Guidance Manual

for

Nonmetallic Mineral

Processing Plants

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New Source Performance Standard (”NSPS”) regulations apply to the operator of any stationary source that contains a type of facility that is affected by an NSPS regulation. Construction, modification, or reconstruction of the facility must have begun after the date of publication of the proposal for the standard. For nonmetallic mineral processing plants, the proposed standards were published on August 31, 1983. Thus, any nonmetallic mineral processing facility that was built or modified after August 31, 1983 and is affected by this NSPS regulation (“Subpart OOO”), must comply with this regulation.[1] Such plants built or modified on or before August 31, 1983 do not need to comply with this regulation. Certain nonmetallic mineral processing plants may contain facilities that are regulated by other NSPS regulations.

1. Introduction to the Regulations Concerning Nonmetallic Mineral Processing Plants

The Subpart OOO applicability is determined by the site or plant’s primary crushing capacity. In Colorado, most sand and gravel operations are considered “portable.”[2] Where a portable sand and gravel plant has the capacity, looking at all initial or primary crushers, of greater than one hundred and fifty (150) tons per hour, then all “affected facilities” are subject to Subpart OOO.[3] To determine primary crushing capacity, it is necessary to look at all initial crushers at the site, whether in use or not. The Division generally permits the initial crushers, and as these machines are moved onto new sites, the crushers subject all affected facilities to Subpart OOO, so long as the site’s primary crushing capacity is one hundred and fifty (150) tons per hour.

At a nonmetallic mineral processing plant, Subpart OOO applies to both “affected facilities” and the most commonly processed nonmetallic minerals at the site. Affected facilities means individual pieces of operating equipment, not the entire plant. The idea is that it is easier to reduce emissions if the operator can focus on controlling emissions of individual pieces of equipment. Section 1.1.1 provides the list of affected minerals and a walk through of a nonmetallic mineral processing plant. Section 1.1.2 describes the individual pieces of operating equipment that are subject to Subpart OOO.

a. Nonmetallic Mineral Processing Plants in General

This section lists nonmetallic minerals affected by Subpart OOO and describes the basics of nonmetallic mineral processing. Nonmetallic minerals, or any mixture of which the majority is any one of the following minerals, are affected by Subpart OOO:

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[1] 40 C.F.R. 60.670(e).

[2] Plant capacity is based upon the capacity of the primary crusher. If the primary crusher processes more than one hundred and fifty (150) tons per hour, then all affected facilities, i.e., crushers, screens and transfer points, are subject to Subpart OOO.

[3] Fixed sand and gravel operations where primary crushing capacity is greater than twenty five (25) tons per hour, are affected facilities subject to Subpart OOO.

- crushed and broken stone (limestone, dolomite, granite, traprock, sandstone, quartz, quartzite, marl, marble, slate, shale, oil shale, and shell)
- sand and gravel
- clay (kaolin, fireclay, bentonite, Fuller's earth, ball clay, and common clay)
- rock salt
- gypsum
- sodium compounds (sodium carbonate, sodium chloride, and sodium sulfate)
- pumice
- gilsonite
- talc and pyrophyllite
- boron (borax, ernite, and colemanite)
- barite
- fluorospar
- feldspar
- diatomite
- perlite
- vermiculite
- mica
- kyanite (andalusite, sillimanite, topaz, and dumortierite)

Crushed stone and gravel are by far the largest segments of the industry in Colorado. Table 1.1 lists the major uses of each individual mineral.

A nonmetallic mineral processing plant is a plant that crushes and grinds any of these listed nonmetallic minerals. Such plants include: lime plants, power plants, steel mills, asphalt concrete plants, and portland cement plants. Portland cement plants and hot mix asphalt facilities are not affected by this regulation, and have separate NSPS regulations with which they must comply (e.g., Subpart F and Subpart I). However, crushers and grinding mills at hot mix asphalt facilities that reduce the size of nonmetallic minerals embedded in recycled asphalt pavement and subsequent affected facilities up to, but not including the first storage silo or bin are subject to Subpart OOO.[4] Subpart OOO does not apply to the following operations: 1) all facilities located in underground mines; and 2) stand alone screening operations at plants without crushers or grinding mills.[5]

In general, nonmetallic mineral processing involves extracting minerals from the ground then loading, unloading, dumping, conveying, crushing, screening, milling, and classifying the minerals. Some mineral processing can also include washing, drying, calcining, or flotation operations. The operations performed depend upon the ore type and the desired product. The mining process can be done either underground or in open pits. It can involve drilling and blasting, or removal by excavator, loader, bulldozer, dragline, or dredging operations. Figures 2-1 and 2-2 show simplified diagrams of the typical process steps required for some nonmetallic mineral processing facilities.

Nonmetallic minerals are normally delivered to the processing plant by truck and are dumped into a hopper or feeder (usually a vibrating grizzly type), which feeds the material onto screens. The screens size the larger rocks from the finer rocks that do not require any crushing. This decreases the amount of material sent to the primary (first) crusher. Jaw or gyratory crushers are usually used for the first reduction in size, although impact crushers are becoming more common. The crushed product and the undersized material fall onto a belt conveyor and usually are transported to either secondary screens and a crusher, or to a surge pile or silo for temporary storage.

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[4] 40 C.F.R. 60.670(a)(1) (as amended June 9, 1997).

[5] 40 C.F.R. 60.670(a)(2) (as amended June 9, 1997).

If present, secondary screens again separate the material into oversized and undersized material. Sometimes the material will be fed to the secondary crusher to reduce the size further. The oversized material goes into the secondary crusher and the undersized material can by-pass the secondary crusher. Gyratory, cone, or impact crushers are most commonly used for the secondary crushing stage. The product from the secondary crushing stage is transported to a secondary screen to further size the material. The reduced material is either discharged directly to the tertiary crusher or sent to classifying screens and then to a fine-ore, or "fines," storage bin. The fine-ore storage bin supplies the milling stage. Cone crushers or hammermills are normally used for tertiary crushing and rod mills, ball mills, and hammermills are used in the milling stage.

The product from the tertiary crusher or the mill may be sent to a type of classifier (dry vibrating screen system, a wash screen, an air separator, or a wet rake or spiral system). The larger material is

Table 1.1
Major Uses of the Nonmetallic Minerals

Mineral	Major Uses
Crushed and broken stone	Construction, lime manufacturing, erosion control
Sand and gravel	Construction, concrete, asphalt
Clay	Bricks, cement, refractory, paper
Rock salt	Highway use, chlorine
Gypsum	Wallboard, plaster, cement, agriculture
Sodium compounds	Glass, chemicals, paper
Pumice	Road construction, concrete
Gilsonite	Asphalt paving
Talc and pyrophyllite	Ceramics, paint, toilet preparations
Boron	Glass, soaps, fertilizer
Barite	Drilling mud, chemicals
Fluorospar	Hydrofluoric acid, iron and steel, glass
Feldspar	Glass, ceramics
Diatomite	Filtration, filters
Perlite	Insulation, filter aid, plaster aggregate
Vermiculite	Concrete
Mica	Paint, joint cement, roofing
Kyanite	Refractories, ceramics

returned to the tertiary crusher or mill to further reduce the size. Minerals that are the desired size can be sent directly to the finished product storage bins or are stockpiled in open areas.

Depending upon the intended use, the nonmetallic minerals may have to be further processed. Washing may be required to meet end product specifications, as in the crushed stone and sand and gravel industry. Light weight minerals may be washed and dried, sintered, or treated before primary crushing. Other minerals may be dried after secondary crushing or milling.

