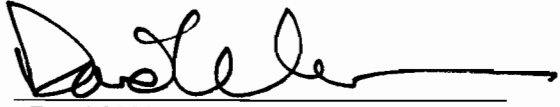


San Joaquin Valley Unified Air Pollution Control District

Aggregate Permit Processing

Approved By:  Date: <u>3/14/13</u>
David Warner Director of Permit Services

I. Purpose

The purpose of this policy is to standardize permitting requirements for aggregate processing facilities, and to guide permit services staff in establishing permit unit boundaries, emission factors, and permit conditions allowing facilities to demonstrate compliance with the established permit requirements.

An aggregate processing facility may engage their equipment in one or more of the following operations: quarrying (by drilling and blasting) or excavating material at the mine site, delivering material from the mine to drive-over grizzlies that feed a conveyor system, washing operations to remove fine material, screening operations to classify material by size, crushing operations to reduce rock size, stock piling, and material load out.

In addition, the site of the aggregate processing plant can also be a good location for a concrete recycling operation, to minimize unloaded truck trips, but concrete recycling may be conducted with dedicated equipment to avoid potential damage to the crushers at the stationary aggregate plant. Recycled concrete is typically crushed and sold for use as aggregate base. Please see District Policy SSP-2150, Allowed Operation of Portable Registered Equipment at a Stationary Source, for specific requirements regarding the use of registered portable equipment.

II. Applicability

This policy applies to all Authority to Construct (ATC) applications for new and modified aggregate processing facilities.

III. Priority Processing

Due to year round operation of aggregate facilities, these facilities are not granted high priority during any particular time of the year. Applicants wishing priority processing may apply for reimbursable overtime processing in accordance with District Policy ADM-1250, *After Hours Processing of High Priority Permit Applications*.

IV. Submittal of Documents

The standard permit application form, signed by the responsible official, must be submitted to the District along with the following supplemental information:

1. Process Flow Diagram

The process flow diagram for a modified facility must make clear what part of the process and/or equipment is changing and show both the pre and post-modification configuration. In general, the process flow diagram should indicate:

- Placement of screens, crushers, conveyors or other similar equipment and associated emission control devices or techniques,
- Permit unit boundaries for existing operations¹,
- Portable equipment (if any) that may be used in conjunction with stationary equipment,
- Design capacity, expressed in tons of material per hour, of the system delivering raw materials from quarry to processing plant,
- Design capacity, in ton/hr, of each circuit where material splits for crushing, screening, stockpiling, or other processing operations,
- Facility maximum operating schedule in hour/day, day/week, and week/year,
- Moisture content of materials handled by the processing plant,
- Moisture content through each circuit during processing,
- Site-specific moisture content corresponding to each aggregate product being produced, and
- Stockpile height, aggregate size, and associated emission control devices or techniques.

N.B.: The information listed above may be used in establishing the facility's potential to emit. Any and all assumptions made in calculating the potential to emit may be incorporated into the permit as enforceable conditions. Applicants are encouraged to bear this in mind when preparing permit applications.

2. Equipment Horsepower Rating

The applicant shall furnish the horsepower rating of each electric motor used in a permitted processing operation.

¹ Note that the permittee may have difficulty determining exactly where the permit unit boundary falls if the permits have not been organized as described in this policy. In such cases, the permittee is encouraged to indicate where they believe the permit unit boundary falls, subject to confirmation by the District.

V. General Plant Layout

Many of the aggregate processing facilities scrape or mine alluvial deposits using scrapers and feed them to a hopper where an arrangement of belt conveyors deliver the material to a grizzly box that knocks out large rocks not suitable for processing. The material is then conveyed to a water washing system where fine materials such as sand, clay, and silt are removed. After washing, the material is typically sent to a circuit consisting of a crusher, a multiple deck screen, and belt conveyors. The belt conveyors take the crushed and screened product off through various branches of the plant, where subsequent circuits with crushers, screens, and conveyors reduce the rock to the desired size. Intermediate washing cycles remove silts and clays that still adhere to the aggregate.

Alternatively, some aggregate processing facilities mine exposed bedrock in suitable locations by drilling and blasting in a quarry. The material produced by blasting² is then conveyed to a grizzly box and then on to the rest of the processing facility as described above.

A typical aggregate processing plant produces the following products:

- Mineral Aggregates
- Concrete Aggregates
- Sand
- Aggregate Base

² The rock formation is drilled to produce blast holes where explosive are inserted. When the explosives are detonated, material is broken loose from the formation and can be collected for processing. Drilling is not a separate method for producing raw material for aggregate processing.

