadout	Sand/gravel			Portable shroud and chute for loading/unloading			
Oldcastle Precast (Pleasanton)	MINERL> Conveying, Cement	Cement			Wind screen for conveying and transfer points			
CEMEX Construction Materials	MINERL> Conveying, Gravel/sand	Sand/gravel			Wind screen for conveying and transfer points			
Hydro Conduit Corporation	Misc. MINERL, Gravel/sand, 20 tons/hr max	Sand/gravel			Wind screen and shroud for handling			
Associated Concrete Co	MINERL> Storage, contained, 35 min/batch	Cement - dry process mfg.			Wind screen or shroud for storage PLUS Water mist system			
Sonoma Compost	MISC-HDLG> Material handling	Fertilizer - other/not spec			Wind screen and shroud for handling			
Mission Trail Waste Systems	MISC-HDLG> Material handling	Waste material - other/not spec			Wind screen and shroud for handling			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
Vulcan Materials/Calmat Company	MINERL> Storage, contained, Gravel/sand	Sand/gravel			Wind screen or shroud for storage PLUS Water mist system			
Vulcan Materials/Calmat Company	MINERL> Screening, Rock, 407 tons/hr max	Stone			Wind screen for screener			
RC Ready Mix Co	MINERL> Storage, contained, Cement	Cement			Wind screen or shroud for storage			
Concrete Ready Mix, Inc	MINERL> Conveying, Concrete	Concrete			Wind screen for conveying and transfer points			
Willowbrook Feeds	FOOD/AG> Storage, Feed grains, 5 days/wk.	Grains - feed			Wind screen or shroud for storage			
Willowbrook Feeds	FOOD/AG> Conveying/transferring	Grains - feed			Wind screen for conveying and transfer points			
Willowbrook Feeds	FOOD/AG> Shipping & receiving	Grains - feed			Portable shroud and chute for loading/unloading			
Allied Waste Services of North	MISC-HDLG> Material handling	Waste material - other/not spec			Wind screen and shroud for handling			
Right Away Redy Mix	MINERL> Storage, contained, Cement	Cement			Wind screen or shroud for storage PLUS Water mist system			
Feed Sources, Inc	FOOD/AG> Pressing, Barley, feed	Barley - feed			Wind screen for presser			
Soiland Co, Inc	MINERL> Mining/quarry, crushing, Rock	Stone			Water fog system, wind screen for crusher			
Quikrete Northern California	MINERL> Loading, feed/surge/weigh bins	Sand/gravel			Portable shroud and chute for loading/unloading			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
Quikrete Northern California	MINERL> Loading, feed/surge/weigh bins	Sand/gravel			Portable shroud and chute for loading/unloading			
San Jose Concrete Pipe Co Inc	MINERL> Concrete batching, Gravel/sand	Sand/gravel			Wind screen and shroud for handling			
CEMEX Construction Materials	MINERL> Conveying, Limestone	Sand/gravel			Wind screen for conveying and transfer points			
Shell Chemical LP	MISC-HDLG> Material handling	Heterogeneous catalyst			Wind screen and shroud for handling			
Tyco Electronics Corporation	MISC-HDLG> Mixing, 4.5 min/batch	Other Materials - other/not spec			Wind screen for mixer PLUS Water mist system			
Central Concrete Supply, Inc	MINERL> Conveying, Gravel/sand	Sand/gravel			Wind screen for conveying and transfer points PLUS Water mist system			
BoDean Company	MINERL> Mining/quarry, stockpiling	Sand/gravel			Wind screen for stock pile			
Tesoro Refining & Marketing Co	MISC-HDLG> Material handling, Coke	Coke			Wind screen and shroud for handling PLUS Water mist system			
Napa Recycling & Waste Service	MISC-HDLG> Material handling	Waste material - other/not spec			Wind screen and shroud for handling PLUS Water mist system			
Recall North America	MISC-HDLG> Material handling, Paper	Paper			Wind screen and shroud for handling PLUS			

Facility	Source	Material	Throughput Tons per year	PM_{10} Emissions lb per day	Recommended Controls	$ Capital	$ Annualized	Potential PM_{10} Reductions lb per day
					Water mist system			
CEMEX Pacific Holdings, LLC	MINERL> Loading, feed/surge/weigh bins	Sand/gravel			Wind screen for loading bins			
CEMEX	Wet Plant Aggregate bin system: 10 bins	Sand/gravel			Wind screen for bins			
South Bay Recycling, LLC (SBR)	Solid Waste Transfer Station	Waste material - other/not spec			Water fog system			
G3 Minerals, Byron Plant	Coarse Waste Sand Stockpile	Sand/gravel			Wind screen for stock pile			
G3 Minerals, Byron Plant	No. 1 Dryer Feed Bin	Sand/gravel			Wind screen for dryer			
G3 Minerals, Byron Plant	No. 2 Dryer Feed Bin	Sand/gravel			Wind screen for dryer			
G3 Minerals, Byron Plant	Quarry Operation	Sand/gravel			Water fog system			
Phillips 66 Carbon Plant	Portable Conveyor	Coke			Wind screen for conveying and transfer points			
Phillips 66 Carbon Plant	Portable Conveyor	Coke			Wind screen for conveying and transfer points			
Phillips 66 Carbon Plant	Stockpile Fugitive Emissions; Including All Transfers	Coke			Wind screen for stock pile			
					Totals	$1,722,600	$412,640	1,493.2 #/day

Staff expects only half of these potential control measures to be implemented, and expects to accrue only half of the emission reductions, based on some facilities and sources may be able to achieve the opacity limit currently, or through other minor improvements to their existing operation.

Expected capital investment for control measure to be approximately $866,000 capital, with resulting annual operating expenses of $206,000. Emission reductions are estimated to be 747 lbs per day of PM_{10}, or 136 tons per year. Average cost effectiveness is $206,000 / 136 = $1,515 per ton. The poorest cost effectiveness is found for two controls: $13,968 per ton for a water fog system at a quarry operation, and $10,303 per ton for a stockpile windscreen at a second quarry operation. These cost effectiveness levels are within normal acceptable ranges for particulate emission reductions.

Water Use

Five water fog systems are recommended in the table above. Each of these water fog systems is anticipated to use 624,000 gallons per year, totaling 3,120,000 gallons of incremental water use. Staff assumes all five will be installed.

Thirty-four water mist systems are recommended in the table above. Each of these water mist systems is anticipated to use 312,000 gallons per year, totaling 10,608,000 gallons of incremental water use. Staff assumes all 34 will be installed.

Total incremental water use for the proposed wind screens, and judicious use of water is 13,728,000 gallons per year, or 37,611 gallons per day.
Water is conservatively estimated to cost $7.48 per 100 cubic feet =748 gallons, equaling $0.01 per gallon.
13,728,000 gallons per year cost $137,280 per year

The CEQA threshold for housing development water use is based on water use needed for 500 dwelling units. Water use is estimated for 225 – 400 gallons per day for each dwelling unit, so the threshold ranges from 41,000,000 – 74,000,000 gallons of water.

The proposed particulate controls will use 33% of the CEQA threshold for incremental water use. If twice as many bulk material handling facilities opt to use water rather than wind screens, water use would be no more than 66% of the CEQA water consumption threshold

Typical urban water use is 8 million acre-feet of water per year = equaling 2.6 trillion gallons per year. 13.728 million gallons of proposed water use equals 5.3 millionths of the typical water supply. The threshold of 41 million gallons of water equals about 16 millionths of the typical water supply.