In general, the factors that affect the amount of emissions from most mineral processing operations include: the type of ore processed, the moisture content of the ore, the amount of ore processed, and a variety of geographical and seasonal factors, such as wind and precipitation. These factors apply to both fugitive and stack emission sources. Process equipment emissions depend upon the size distribution of the processed material, the moisture content, and the velocity of the particle. Natural forces such as the weather and wind can also affect the emissions.

b. General Descriptions of Process Equipment Affected by this Regulation

Any of the following types of plants or equipment found at a nonmetallic mineral processing plant that were constructed or modified after August 31, 1983 are subject to Subpart OOO: crushers, grinding mills, screening operations, bucket elevators, belt conveyors, bagging operations, storage bins, and enclosed truck or railcar loading stations.[6] This section discusses the most common types of equipment used in the industry and the principles of operation. The Inspector will encounter a diversity of processes and process equipment during inspections, so the Inspector should have a basic knowledge of the type of equipment most likely encountered in the field. An operating plant can be spread over a large area or concentrated in a smaller area.

It is usually best to start the inspection at the beginning of the process operations and end at the finished product loading station(s) or stockpiles. For this reason, this section is organized by the process order most often found in the industry.

i. Crushers

The crushing or grinding operation is generally the first process. However, some materials such as pumice, are so fragile that they only require screening. Also, some river rock or smooth stone decorative rock is never crushed only sized with screens. Plants that do not use crushing or grinding or screening are not considered nonmetallic mineral processing plants, and thus, are not subject to the Subpart OOO. After blasting, scraping, or breaking rock is completed in the quarry, the first size reduction of the raw material is usually done in the primary crusher. Crushing is the reduction in size of the material to a coarse or fine material. Crushing is accomplished by either impaction or compression of the stones. In impaction, a breaking force is applied very rapidly. In compression, the rock is slowly squeezed and forced to break. Generally, compression crushers produce coarser material than impaction crushers. Often size reduction of the raw material must be done in stages and the material crushed several times. The

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[6] 40 C.F.R. 60.670(a) and (c).

various stages can include primary, secondary, and tertiary crushing. The most common crushers used in the industry are: jaw, gyratory, roll, and impact crushers.

Crushers will cause particulate emissions. Particulate emissions are primarily seen at the crusher input and output points. The amount of emissions are the result of the: type of rock processed, moisture content of the rock, and type of crusher used. The type of crusher used affects the amount the machine can reduce the size, the particle size of the product, and the amount of force put on the raw material. Crushing units using impaction rather than compression produce a larger percentage of fine material ("fines"). In addition to generating more fines, impaction crushers put more force on the material. The result is that impaction crushers generate larger amounts of uncontrolled particulate emissions per ton of material processed than other types of crushers. The amount of uncontrolled emissions from the crusher also depends upon whether the crusher is used in the primary, secondary, or tertiary crushing stages. Emissions increase progressively from primary to secondary to tertiary crushing. Other factors may also result in greater emissions depending upon the mechanism the crusher uses.

(1) Jaw Crushers

A jaw crusher has a vertical fixed jaw and a moving inclined jaw that is operated by a single toggle or a pair of toggles. Rock is crushed by compression, because the moveable jaw opens and closes against the fixed jaw. The main use of jaw crushers is for primary crushing. A jaw crusher can be categorized by the size of its feed opening and may range from approximately 15 x 30 centimeters to 213 x 168 centimeters (5.9 in. x 11.81 in. to 83.86 in. x 66.14 in.). The size reduction of the mineral is usually between 3:1 to 10:1 depending upon the type of raw material. The capacity varies depending upon the unit and the amount of material discharged.

There are several types of jaw crushers Inspectors may see more often. One is the double-toggle type, also known as the Blake. As illustrated in Figure 2-3, an eccentric shaft drives a Pitman arm that raises and lowers a pair of toggle plates to open and close the moving jaw which is suspended from a fixed shaft. Another type is the single-toggle jaw crusher. In a single-toggle, the moving jaw is itself suspended from an eccentric shaft and the lower part of the jaw supported by a rolling toggle plate (see Figure 2-4). Other types, such as the Dodge and overhead eccentric, are used on a limited scale.

(2) Gyratory Crushers

A gyratory crusher is a jaw crusher with circular jaws between which the material flows and is crushed. A gyratory crusher has much greater capacity than a jaw crusher. There are three types of gyratory crushers: pivoted spindle, fixed spindle, and cone. The fixed and pivoted spindle types are used for primary and secondary crushing. The cone crushers are used for secondary and tertiary crushing.

The pivoted spindle gyratory, as shown in Figure 2-5, has a crushing head mounted on a shaft that is suspended from above and free to pivot. The bottom of the shaft is placed in an eccentric sleeve which turns and causes the crusher head to move in a circular path within a fixed circular chamber. The crushing action is similar to that of a jaw crusher, because the crusher moves to and from a fixed crushing plate. Some part of the crusher head is working at all times, thus, material is continuously discharged from a gyratory.

The fixed spindle gyratory has a crushing head mounted on an eccentric sleeve fitted over a fixed shaft. This produces a uniform crushing stroke from the top to the bottom of the crushing chamber.

The cone crusher is a gyratory equipped with a flatter head (see Figure 2-6). This allows for fine crushing of the raw material. Unlike regular gyratories, the cone crusher sizes the material at the closed side setting and not the open side (wide-side) setting. This assures that the material discharge will have been crushed at least once at the closed side setting. Cone crushers yield an elongated product and a high percentage of fines due to interparticle crushing. They are the most commonly used crusher in the industry for secondary and tertiary reduction.

(3) Roll Crushers

Roll crushers are primarily used at intermediate or final reduction stages and are often used at portable plants. There are two types: double-roll and single-roll. The double-roll crusher consists of two heavy parallel rolls which are turned toward each other at the same speed (see Figure 2-7). Usually, one roll is fixed and the other set by springs. Rock particles are caught between the rolls and crushed almost totally by compression. These units produce few fine sized materials and no oversize materials. They are often used for reducing hard stone to a final product ranging from one quarter (1/4) inch to twenty (20) mesh. The single-roll crusher consists of a toothed or knobbed roll and a curved crushing plate that may be corrugated or smooth. A toothed roll crusher is depicted in Figure 2-8. The feed caught between the roll and the crushing plate is broken by a combination of compression, impact, and shear. The single-roll crusher is principally used for reducing soft materials such as limestones.

(4) Impact Crushers

Impact crushers include hammermills and impactors. These crushers use the force of fast rotating very large hammers or impellers to strike or shatter free-falling rock particles. These crushers produce a fractured product that is made up of a large proportion of fine material. Impact crushers are often used in such industries as cement manufacturing and agstone production.

A hammermill, as depicted in Figure 2-9, has a high speed horizontal rotor with several rotor discs to which sets of swing hammers are attached. As rock particles are fed into the crushing chamber, they are impacted and shattered by the hammers. Next, the shattered rock collides with a steel breaker plate and is fragmented even further. A cylindrical screen at the discharge opening stops oversized material until it is reduced to a size small enough to pass through the grate bars. The size of the resulting product is controlled by the rotor speed, the spacing between the grate bars, and by hammer length.

An impact breaker is similar to a hammermill, except it has no screen to stop the material (see Figure 2-10). The material is broken by impact alone. Adjustable breaker bars are used instead of plates to throw material back into the path of the impellers. Impact breakers are appropriate for soft rocks like limestone.

ii. Grinding Mill

Grinding reduces the material a step further to sizes smaller than a crusher can attain. The force applied to material at this stage is less, because the material is smaller. Grinding mills can crush using a wet or dry process. Subpart OOO includes the air conveying system, air separator, and air classifier as part of the grinding mill.[7]

As with crushers, reduction by impaction produces a greater amount of fine material than reduction by compression in a grinding mill. The particulate emissions are generated from the grinding mills at the grinder's inlet and outlet. In gravity type grinding mills that accept feed from a conveyor and discharge the product into a screen or classifier or onto a conveyor, the points where the material is transferred are the sources of particulate emissions. The outlet has the highest emissions potential, because there is more fine material. Air-swept mills include an air conveying system and an air separator or classifier (or both). The air separator and classifier are usually cyclone collectors. There are two types of air-swept systems: 1) the air conveys the material to a separator for deposit into a storage bin with the conveying air escaping through the cyclone vent; and 2) the air conveys the material to a separator and the air is continuously recirculated. The second type allows for a dustless operation, because the circulating air system is maintained under suction. Any surplus air is released through a vent. In both cases, the vent gases will contain a certain amount of particulate matter. The principle types of grinding mills are: hammer, roller, rod, pebble and ball, and fluid energy. These are discussed next.