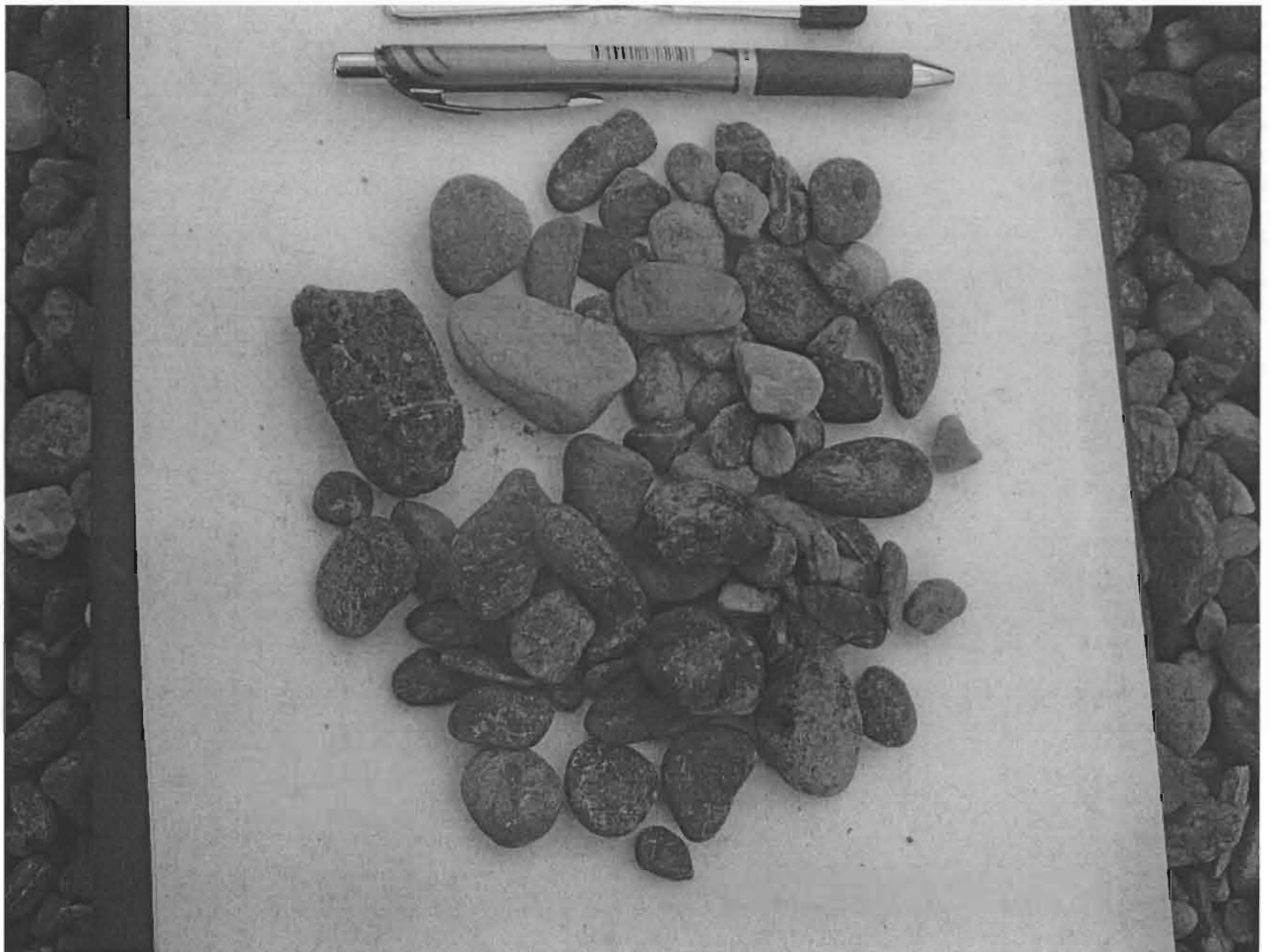
Mineral Aggregate: this category occupies the broadest size range, from sand (0.1") to 1-1/2", and is used in making asphalt batches for road pavement. Mineral aggregate can be a byproduct of aggregates processed through crushers. There are no silt content specs for these aggregates. In general, these aggregates are clean and can retain up to 2% moisture. The following pictures show these aggregates, both some extremely coarse aggregate on the left and some much finer pea gravel on the right.



1-1/2" Mineral Aggregate

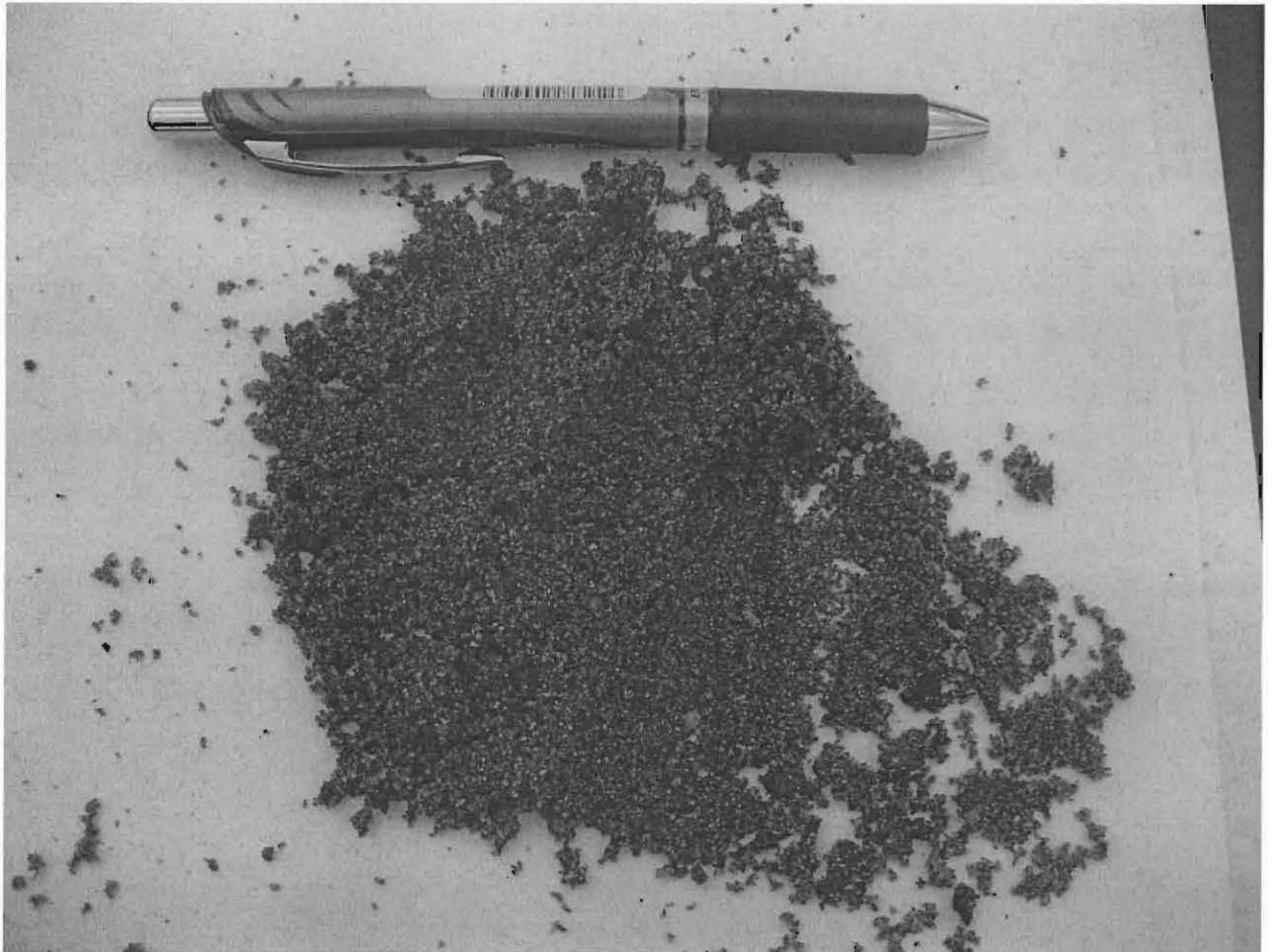
Pea Gravel (1/4 - 3/8")

Concrete aggregates: ranges from 3/8" to 1" in size, and is used by concrete batch plants where the aggregates are mixed with cement, sand, fly ash, and other ingredients to make concrete for a variety of purposes. Silt content for these aggregates is about 1%, as determined by Method ASTM C33. To meet this specification, these aggregates are washed at least 2-3 times (depending on the silt adhering to these aggregates). Due to low silt content, these aggregates can retain up to 2% moisture. The following picture shows silt content on the concrete aggregates.