(1) Hammermills

A hammermill is a high speed horizontal rotor with several rotor discs to which sets of swing hammers are attached. As the material is fed into the grinding chamber, it is hit and shattered by the hammers. The shattered rock then hits a steel breaker plate and is further broken. A cylindrical grate or screen at the discharge opening stops the oversized material until it is reduced to a size small enough to pass between the grate bars. The rotor speed, spacing between the grate bars, and hammer length control the product size. These mills are used for nonabrasive materials.

(2) Roller Mill

The roller mill is also called a Raymond Roller Mill. It has an integral whizzer separator that produces material at a size of twenty (20) mesh to three hundred and twenty five (325) mesh or finer. Rollers that travel along the inside of a horizontal stationary ring grind the material. The rollers swing outward by centrifugal force and trap the material between them and the ring. The material is then carried out of the mill by a stream of air to a whizzer separator located directly on top of the mill. Next, the oversized material is separated and dropped back for further grinding and the desired fine material passes up through the whizzer blades into the duct leading into the air separator (cyclone).

(3) Rod Mill

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[7] 40 C.F.R. 60.671.

The rod mill is a granular grinding unit used to grind a maximum material size of two (2) to four (4) centimeters (3/4 inch to 1.5 inch). The material is grinded to a maximum of sixty five (65) mesh. The rod mill is normally used in a closed circuit with a sizing device (classifiers or screens) and for wet or dry grinding. The mill usually consists of a horizontal, slow-speed, rotating, cylindrical drum. The grinding media consists of steel rods, slightly shorter than the mill's inside length. The rods freely roll inside the drum during its rotation to provide the desired grinding action.

(4) Pebble and Ball Mills

A pebble mill is a cylindrical, horizontal, slow-speed rotating drum containing ceramic pebbles. As the material is added to the drum, the pebbles hit the material and break it into small sizes. A ball mill is the same process using steel, flint, porcelain, or cast iron balls. The operator chooses the appropriate size of the pebbles or balls based upon the size of feed material and the desired fineness of the product. Usually, the larger pebbles and balls are used for preliminary grinding and the smaller for final grinding. Ball mills reduce the size of the material mostly by impaction.

(5) Fluid Energy Mills

If the desired material size is in the range of one (1) to twenty (20) microns, an ultrafine grinder such as the fluid energy mill is required. In a fluid energy mill, a gas stream moving in a circle suspends the material and moves it in a circular motion. The material is reduced in size when it hits or rubs against the mill walls and when the particles hit each other. Product size can be varied by changing the speed of the gas through the grinder.

(6) Separating and Classifying

As mentioned above, Subpart OOO regulates the separating and classifying operations as part of the grinding mill. This is the process by which the material is sorted and separated by size. Mechanical air separators are often used to classify dry materials that are relatively small. The separator begins where the vibrating screens have left off. The separator uses a fan to create an ascending air current. The material is added through the feed opening and drops on the lower or distributing plate where it is then spread and thrown off by centrifugal force. The force throws the heavier particles against the inner casing. The smaller and lighter particles are picked up by the ascending air current created by the fan. The smaller material is carried over into an outer cone and deposited. The larger material drops into the inner cone, passes out through a opening, and is sent back to the grinding mill. The air is either recirculated to the grinding mill or vented. Both vents are a source of particulate matter.

iii. Screening Operation

Screening is the process by which a mixture of stones is separated according to size. In screening, material is dropped onto a mesh surface with openings of desired size and separated into two groups. One group is the undersized material which falls through the screen opening and the other is oversized material which stays on the screen surface. Screening surfaces may be constructed of metal bars, perforated or slotted metal plates, woven wire cloth, or polyurethane materials. The capacity of a screen is usually expressed in tons of material per hour. Screening equipment most commonly used in the nonmetallic minerals industry includes: grizzles, shaking screens, vibrating screens, and revolving screens.

Screening can be done either wet or dry. Dry screening is more common than wet screening in the crushing circuits. If the purpose of a wet screening is to remove unwanted material from the product (i.e., silt, clay, grit, etc.) and not to separate product by size, the operation is termed washing. Washers are not affected facilities under Subpart OOO, because of the definition used for screening operation. However, some washers such as deck-type screens with spray bars can be modified for dry screening by removing the sprays. If a washer is modified and used for dry screening, and the washer was manufactured after August 31, 1983, the modified washer constitutes a screening operation and becomes an affected facility.

(1) Grizzlies

A grizzly consists of a set of uniformly spaced bars, rods, or rails. The bars may be horizontal or inclined and are usually wider in cross section at the top than the bottom. This prevents the clogging or wedging of stone particles between bars. The spacing between the bars ranges from five (5) to twenty (20) centimeters (2 inches to 7⅞ inches). The bars are usually constructed of manganese steel or other highly resistant material. Grizzlies are primarily used to prevent oversized material from entering the crusher. Grizzlies may be stationary, cantilevered (fixed at one end with the discharge end free to vibrate), or mechanically vibrated. Vibrated grizzlies are simply bar grizzlies mounted on eccentrics. The entire assembly is moved forward and backward at approximately one hundred (100) strokes a minute, resulting in better movement through and across the grizzly surface.

(2) Shaking Screens

The shaking screen consists of a rectangular frame with perforated plate or wire cloth screening surfaces, usually suspended by rods or cables and inclined at an angle of fourteen degrees (14°). The screens are mechanically shaken. Generally, shaking screens are used for screening larger material (1.3 centimeters or larger).

(3) Vibrating Screens

Where large capacity and high efficiency are desired, the vibrating screen has practically replaced all other screen types. It is the most commonly used screen type in the nonmetallic minerals industry. A vibrating screen essentially consists of an inclined flat or slightly convex screen that is rapidly vibrated. The vibrations may be generated mechanically (using an eccentric shaft, unbalanced fly wheel, or cam and tappet assembly) or electrically (using an electromagnet).

(4) Revolving Screens

The revolving screen is an inclined cylindrical frame wrapped by a screen of wire cloth or perforated plate. Feed material is added at the upper end and as the screen is rotated the undersized material passes through the screen openings. The oversized material goes out at the lower end.

iv. Material Storage and Handling

Storage bins are used for raw materials, intermediates, and final product. These bins can be loaded and unloaded by gravity, mechanically, or by pneumatic conveying and loading systems. Loading and unloading may occur continuously or intermittently. As material is added to the bin, dust-laden air is pushed out. This air is either discharged to the atmosphere without controls through vents, or is collected and conveyed to a control device.

v. Bucket Elevator

Bucket elevators are used where the material must be raised high in a limited space. These elevators have a head and foot assembly which supports and drives a continuous single or double strand chain or belt to which the buckets are attached. The three types most often used are: the high-speed centrifugal discharge; the slow speed positive or perfect-discharge; and the continuous-bucket elevator.

The centrifugal-discharge elevator has a single strand of chain or belt to which the buckets are attached. As the buckets round the tail pulley, the buckets scoop up their load and carry it to the point of discharge. The buckets are spaced so that at the top the material is thrown out by the centrifugal action of the bucket rounding the head pulley. The positive-discharge uses spaced buckets and has a double-strand chain and discharges differently. An additional sprocket below the head pulley bends the strands back under the pulley, the bucket is turned upside down, and the material is dumped out. The continuous-bucket elevator uses closely spaced buckets attached to a single or double strand belt or chain. Material is loaded directly into the buckets during ascent and is poured gently out by using the back of the bucket in front of it as a discharge chute.

vi. Belt Conveyor

Belt conveyors are the most widely used method of transporting, elevating, and handling materials in this industry. (See Figure 2-11.) A belt conveyor consists of a continuous belt that is carried on a series of idlers usually arranged so that the belt forms a trough. The belt is stretched between a drive or head pulley and a tail pulley. These belts are usually made of reinforced rubber. Normally operating speeds range from sixty (60) to one hundred and twenty (120) meters per minute (2.2 miles per hour to 4.5 miles per hour). Depending upon the belt speed, belt width, and rock density, load capacities may be in excess of 1,360 megagrams (1,500 tons) per hour. Subpart OOO only regulates particulate matter emissions from transfer points to and from the affected facility (except transfer points to stockpiles).

vii. Bagging Operation

In the nonmetallic minerals industry, the valve type paper bag is often used for shipping fine materials. The valve bag is “factory closed.” This means the top and bottom are closed either by sewing or pasting, and a single small opening is left on one corner. The material is put into the bag through the valve. The valve bag is filled by a packing machine designed for this very purpose. The material enters the bag through a nozzle inserted in the valve opening. The valve closes automatically when filling is complete, because of the internal pressure of the contents of the bag as soon as it is filled. Bagging operations are a source of particulate emissions. Dust is emitted during the final stages of filling when dust laden air is force out of the bag, thus, the fugitive emissions are generally located in the area of the bagging machine.

viii. Enclosed Truck or Railcar Loading Station

Product materials that are not bagged for shipment may be either bulk loaded into trucks or railroad cars. Usually, loading is done using gravity feeding through plastic or fabric sleeves. Bulk loading of fine material is a source of particulate emissions, because dust laden air is forced out of the truck or railcar during loading. Subpart OOO defines an enclosed truck or railcar loading station as that portion of a nonmetallic mineral processing plant where “nonmetallic minerals are loaded by an enclosed conveying system into enclosed trucks or railcars.” Thus, the system conveying the material into the truck or railcar must also be enclosed. To determine the end of the enclosed conveying system, the Inspector should trace the system from the point the material is loaded into the truck or railcar, backwards to the first transfer point. Any particulate matter emissions between these two transfer points are emissions from the enclosed conveying system. Finally, the definition of enclosed truck or railcar loading station states that the truck or railcar be enclosed. Enclosed can mean using a hood or cover that is part of or attached to the truck or railcar and allows for loading of material and displacement of air.

c. Exempt Plants

i. Exempted by Plant Type and Size

Certain nonmetallic mineral processing plants are exempt from this regulation, because the U.S. Environmental Protection Agency (“U.S. EPA”) determined that due to the size and type of the facility any emission reductions might be unreasonably costly for the environmental benefit received. The size is determined by the capacity of the plant. Capacity is defined as the total of all the rated capacities of all the initial crushers that are part of the plant.[8] If an operator claims a plant is exempt, the operator must be able to demonstrate that the capacity allows for such an exemption. The Inspector should request calculation sheets that demonstrate the rated capacity (the manufacturer rates the capacity) of each crusher, initial or primary, added together is equal to or less than the required capacity. The following types of plants are exempt from this regulation if the operator can demonstrate the capacity is equal to or less than the capacity indicated:

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[8] 40 C.F.R. 60.671.

- fixed sand and gravel plants and crushed stone plants with capacities of twenty five (25) tons per hour (twenty three [23] megagrams per hour) or less ("fixed" plants, as defined in Subpart OOO, are very rare);

- portable sand and gravel plants and crushed stone plants with capacities of one hundred and fifty (150) tons per hour (one hundred and thirty six [136] megagrams per hour) or less; and

- common clay plants and pumice plants with capacities of ten (10) tons per hour (nine [9] megagrams per hour) or less.

A facility is considered "portable" if it is mounted on a movable chassis or skid and it is not attached to any anchor slab or structure by any means other than electric cabling. An Inspector should ask the operator whether the source is portable and then visually verify whether this is true.

ii. Facilities Exempted Because Replaced by Facilities of Equal or Smaller Size

Subpart OOO also exempts certain facilities that are replaced with like facilities of the same or smaller size.[9] Size means the manufacturer's highest rated capacity of the facility in tons per hour for the following facilities: crushers, grinding mills, bucket elevators, bagging operations, and enclosed truck or railcar loading stations. To ensure that the replacement equipment is actually of equal or smaller size, the manufacturer's highest rated capacity of both the existing equipment and the replacement equipment should be based on the same operating criteria. For example, the size of an existing crusher may be based on the crusher "efficiency index number" methods and the size of the replacement crusher should be measured using the same index. If a facility is exempt under this exception, the operator is only exempt from the following requirements: particulate matter standard; wet scrubber monitoring of operations; and performance test. The operator must submit to the Division certain information about the existing facility being replaced and the replacement piece of equipment.[10]

However, if the entire production line is replaced with equipment of equal or smaller size, the exemption does not apply.[11] "Production line" means all affected facilities that are directly connected together by a conveying system.[12] The Inspector should be aware of whether the Air Pollution Control Division ("Division") or U.S. EPA has approved any claimed exemptions. If

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[9] 40 C.F.R. 60.670(d)(1) (as amended June 9, 1997). This "replacement" exemption does not apply to a replacement facility that is already subject to Subpart OOO (i.e., facilities with a startup date after 1983).

[10] 40 C.F.R. 60.670(d)(2).

[11] 40 C.F.R. 60.670(d)(3).

[12] 40 C.F.R. 60.671.

the Inspector does not know if the Division or U.S. EPA has approved the exemption of the particular piece of equipment, the Inspector should notify the Division as soon as possible.

d. Nonmetallic Mineral Processing Facilities Subject to Other New Source Performance Standard Regulations

There are two types of facilities that meet the requirements of Subpart OOO, but are subject to the NSPS regulations Subpart F or Subpart I. However, at these types of facilities, the nonmetallic mineral processing regulation Subpart OOO does apply to affected facilities that precede equipment covered by Subpart F or Subpart I. For example, onsite crushing operations at asphalt concrete plants will be subject to Subpart OOO. Once the crushed stone is entered as a raw material into the asphalt concrete process, equipment for handling it is covered under Subpart I.

Portland cement plants are subject to 40 C.F.R. Part 60, Subpart F, Standards of Performance for Portland Cement Plants. A portland cement plant is any plant that manufactures portland cement by either a wet or dry process.[13] An Inspector must determine prior to the inspection whether the source is a portland cement plant or has a portland cement plant at the facility. If the only nonmetallic mineral processing plant is a portland cement plant, this Chapter 1.0 and related checklists do not apply to that source. If the facility includes a portland cement plant and a nonmetallic mineral processing plant that is not a portland cement plant, then this Chapter 1.0 and related checklists may apply only to the latter plant.

Hot mix asphalt facilities are subject to 40 C.F.R. Part 60, Subpart I, Standards of Performance for Hot Mix Asphalt Facilities. A hot mix asphalt facility is a facility that manufactures hot mix asphalt by heating and drying aggregate and mixing it with asphalt cements.[14] An Inspector must determine prior to the inspection whether the source is a hot mix asphalt facility or has a hot mix asphalt facility at the site. If the only nonmetallic mineral processing plant is a hot mix asphalt facility, this Chapter 1.0 and related checklists do not apply to that source. If the facility includes a hot mix asphalt facility and a nonmetallic mineral processing plant that is not a hot mix asphalt facility, then this Chapter 1.0 and related checklists apply only to the latter plant.