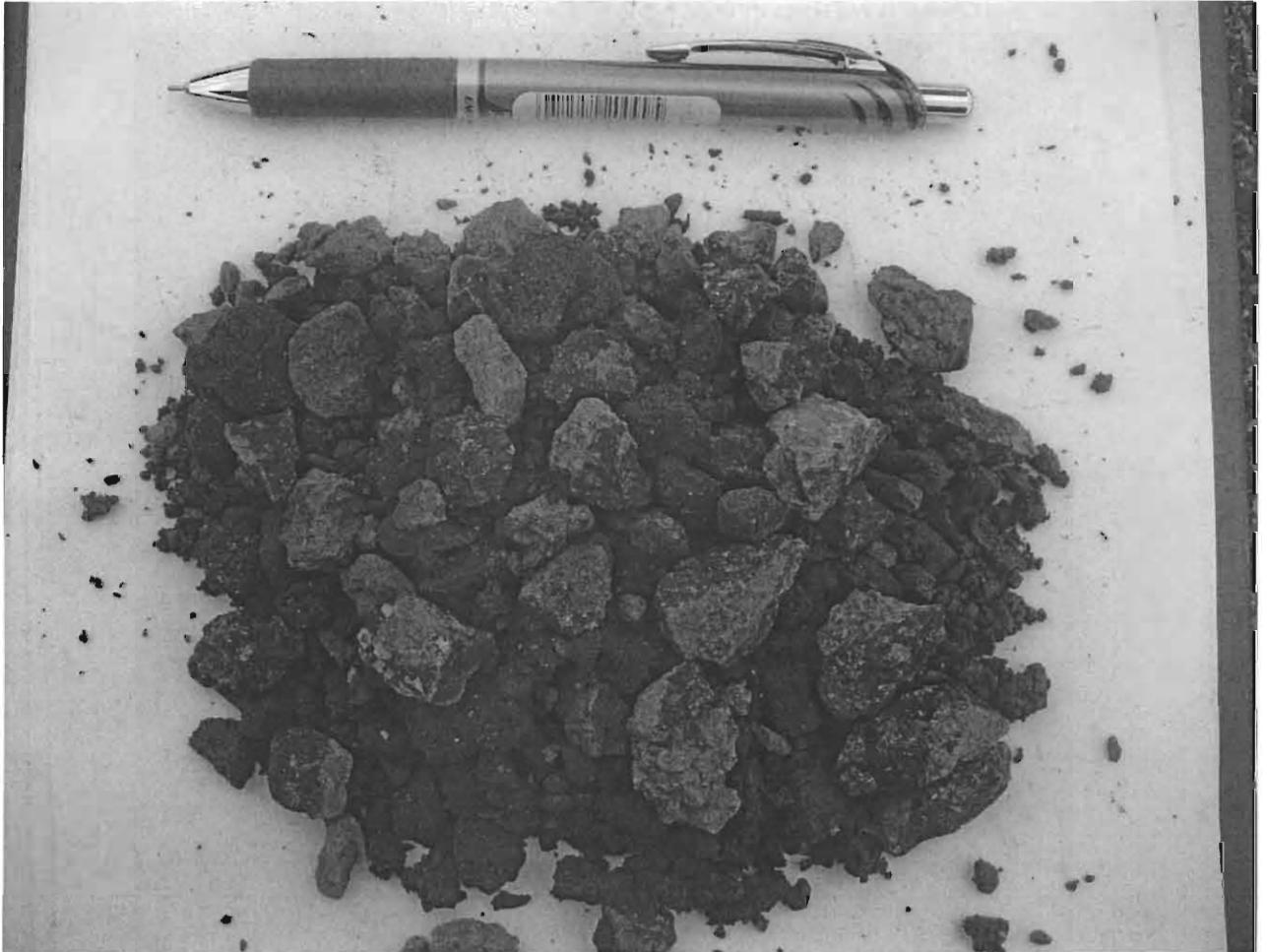
Concrete Aggregate

Sand: varies between 0.001" to 0.1" in size, is also used by concrete batch plants and asphalt plants, as well as in a variety of other processes. Sand is a byproduct of crushed aggregates, in addition to being present in the alluvial deposits mined for aggregate. Silt content on sand is required to be no greater than 8% (CalTrans Section 90). To ensure the low silt content, an aggregate facility may wash the sand at least 2-3 times. Due to smaller particle size and resulting high surface area for a given mass, sand can sustain 5-8% moisture content. The following picture shows typical sand produced at an aggregate facility.



Sand

Aggregate base: varies between $\frac{3}{4}$ " to $1\frac{1}{2}$ " in size and is used in making road base. The allowable silt content is up to 9% (CalTrans Section 26). Due to significant amount of silt on these aggregates, they can hold up to 6% moisture. The following picture shows these aggregates.



Aggregate Base

VI. Permit Unit Boundaries

Historically, the District has issued 4-6 permits for an aggregate processing operation, including 'receiving and pre-washing operation', 'primary crushing, screening and storage', 'secondary crushing, screening and storage', 'tertiary crushing, screening and storage' and 'aggregate loading operation'. It appears that these permit unit boundaries, particularly the distinction between primary, secondary, and tertiary crushing, were based on the distinctions made in EPA Document AP-42.