2. Categories of Sources

Federal regulation of air pollutants is based on differentiating between types of sources. There are new facilities, modified facilities, reconstructed facilities, and existing facilities. Whether a source is new, modified, reconstructed, or existing determines whether the operator must be in compliance with Subpart OOO and which requirements apply. New, modified, and reconstructed sources must comply with applicable NSPS regulations. Existing sources are not required to comply unless reconstruction or modification occurs that makes the existing source subject to the NSPS regulation.

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[13] 40 C.F.R. 60.61.

[14] 40 C.F.R. 60.91(a).

a. New Facility

A new facility is a source for which construction commenced after U.S. EPA first proposed a relevant emission standard. "Commenced" means that an operator has undertaken a continuous program of construction, reconstruction, or modification or has entered into a contractual obligation to undertake and complete such a program.[15] "Construction" also has a particular meaning. U.S. EPA defined it as the fabrication, erection, or installation of an affected facility.[16] Therefore, for nonmetallic metal processing facilities, a new source is a facility at which construction was commenced after August 31, 1983. For example, a crusher manufactured after August 31, 1983 is an affected facility. However, if it was manufactured before August 31, 1983, but erected or installed after this date it would not be an affected facility.

b. Modified Facility

A modified facility is one where there is a physical change in an existing facility or a change in the method of operation of an existing facility after U.S. EPA first proposed a relevant emission standard (August 31, 1983).[17] An addition of an affected facility to an existing plant as an expansion to that plant or a replacement for an existing facility by an affected facility, will not, by itself, make Subpart OOO applicable to any other facility within that source. To be considered a modification, the change must result in an increase in the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by the facility. In addition to or instead of an increase in emissions of an air pollutant, a modification has occurred if the change results in the emission of any air pollutant (to which a standard applies) that was not previously emitted. There are changes to a facility that alone are not considered modifications. Such changes include: 1) routine maintenance, repair, and replacement; 2) an increase in production rate without a capital expenditure on a facility unless previously limited by a federally enforceable limitation; 3) an increase in the hours of operation unless previously limited by a federally enforceable limitation; 4) use of alternative raw materials if the facility was designed to accommodate them before August 31, 1983; 5) the addition or use of an air pollution control device; and 6) relocation or change in ownership.[18]

The following are two examples of modified sources.

- A gravel processing plant constructed in 1979 is operating that currently emits particulate matter. The operator changes an existing crusher on May 5, 1990. As a result, there is an increase of emission of particulate matter into the atmosphere. The crushing plant emitted particulate matter before the change occurred to the crushing plant. Thus, a

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[15] 40 C.F.R. 60.2.

[16] 40 C.F.R. 60.2.

[17] 40 C.F.R. 60.2.

[18] 40 C.F.R. 60.14(e).

modification occurred, because there was an increase of the air pollutant particulate matter into the atmosphere.

c. Reconstructed Facility

Reconstruction of an existing facility, means the replacement of components to such an extent that the fixed capital cost of the new components exceeds fifty percent (50%) of the fixed capital cost to construct a comparable new facility, and it is technologically and economically feasible for the operator to meet the standards. The affected facility is the individual piece of equipment, not the entire plant. There are specific requirements as to what can be used to calculate the fixed capital costs. In addition, Subpart OOO distinguishes routine maintenance, repair, and maintenance from reconstruction. Finally, reconstruction can also occur if there is a continuous program of component replacement. The Inspector does not need to be familiar with the details of these issues. However, if the operator replaced components of a new facility and is claiming that facility was not reconstructed and thus is not subject to Subpart OOO, the Inspector must notify the Division and supply the Division with the necessary information.

d. Existing Facility

An existing facility is a nonmetallic metal processing plant that was constructed and last modified on or before August 31, 1983 (date U.S. EPA proposed the standard).

3. Air Pollution Control Devices

a. Emission Controls for Crushers and Grinding Mills

Generally, one or both of the following techniques are used to control emissions from crushers and grinding mills: 1) wet dust suppression; and 2) dust collection by a capture and conveying system to a control device.

Wet dust suppression consists of introducing water or water with a chemical dust suppressant into the material flow, causing the fine particulate matter to stay with the material flow rather than become airborne. It usually involves water sprays both above and below the crusher throat that prevent emissions by keeping the material moist during crushing. Enough moisture must be added to keep the ore surfaces wet as the material is reduced. The water spray nozzles above the crusher throat may be positioned close to the receiving end of the throat or above the throat to suppress the dust. A wide spray pattern helps to reduce truck dump emissions as well as emissions from the crusher throat. However, emissions from truck dumping of material into a crusher, grinding mill, screening operation, or feed hopper are exempt from Subpart OOO.

Spray nozzles below the throat suppress dust generated by breaking the material. Figure 2-12 shows a typical arrangement for the control of emissions at the crusher discharge. If an operator uses plain or untreated water, additional water (five to eight percent) may be required to adequately suppress the dust, because of its unusually high surface tension. However, in some processes the excess moisture may cause downstream screen blinding or coat the minerals resulting in a product that does not meet the necessary specifications. To counteract this effect, small quantities of wetting agents or surfactants may be added to the water to reduce its surface tension and improve the wetting efficiency.

Dust collection involves hooding and enclosing dust-producing emission points and exhausting emissions to a collection device. (See Figure 2-13 for a typical hood configuration.) Hooding and air volume requirements for the control of crusher and grinding emissions are quite variable depending upon the size and shape of the emission source, the position of the hood relative to points of emission, and the velocity, nature, and quantity of the released particles. The only established criterion is that a minimum indraft velocity of sixty one (61) meters per minute (two hundred [200] feet per minute) be maintained through all open hood areas. To effectively control emissions, ventilation should be applied at both the upper portion (feed end) of the equipment and at the discharge point. An exception to this would be at primary jaw or gyratory crushers, because the operator needs to have ready access to dislodge large rocks that may get stuck in the crusher feed opening. Where access to a device is required for maintenance, removable hood sections may be used. In general, the upper portion of the crusher or grinder should be enclosed as completely as possible. For either impact crushers or compression type crushers, pick-up should be applied downstream of the crusher for a distance of at least 3.5 times the width of the receiving conveyor.

Grinding or milling circuits that use air conveying systems, operate at slightly negative pressure to prevent the escape of air containing dust. Some air is drawn into the system and must be vented, because the system is not airtight. This vent stream can be controlled by discharging it through a control device.

b. Emission Controls for Screening Operations

Dust is emitted from screening operations as a result of moving the dry material. The level of uncontrolled emissions depends upon the quantity of fine particles contained in the material, moisture content of the material, and type of screening equipment. Usually dry screening of fine particles produces higher emissions than the screening of larger materials. Also, screens moving at higher speeds, force, and frequency emit more dust than those operated at smaller speeds, force, and frequencies. As with crushers and grinding mills, particulate matter emission control may be accomplished by either wet dust suppression or by dust collection and conveyance to a control device. A full coverage hood, as depicted in Figure 2-14, is used to control emissions generated at the screening surfaces.

c. Emission Controls for Storage Bins

The amount of uncontrolled particulate matter emissions generated when a storage bin is being loaded is dependent upon the material size, loading rate, moisture content, and the charging (loading) mechanism used. Top loading of a storage bin involving free-falling material is expected to generate the greatest emissions. The control devices most often used on storage bins are fabric dust collectors (baghouse) or air pollution control cyclones. The baghouse may be positioned atop the storage bin or may be positioned some distance away. If a cyclone is used, however, it is positioned above the bin loading port. Cyclones with low circumference to height ratios are designed as air separators and are not efficient in reducing fine particulate matter emissions.

d. Emission Controls for Bucket Elevators

Particulate matter emissions generated by bucket elevators are dependent upon the particle size, distribution of the material, freefall distance, moisture content, and speed of the elevator belt or chain. The emission control is applied at the top of the elevator at the point the bucket is emptied of the material. One control captures the dust and a conveying system brings the dust to a control device, usually a baghouse. The angle that the capture system duct enters into the elevator is important to avoid duct pluggage. This angle should be above or below perpendicular to the elevator. The fan draft coming off of the capture system should be enough to capture the fine material within the enclosure.

e. Emission Controls for Belt Conveyor Transfer Points

Particulate matter emissions from belt conveyor transfer points are dependent on the particle size, distribution of the material conveyed, moisture content, belt speed, wind speed, and free-fall distance. The emission control method most often used in Colorado is water sprays. Fugitive emissions are possible from the return portion of the belt if the material is not completely emptied and sticks to the belt surface. Belt cleaning is usually done immediately below the head pulley by scrapers, brushes, or vibrators. Where there are transfer points between two belts, the operator should have hoods designed to enclose both the head pulley of the upper belt and the tail pulley of the lower belt. With careful design, the open area can be reduced to approximately 0.15 square meters per meter (0.5 square feet per foot) of belt width. Factors affecting the air volume that will be exhausted include the conveyor belt speed and the free-fall distance of the material.

If there is a belt-to-belt transfer of material with less than a 0.91 meter (three foot) fall, the enclosure illustrated in Figure 2-15 is often used. If there is a belt-to-belt transfer of material with greater than a 0.91 meter (three foot) fall and for chute to belt transfers, something similar to Figure 2-16 is often used. The exhaust connection should be made as far downstream as possible to maximize dust fallout and thus minimize unnecessary dust entrainment. If the material has a high percentage of fine material, additional exhaust air may be required at the tail pulley of the belt receiving the material. Belt or chute-to-bin transfer points differ from the other transfer operations, because there is no open area downstream of the point of transfer. Thus, emissions occur only at the loading point. (See Figure 2-17.)

f. Emission Controls for Bagging Operations

Bagging operations are controlled by local exhaust systems and vented to a baghouse for product recovery. Hood face velocities around one hundred and fifty (150) meters per minute (492 feet per minute) should be used. Figure 2-18 shows an automatic bag filling operation and vent system. If the baghouse serves other process equipment that may not be subject to this regulation, the baghouse emissions will still be subject to Subpart OOO particulate emission standards unless the other process equipment is covered by another NSPS standard.

g. Emission Controls for Enclosed Truck or Railcar Loading Stations

Particulate emissions from enclosed truck or railcar loading of coarse material can be minimized by eliminating any breaks in the enclosed system. Shrouds, telescoping feed tubes, and windbreaks can further reduce the fugitive emissions from this intermittent source. Particulate emissions from loading of fine material into either trucks or railroad cars can be controlled by an exhaust system vented to a baghouse. The material is fed through one of the vehicle's openings and the exhaust connection is usually at another opening. The system should be designed with a minimum amount of open area around the periphery of the feed chute and the exhaust duct.

4. Requirements for Affected Facilities

The Inspector will need to be familiar with the applicable Subpart OOO requirements for the plant. The general requirements for permits, performance tests, emission limits, reporting, and recordkeeping are usually the same for each type of facility at a nonmetallic mineral processing plant. The test methods used and the locations at which the emission tests should be made can differ. Thus, the following are descriptions of the general requirements and details of the specific requirements for facilities at a nonmetallic mineral processing plant.

a. Construction and Operating Permits

An operator must obtain a construction permit unless the source commenced construction or operation before February 1, 1972. Certain sources are exempt from obtaining a construction permit as per the Air Quality Control Commission's Regulation No. 3, Part B. The Inspector must review the construction permit prior to the inspection to determine the requirements the operator must meet and, in the alternative, the Inspector must know whether the source is required to obtain a permit in the absence of a permit.

Nonmetallic mineral processing facilities that are major sources are required to obtain a Title V Operating Permit.[19] A nonmetallic mineral processing plant is a major source if it emits or has the potential to emit one hundred (100) tons per year or more of particulate matter.[20] Controlled fugitive emissions are considered in determining whether a source is a major source. However, uncontrolled fugitive emissions are not considered. The Inspector must review the operating permit prior to the inspection to determine the requirements the operator must meet.

b. State Requirements for Existing Sources

Subpart OOO does not regulate "existing sources" which are sources at nonmetallic mineral processing plants constructed or modified prior to August 31, 1983. The Air Quality Control Commission's ("AQCC's") Regulation Number 1 for particulate matter emissions do include existing sources and sources that do not have permits. The operator of an existing source

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[19] AQCC Regulation No. 3 Part C Section II.A.1.b.

[20] AQCC Regulation No. 3 Part A Section I.B.59.(b).

must use control measures and operating procedures as determined by the Division and included in the facility's permit.[21]

c. Performance Test

An operator must conduct a performance test with notice to the Division, at a certain time, and in a certain manner for fugitive emissions from stacks. However, generally there are no stacks at nonmetallic mineral processing plants. If there is a stack, the results of the test will establish whether the source is in compliance with the emission standards set forth by Subpart OOO. The operator must provide notice to the Division at least thirty (30) days prior to the performance of the initial test. This allows the Division to have an observer present for the testing.

A performance test must be performed within sixty (60) days after reaching the maximum production rate at which the facility will be operated, but no later than one hundred and eighty (180) days after the initial startup of the facility.[22] The maximum production rate at which the affected facility will be operated is the maximum achievable capacity based upon the representative performance of the affected facility. To apply this concept to an individual piece of operating equipment, the maximum production rate is the maximum process rate at which the individual piece of equipment is expected to operate considering maximum plant capacity. This rate may or may not be the same as the manufacturer's rated capacity. "Startup" means the first time the affected facility is operated for any reason.[23] This includes short process runs of raw material to determine the product quality or specification in addition to a full production run.

In conducting the tests, the operator can use the general test methods U.S. EPA has developed for all NSPSs. These requirements include notification requirements, initial performance test requirements, test methods and exceptions, requirements for operating conditions during testing, and sampling facility requirements.[24] The operator must run three (3) test runs, and compliance is based on the average of the three test runs. An Inspector may choose to be present during the initial performance test. However, the Inspector's primary responsibility is to ensure that the test was completed and results are forwarded to the Division.

[21] AQCC Regulation No. 1 Section III.D.1.a.(i).

[22] 40 C.F.R. 60.8(a).

[23] 40 C.F.R. 60.2 definition "Startup."

[24] 40 C.F.R. Part 60 Appendix A.

d. Emission Standards

On and after the date of the performance test, the operator must ensure that all transfer points on belt conveyors and all other affected facilities have stack emissions within certain levels.[25] The stack particulate matter standard is in the form of a concentration. Specifically, no operator can allow particulate emissions to be discharged from any emission point at a rate greater than 0.05 g/dscm.[26] Unless a wet scrubbing control device is used, an opacity limit of seven percent (7%) is also applicable.[27] These standards also apply to emissions from multiple storage bins with combined stack emissions.[28] If a wet scrubber control device is used, other measurements of compliance are used involving monitoring of the scrubber pressure drop and scrubbing liquid flow rate, instead of using an opacity standard.

Sixty (60) to one hundred and eighty (180) days or more after achieving the maximum production rate that the facility will operate at, the operator must ensure that:

1) no visible emissions may be discharged into the atmosphere from any wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to the next crusher, grinding mill, or storage bin;[29] and
2) screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations where such screening operations, bucket elevators, and belt conveyors process saturated materials up to the first crusher, grinding mill, or storage bin in the production line.[30]

There is a separate standard for fugitive emissions. Sixty (60) days or more after achieving the maximum production rate that the facility will operate at, the operator must meet an opacity standard of ten percent (10%).[31] There are three exceptions to this ten percent (10%) opacity standard.