However, District Policy APR-1025, *Permit Unit Determination*, specifies that a single permit unit can suffice for a continuous process where all equipment is physically united by conveyors, pipes, or ducts to produce a product and does not operate independently. In a typical aggregate processing operation, the entire process from grizzly feeder to stockpile is commonly operated as a coherent whole to produce product, with the process material moved throughout the operation by conveyors. Typically, the only significant storage of process material occurs at the end of the operation, when the finished product is placed in stock piles, either for eventual load out and sale or for use in a related asphalt or concrete production operation. Pursuant to APR-1025, two permit units are sufficient for a typical aggregate plant unless site-specific factors demand that aggregate processing be broken up into multiple permit units.

1. Aggregate Processing Operation
2. Aggregate Storage and Loadout Operation

Organizing an aggregate processing operation into the two units listed above has a number of advantages, both for the operator and for the District. First, this organization settles the question of whether crusher X and screen Y are part of primary crushing permit unit A, secondary crushing permit unit B, or tertiary crushing permit unit C, for the benefit of both the facility and the Compliance Division. This benefit cannot be overstated, especially as many facilities currently have different product throughput limits and other permit conditions for 4-6 permit units that artificially isolate different sections of their plant.

Second, reducing the number of permit units will make it less burdensome for facilities to document compliance with their daily emissions limitations. Currently, a facility may have 3-4 different throughput limits based on the mass of material through a given permit unit. To determine the throughput in any permit unit, the facility must install a weighing cell somewhere in that permit unit, with appropriate connections to the central control system. This requirement can become capital intensive and very burdensome for smaller facilities, particularly if the plant is organized into 4-6 permit units requiring at least one weighing cell for each permit unit. By organizing the aggregate processing operation into a single permit unit, with the typical process rates through various portions of the system mapped out under the overall material throughput limit by the plant's physical design, record

keeping and compliance demonstrations are simplified.

Note that other configurations of the aggregate processing operations are possible and may require that aggregate processing be broken into multiple permit units. Such a determination will be made on a case-by-case basis taking into account relevant site-specific factors in order to justify the permit unit boundary. In the absence of such a case-by-case determination, the District will presume that the aggregate processing operation constitutes a single permit unit.

The following are examples of the equipment description for an aggregate processing operation and an aggregate load out operation:

AGGREGATE PROCESSING OPERATION: GRIZZLY FEED SYSTEM, CRUSHING AND SCREENING SYSTEM, ASSOCIATED CONVEYORS, AND A PERMIT EXEMPT WASH PLANT SYSTEM (LOW EMITTING UNIT)

FINISHED AGGREGATE STORAGE AND LOADOUT OPERATION

An equipment configuration under each system must be included in the form of permit conditions. Following is an example of such conditions:

- *Grizzly Feed System: This system consists of two hoppers that feed to a grizzly box with an arrangement of 15 conveyors up to and including the grizzly box. The conveyors in this system are equipped with a water spray bars. The equipment in this system is subject to the District permitting requirements.*
- *Crusher and Screening System: This system consists of 2 jaw crushers, 2 cone crushers, 2 standard cone crushers, 6 double deck screens, and 30 conveyors.*

VII. Potential to Emit Calculation Methodology

An aggregate processing facility includes the following equipment: crushers, screens, conveyors, storage area. In order to determine the potential emissions from the emission units processing each type of material, it is recommended that the facility use the worksheet included in this policy. If site-specific emission factors are available they should be used to determine emissions, although the most recent generally accepted emission factors from AP-42, Table 11.19.2 can be used as an alternative to developing site-specific emission factors. As specified in the Background Document for AP-42, controlled emission factors may be used only if a facility uses a wet suppression system or if a facility proposes to meet greater than 1.5% moisture content by weight before and after a particular operation.

Excluding crushers³, a unit handling material with 6% or greater moisture does not result in significant emissions. Thus, potential emissions can be set to zero for such unit. For other operations, the emission factors in Table 1 may be used in the absence of site-specific emission factors.