First, if the operator uses a crusher without a capture system, the operator cannot allow fugitive emissions greater than fifteen percent (15%) opacity.[32] The Inspector ought to be aware

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[25] 40 C.F.R. 60.672(a). This, of course, applies only to plants that collect their emissions and vent them to a stack. This is, to date, a rare occurrence in Colorado.

[26] 40 C.F.R. 60.672(a)(1).

[27] 40 C.F.R. 60.672(a)(2).

[28] 40 C.F.R. 60.672(g), as amended June 9, 1997.

[29] 40 C.F.R. 60.672(h)(1), as amended June 9, 1997.

[30] 40 C.F.R. 60.672(h)(2), as amended June 9, 1997.

[31] Note that the twenty percent (20%) opacity standard set forth in Regulation No. 1, Section II., applies to all operations not otherwise specifically subject to the opacity requirements of Subpart OOO.

[32] 40 C.F.R. 60.672(c).

of which machines are used as crushers and which are grinders for the purposes of this exception. As a guide, grinding mills generally reduce the feed material to a forty (40) mesh or less.

Second, truck dumping of nonmetallic minerals into any screening operation, feed hopper, or crusher is exempt from these particulate matter and fugitive emission opacity standards.[33] The Inspector must, during opacity compliance determinations, separate emissions from the affected facility from those of any truck dumping operation. If the emissions cannot be separated during a Method 9 compliance test, the Inspector need not interrupt the process of recording opacity observations, but should note which observations occurred during the truck dumping. When determining average opacity, observations during these events cannot be used in any twenty four (24) observation (six minute) set.

The third exception concerns facilities enclosed in a building. If the affected facility is enclosed in a building, the operator has two standards to choose from. The operator may choose to follow the general standards (0.05 g/dscm particulate matter stack emissions and ten percent opacity or fifteen percent opacity) or a second set of standards. This second set of standards means the operator of an affected facility in an enclosed building may:

- not cause any fugitive emissions to be discharged except from a vent; and
- not cause any discharges from any vent of any building that encloses a conveyor belt transfer point or any other affected facility emission of stack emissions which contain particulate matter in excess of 0.05 g/dscm or exhibit greater than seven percent (7%) opacity, unless a wet scrubber is used.

For the second part of this standard, if a wet scrubber is used, the operator need only comply with the reporting provisions of Subpart OOO.

Finally, sixty (60) to one hundred and eighty (180) days or more after achieving the maximum production rate that the facility will operate at, the operator must meet an opacity standard of seven percent (7%) from any baghouse that controls emissions from an individual, enclosed storage bin.[34]

While this regulation states that the emission standards take effect on and after the date on which the performance test(s) is completed, an operator still must maintain and operate, at all times, any affected facility and associated control equipment "in a manner consistent with good air pollution control practice for minimizing emissions."[35]

e. Test Methods

Subpart OOO sets forth how the operator must determine whether a facility is in compliance with the standards developed using the procedures defined by U.S. EPA.[36] The

[33] 40 C.F.R. 60.672(d).

[34] 40 C.F.R. 60.672(f), as amended June 7, 1997.

[35] 40 C.F.R. 60.11(d).

[36] 40 C.F.R. 60.675.

following identifies the applicable test method(s) and identifies any special instructions or conditions that must be followed (i.e., sampling rates, volumes, or temperatures) for stack testing and fugitive emission testing. If there is a delay in conducting any rescheduled performance test required by Subpart OOO after thirty (30) days notice, the operator shall submit a notice to the Division at least seven (7) days prior to any rescheduled performance test.[37]

i. Test Method for Stack Emissions[38]

As mentioned above, stacks are not often found at a nonmetallic mineral processing plant. If a stack is being used, the following test methods must be followed. First, Method 5 or Method 17 will be used to determine the particulate matter concentration during stack testing. The sample volume must be at least 1.70 dscm (sixty [60] dscf). Under Method 5, if the gas stream being sampled is at ambient temperature, the sampling probe and filter may be operated without heaters. If the gas stream is above ambient temperatures, the sampling probe and filter may be operated at a temperature high enough, but no higher than one hundred and one degrees Celsius (121°C) (two hundred and forty nine degrees Fahrenheit [249°F]). This prevents water condensation on the filter. Second, Method 9 must be used to determine compliance with opacity standards and the following procedures must be followed:

- initial compliance is determined using a minimum total time of observation for each affected facility of three (3) hours (thirty-six minute averages) (unless alternative method approved or requirement waived by Division or U.S. EPA);

- opacity compliance determination must be made at the same time the performance (stack test) occurs, unless:
  - -- no performance test is required, or
  - -- visibility or other conditions prevent concurrent observations.[39]

The Inspector need only ensure that the operator is conducting the test and sending the results to the Division.

At a grinding mill, emissions can be vented through an air pollution control device to a stack. If facilities at a grinding mill are vented to the same air pollution control equipment and stack as nonaffected facilities, the emission point is subject to this Subpart OOO. In such cases, testing of the stack emissions should be conducted while the nonaffected facilities are not operating. However, a dryer cannot usually be shut down during a performance test. Instead, U.S. EPA allows the operator to prorate the emissions between the dryer and grinding mill. The equation used is detailed in Addendum A.

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[37] 40 C.F.R. 60.675(g), as amended June 7, 1997.

[38] 40 C.F.R. 60.675(b).

[39] 40 C.F.R. 60.675(b).

ii. Test Method for Fugitive Emissions[40]

Method 9 must be used to determine compliance with opacity standards. It should be noted that U.S. EPA policy allows no measurement error allowance in conducting a Method 9 test. In administering Method 9, the following procedures must be followed:

- initial compliance is determined using a minimum total time of observation for each affected facility of three (3) hours (thirty-six minute averages) (unless alternative method approved or requirement waived by Division or U.S. EPA);

- opacity compliance determination must be made at the same time the performance (stack test) occurs, unless:
    - -- no performance test is required, or
    - -- visibility or other conditions prevent concurrent observations.[41]

The Inspector is not required to do a full Method 9 measurement during an inspection. Instead, U.S. EPA developed the following guidelines that may be used for performing Method 9 observations during an inspection. If it is a continuous operating and emitting sources the minimum observation time using Method 9 should be eighteen (18) minutes (three six-minute observation sets). If it is an intermittent operating and emitting source, the minimum observation is at least two (2) or three (3) cycles of operation. The observations should end at the end of the process cycle and be noted on the visible emission observation form. Observations should continue when the next cycle begins and at least two six-minute observation sets should be recorded.

There are four other requirements when measuring fugitive emissions. First, the minimum distance between the observer and the emission source must be 4.57 meters (fifteen [15] feet). Second, the observer shall, when possible, select a position that minimizes interference from other fugitive emission sources (e.g., road dust). Third, the observer must stand in the required observer position relative to the sun (observer to sun angle sector of 140°). Finally, if an operator uses a wet dust suppression for particulate matter control, a visible mist can be generated by the spray. This mist is not particulate matter emissions and is not considered visible emissions. If such water mist is present, the observation of emissions must be made at a point in the plume where the mist is no longer visible. Sometimes a wet suppression system may be activated intermittently. In such situations, there are two options available. First, the observer can choose a point in the plume beyond which the water mist disappears. Second, the observer can choose the point in the plume of greatest opacity when the wet dust suppression system is not being operated and begin the Method 9 observations. When the wet dust suppression system is operated, the observer should continue to record opacity, but note all such observations on the data sheet. Later, the observer should eliminate any such observations from any twenty four-observation (six [6] minute) set.

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[40] 40 C.F.R. 60.675(c).

[41] 40 C.F.R. 60.675(c).