Table 1: Aggregate Processing Emission Factors	
Source	Emission Factor
Truck Unloading	0.000016 lb-PM ₁₀ /ton of material
Transfer Point (Conveyor or front-end loader drop)	0.000046 lb-PM ₁₀ /ton of material (controlled)
	0.0011 lb-PM ₁₀ /ton of material (uncontrolled)
Screening	0.0087 lb-PM ₁₀ /ton of material (uncontrolled)
	0.00074 lb-PM ₁₀ /ton of material (controlled)
Crushing	0.0024 lb-PM ₁₀ /ton of material (uncontrolled)
	0.00054 lb-PM ₁₀ /ton of material (controlled)
Storage Piles (uncontrolled)	5.27 lb-PM ₁₀ /acre/day
	0.121 lb-PM ₁₀ /1,000 ft ² /day

A word about the emission factor for storage piles is in order. Section 13.2.5 of AP-42 presents a predictive equation for calculating industrial wind erosion emissions as a function of several parameters including a wind speed factor known as the “fastest mile”. Fastest mile is an obsolete parameter that was abandoned in the early 1990s, when it was replaced by the average fastest 2-minute wind speed. Although these parameters are not precisely identical (except when the fastest 2-minute wind speed is 30 mph), they are comparable. Furthermore, because of the way the two parameters are defined it is expected that the fastest 2-minute wind speed will tend to be slightly higher than the wind speed corresponding to the fastest mile, making an emission factor calculated based on the fastest 2-minute wind speed conservative in comparison with one based on the fastest mile.

The District has previously used the equation in Section 13.2.5 with an average wind speed of 12 mph, in the belief that this was a conservative assumption⁴. However, the predictive equation is highly non-linear function of the fastest mile, as described on AP-42 page 13.2.5-5, so it is inappropriate to use the equation without the correct wind parameter. This is reinforced by the fact that, using typical storage pile geometry, the result from the equation falls to zero below a threshold of approximately 11 mph, just under the 12 mph previously used.

District staff reviewed fastest 2-minute wind speed data from stations in Modesto, Fresno, and Bakersfield, for the period 1995 – 2011. Staff used the predictive equation to calculate emissions for each day and then calculated the average

³ Crushers generate substantial amounts of dust which cannot be instantaneously controlled by an existing 6% moisture content.

⁴ Compared with the actual average wind speed of 7.5 mph for the Stockton airport.

across the entire data set. The result is presented in Table 1 above for use as an average emission factor for sand and aggregate storage where site-specific factors for calculating emissions are not available. The resulting emission factor is expected to be appropriate for use anywhere within the District's jurisdiction because the data is drawn from all three regions within the District, and the emission factor varies regionally by only about 20%. Furthermore, this emission factor is expected to be reasonable for use in evaluating and limiting the potential to emit because it corresponds to a fastest 2-minute wind speed of slightly over 17 mph. By comparison, the fastest 2-minute wind speed is 17 mph or less over 70% of the time in the Northern region and over 80% in the Central and Southern regions. This emission factor will also be incorporated into the concrete batch plant guideline for expedited application review in place of the current emission factor calculated from average wind speed.

Note that water spray systems can reduce loading and wind erosion emissions from storage piles 80 to 90% according to AP-42, Section 11.19.1-5 (11/95). Therefore, 80% shall be used as a conservative estimate in calculating emissions from the stockpiles. For other emissions units, the appropriate controlled emission factor from Table 1 may be used to reflect the impact of the water spray system.

In addition, since concrete aggregate and mineral aggregate are thoroughly washed during processing to remove silt, the amount of material that can become entrained in the atmosphere is *de minimus*. Therefore, no emissions will be ascribed to storage piles exclusively containing finished mineral aggregate, or finished concrete aggregate, of 3/8" size or larger. These storage piles shall be included in the conditions defining the finished aggregate storage and loadout operation, but the potential to emit for these storage piles is zero. The following condition will be included on any permit that includes stockpiles of finished concrete aggregate or mineral aggregate of 3/8" size or larger, for which this assumption of negligible emissions has been used in the evaluation:

- *Stockpiles for 3/8" and larger concrete or mineral aggregates shall be clearly designated and used only for the storage of aggregate that has been thoroughly washed to remove silt. Washing shall be sufficient to reduce silt content to 1% by mass or less. Such stockpiles shall be considered "emissions exempt". [District Rule 2201]*

N.B.: Emission factors listed in Table 1 are generally accepted emission factors and are subject to revision in accordance with District Policy APR-1110, Use of Revised Generally Accepted Emission Factors.

VIII. Daily Emission Limits

Daily emission limits (DEL) and other enforceable conditions are required by Section 3.17 of Rule 2201 to establish and enforce an upper limit on a unit's permissible emissions. A DEL must be enforceable, in a practical manner, on a daily basis. For an aggregate storage operation, the DEL is established by conditions limiting the size of the stockpiles (in acres) and the emission factor. For the aggregate processing operation, the DEL can be established using a single emission factor and the maximum process throughput, in tons per day. The combined emission factor is calculated by determining the potential emissions from each individual emissions unit, based on the emission factors specified in Section VI and the throughput for that emissions unit. The potential emissions from the individual emissions units are then totaled and divided by the plant's overall throughput limit.

For example, if a plant included two branches processing different amounts of material, with the sum of all PE2 equal to 16.0 lb/day, we would divide the plant's total PE2 by the receiving throughput, say 1,600 ton/day, for a combined emission factor of 0.01 lb-PM₁₀/ton. The DEL would then consist of two conditions:

Aggregate Processing:

- *PM10 emissions from this aggregate processing operation shall not exceed 0.01 lb/ton. [District Rule 2201]*
- *The total amount of aggregate received and processed shall not exceed 1,600 tons in any one day. [District Rule 2201]*

However, in many cases the facility will elect to keep its processing rate confidential in accordance with Rule 1030; in this case, the DEL can be established as a flat mass emissions limit expressed in pounds of PM₁₀ per day. As an example:

- *PM10 emissions from this aggregate processing operation shall not exceed 16.0 lb/day. [District Rule 2201]*

As an example for a storage and loadout operation with five acres of storage piles with wet suppression (80% control efficiency as noted in Section VI) and the capacity to load out 4,000 tons (still wet and, therefore, controlled) in any one day through a single drop into the truck trailer:

Aggregate Storage and Loadout:

- *PM10 emissions from this aggregate storage operation shall not exceed 0.34 pounds per acre per day (lb/ac-day). [District Rule 2201]*
- *The total area of sand and mineral aggregate storage piles, excluding emissions exempt stockpiles, shall not exceed 5 acres. [District Rule 2201]*
- *PM10 emissions from the aggregate loadout operation shall not exceed 0.000046 lb/tn. [District Rule 2201]*
- *The total amount of aggregate loaded out shall not exceed 4,000 tn/day. [District Rule 2201]*

Or, for the same facility wishing to keep its capacity confidential:

- *PM10 emissions from the aggregate storage and loadout operation shall not exceed 5.4 pounds in any one day. [District Rule 2201]*

IX. Compliance Assurance

A permittee electing to use generally accepted emission factors from AP-42 is not required to perform source testing on their equipment to validate the emission factors; however, all processing equipment is potentially subject to the source testing requirements listed in District policy APR-1705, *Source Testing Frequency*, or other applicable State or Federal regulations.

X. New Source Performance Standards

The requirements in Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Subpart OOO, *Standards of Performance for Nonmetallic Mineral Processing Plants*, are applicable to fixed and portable nonmetallic mineral processing plants with processing rates greater than 25 ton/hr and 150 ton/hr, respectively, which commence construction, reconstruction or modification after August 31, 1983.

§60.672(a), which applies to point sources of emissions routed through an emission control device (such as a crusher served by a baghouse) is split into two requirements. The first, which is applicable to affected facilities (which commenced construction, reconstruction, or modification between August 31, 1983 and April 22, 2008) states that no owner or operator shall cause to be discharged into the atmosphere emissions which contain particulate matter in excess of 0.022 gr/dscf, or that exhibit greater than 7% opacity. The following conditions will be placed on the permit for applicable affected facilities:

- *Particulate matter emissions from [emission unit with stack] shall not exceed 0.022 grains/dscf pursuant to Title 40, Part 60, Subpart 000 (Standards of Performance for Nonmetallic Mineral Processing Plants) of the Code of Federal Regulations. [District Rule 4001]*
- *Visible emissions from [emission unit with stack] shall not exceed 7% opacity as measured pursuant to Title 40, Part 60, Subpart 000 (Standards of Performance for Nonmetallic Mineral Processing Plants) of the Code of Federal Regulations. [District Rule 4001]*

The second requirement in §60.672(a) applies to facilities that commenced construction, reconstruction, or modification on or after April 22, 2008. This requirement eliminates the opacity limit for applicable affected facilities (except for dry control devices on individual enclosed storage bins) but reduces the PM emission limit from 0.022 gr/dscf to 0.014 gr/dscf. The following condition will be placed on the ATC for applicable affected facilities:

- *Particulate matter emissions from [emission unit with stack] shall not exceed 0.014 grains/dscf pursuant to Title 40, Part 60, Subpart 000 (Standards of Performance for Nonmetallic Mineral Processing Plants) of the Code of Federal Regulations. [District Rule 4001]*

§60.672(b), which applies to fugitive emissions from any affected facility (except crushers not served by a control device), is also divided into separate requirements for existing sources and for new sources. For existing sources, fugitive opacity shall not exceed 10% for most affected facilities, and 15% for crushers. For new sources, the opacity limits are 7% generally and 12% for crushers. Note that since open storage stockpiles are not included in the list of affected facilities specified in §60.670, these fugitive opacity limits do not apply to the stockpiles, although opacity may be limited under Rule 2201 as mentioned elsewhere. The following conditions shall be placed on the permits to enforce these requirements for applicable affected facilities:

- *Visible emissions from any affected facility shall not exceed 10% opacity as measured pursuant to Title 40, Part 60, Subpart 000 (Standards of Performance for Nonmetallic Mineral Processing Plants) of the Code of Federal Regulations. [District Rule 4001]*
- *Visible emissions from each crusher shall not exceed 15% opacity as measured pursuant to Title 40, Part 60, Subpart 000 (Standards of Performance for Nonmetallic Mineral Processing Plants) of the Code of Federal Regulations. [District Rule 4001]*

The following conditions shall be placed on the applicable ATC to enforce these requirements for new facilities:

- *Visible emissions from any affected facility shall not exceed 7% opacity as measured pursuant to Title 40, Part 60, Subpart OOO (Standards of Performance for Nonmetallic Mineral Processing Plants) of the Code of Federal Regulations. [District Rule 4001]*
- *Visible emissions from each crusher shall not exceed 12% opacity as measured pursuant to Title 40, Part 60, Subpart OOO (Standards of Performance for Nonmetallic Mineral Processing Plants) of the Code of Federal Regulations. [District Rule 4001]*

XI. Standardized Permits

Permit Conditions

Attached are standardized ATC/PTO conditions that shall be used as a guide for all new aggregate permits. It is important to note that this standardized permit is generic in nature, and therefore cannot contain all conditions that may be necessary to ensure compliance with all applicable requirements. This is particularly true with New and Modified Stationary Source Review requirements that may be imposed on ATCs. For this reason, it may be necessary to place additional site-specific conditions on some permits.

Facilities with a Moisture Content Limit and Moisture Testing Requirement:

- *All quarrying, processing, and handling of sand, gravel, aggregate, road rock, and other materials shall be performed in such a manner and with a moisture content of X% or greater, by weight, to prevent emissions of fugitive particulate matter. [District Rule 2201]*
- *All aggregate processed by the [crushing, screening and conveying] operation(s) shall maintain a minimum moisture content of X%, by weight. [District Rule 2201]*
- *The moisture content of the aggregate processed by the [crushing, screening and conveying] operation(s) shall be measured on a monthly basis and when requested by the District. [District Rule 2201]*
- *The percent moisture of the aggregate processed by the [crushing, screening and conveying] operation(s) shall be determined using the following equation and a minimum aggregate sample weight of 2.0 pounds: [(weight of wet sample - weight of dry sample) / weight of dry sample] x 100. [District Rule 2201]*

Monitoring Visible Emissions:

For facilities that propose to use the generally accepted emissions factors in Table 1 and demonstrate compliance by monitoring the visible emissions, replace the moisture content testing requirements above with the following conditions:

- *Upon initial startup of the plant, an individual certified to perform EPA Method 9 visible emission observations shall perform an inspection of all conveyor transfer points, crushers, and screens. The initial inspection shall take place at an appropriate time of day depending on plant start time and sunrise. [District Rule 2201]*
- *An individual trained to perform EPA Method 22 visible emission observations shall perform a daily inspection of the facility. Daily inspections shall take place at an appropriate time each day depending on plant start time and sunrise. The duration of Method 22 observations shall not be less than 15 minutes. [District Rule 2201]*
- *Water spray equipment that sufficiently wets materials to minimize visible dust emissions shall be installed on all feeders, crushers, and screens. Stockpiles shall be maintained sufficiently wet by appropriate means to maintain compliance with the appropriate visible emission limitations of this permit. Water spray equipment shall be installed on conveying equipment as necessary to provide adequate moisture application to maintain compliance with the appropriate visible emission limitations of this permit. [District Rule 2201]*
- *Spray nozzles shall be turned on, as necessary, to control fugitive emissions from the feeders, conveyor transfer points, screens, and crushers. [District Rule 2201]*
- *All spray nozzles shall be maintained in proper working condition at all times. [District Rule 2201]*

XII. Consolidation of Existing Permits to Operate

All new aggregate operations shall be permitted in accordance with this policy unless unusual site-specific circumstances require a deviation from the methodology prescribed herein. Existing permits to operate will not be modified to conform to this policy except in the following situations:

- The permit holder specifically applies to consolidate the permits to operate in accordance with this policy,
- The facility undergoes reconstruction as defined in 40 CFR 60.15, or
- An ATC application for which all relevant permits are open for modification, but only with the explicit approval of the applicant. If the facility has non-aggregate permits (emergency engine, abrasive blasting, boiler, etc.), these permits do not have to be open to ask the facility if they want to consolidate the aggregate permits to conform to this policy.