The duration of the Method 9 observations when determining compliance with the fugitive emissions standard may be reduced from three (3) hours to one (1) hour if the following conditions apply:

1) there are no individual readings greater than ten percent (10%) opacity; and
2) there are no more than three (3) readings of ten percent (10%) for the one-hour period.[42]

At a baghouse that controls emissions from an individual enclosed storage bin, the duration of the Method 9 observations shall be one (1) hour (ten [10] 6-minute averages).[43]

At a crusher, the Inspector must take observations at the crusher inlet, crusher outlet, and crusher discharge onto a belt conveyor. Thus, the emissions from the crusher discharge onto a belt conveyor should not be considered when the Inspector measures emissions from the belt conveyor. Thus, emissions at the crusher inlet and outlet are limited to fifteen percent (15%) opacity. The crusher discharge emissions onto a belt conveyor are limited to ten percent (10%) opacity. The Inspector must take care to separate fugitive emission opacity from water mists generated by any wet suppression systems the operator is using. Also, the Inspector must exercise caution when observing crusher emissions, because ore fragments may be violently thrown from the crusher. This is especially a concern at the crusher feed inlet and where mobile equipment is hauling ore to or from the crusher.

At any crusher at which a capture system is not used, the duration of a Method 9 observations may be reduced from three (3) hours to one (1) hour only if the following conditions apply:

1) there are no individual readings greater than ten percent (10%) opacity; and
2) there are no more than three (3) readings of ten percent (10%) for the one-hour period.[44]

At a grinding mill, fugitive emissions are generated at the inlet and outlet of the grinder. A majority of the emissions are found at the outlet. The Inspector should also inspect the air conveying system, air separator, and air classifier, because these units are included in the definition of grinding mill. If facilities at a grinding mill are vented to the same air pollution control equipment and stack as nonaffected facilities, the emission point is subject to this Subpart OOO. In such cases, testing of the stack emissions should be conducted while the nonaffected facilities are not operating. However, a dryer cannot usually be shut down during a performance test. Instead, U.S. EPA allows the operator to prorate the emissions between the dryer and grinding mill. The equation used is detailed in Addendum A.

Screening operations may be controlled for fugitive emission by wet suppression systems or with hooded capture systems. Opacity observations should be made at the point of maximum opacity in the plume. Hooded screens should be checked for signs of ill-fitting seals or gaps in hood integrity. If the screen is not operating during the inspection, the Inspector should observe the immediate area of the screen for signs of excess emissions during operation. Excessive dust

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[42] 40 C.F.R. 60.675(c)(3), as amended June 9, 1997.

[43] 40 C.F.R. 60.675(c)(2), as amended June 9, 1997.

[44] 40 C.F.R. 60.675(c)(3), as amended June 9, 1997.

buildup may indicate that the nonoperating affected facility should be reinspected when operating.

Storage bins are vented during loading or unloading which causes emissions. The vents may be controlled or uncontrolled. Typical controls are cyclones, baghouses, or wet suppression. The Inspector should observe the vent discharge points during at least one cycle (loading or unloading). In addition, the Inspector should observe the area around the vent. Look for whether dust has accumulated.

Bucket elevators usually have a capture system at the top of the elevator where the bucket discharges the material. Often fugitive dust is sent to a baghouse. The Inspector should observe the entire length of the elevator enclosure. Emissions most often occur at the capture system atop the elevator or at the access door(s) to the elevator.

For belt conveyors, opacity measurements must be done at the transfer points to and from the belt conveyor and during operation of the conveyor. However, if the transfer point is to a storage pile, then no opacity observation is required. The common control methods used are wet suppression, hooding, capture, and conveying to a control device. Inspectors must be aware, that if the moisture content of the material on the conveyor is sufficient to prevent material from becoming airborne, opacity observations can be waived. Belt conveyor transfer points after process drying are more likely to result in visible emissions and are typically controlled with a hooded capture system.

Most bagging operations are enclosed in buildings. Thus, the Inspector must do Method 22 observations and if the Method 22 observations are positive for visible emissions, the Inspector must perform Method 9 observations inside the building. If powered vents are used, the Inspector should also do Method 9 observations of these vents.

Enclosed truck or railcar loading operations are intermittent operations and the Inspector must take a visible emissions observations during at least one cycle of operation. Again, the enclosed truck or railcar loading operation includes the conveying system and the truck or railcar. A nonenclosed truck loading station is not subject to Subpart OOO. The Inspector should take measurements immediately above the transfer point to the truck or railcar.

Initial Method 9 performance tests are not required under Subpart OOO for the following:

1) wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to, but not including the next crusher, grinding mill, or storage bin; and
2) screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations, that process saturated materials up to the first crusher, grinding mill, or storage bin in the production line.[45]

iii. Determining the Presence of Fugitive Emissions from Buildings[46]

As mentioned in Section 1.4.4.3 of this Chapter 1.0, there are different requirements if the affected facility is enclosed in a building. The following describes the applicable test methods and any other requirements to determine fugitive emissions from a building. The operator must

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[45] 40 C.F.R. 60.675(h), as amended June 9, 1997.

[46] 40 C.F.R. 60.675(d).

use Method 22 to determine fugitive emissions from a building. The performance test must be performed while all the affected facilities inside the building are operating. The performance test for each building shall be at least seventy five (75) minutes in duration. Each side of the building and the roof must be observed for at least fifteen (15) minutes.

The Inspector is not required to duplicate the performance test during an inspection. Instead, U.S. EPA has developed acceptable guidelines that an Inspector can utilize. If it is a continuous operating and emitting source, the minimum observation time using Method 22 should be twenty (20) minutes (five minutes per side and top). The minimum observation for intermittent operating and emitting sources is at least two (2) or three (3) cycles of operation. The observations should end at the end of the process cycle and be noted on the visible emission observation form. Then the observations should continue when the next cycle begins and at least two (2) six-minute observation sets should be recorded.

After the Inspector has determined using Method 22 that fugitive emissions are emitted from the building, there are certain allowable changes to the procedures used to apply Method 9 inside the building. First, the observer should assume a position at least 4.57 meters (fifteen [15] feet) from the source of emissions. Second, without the proper sunlight, the observer should use portable directional lights positioned within the one hundred and forty degrees (140°) sector to the observer's back. Finally, if the background color is sufficiently similar to the emission color, artificial backgrounds are permissible to promote color and contrast.

If the Inspector cannot access the inside of an affected building, the Inspector must first use the above described Method 22 to determine whether there are fugitive emissions. After a positive Method 22 reading, the Inspector can perform a Method 9 test on the entire building.

iv. Approved Alternative Test Methods for Fugitive Emissions

If emissions from two or more facilities continuously mix or combine together so that the opacity of fugitive emissions from an individual facility cannot be read, the operator can use one of two alternative test procedures. First, the operator can determine the highest fugitive opacity standard applicable to one of the individual facilities and use it as the standard for the combined emission stream.[47] The highest fugitive opacity standard must be Federally enforceable. Also, Method 9 opacity observations must use the point of highest opacity whether it is from a single or combined plume. Second, the operator can separate the emissions so that the opacity of emissions from each individual facility can be read.[48] Emissions can be separated by constructing a physical barrier or by shutting down the facility that is interfering. This can be done as long as the maximum achievable production rate (capacity) of the facility being tested is not affected and shutting down the interfering facility does not cause operational problems.

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[47] 40 C.F.R. 60.675(e)(1)(i).

[48] 40 C.F.R. 60.675(e)(1)(ii).

f. Monitoring Requirements for a Wet Scrubber

The principle operation of a wet scrubbing device involves contacting dust particles with liquid droplets in some way and then having the wetted and unwetted particles impinge upon a collecting surface where they can be separated and removed. The most common types of wet scrubbers are: wet cyclones, mechanical, spray, self-induced spray, and venturi scrubbers.

An operator must comply with the following monitoring requirements if the operator uses a wet scrubber to control emissions. First, the operator must install, calibrate, maintain, and operate a device for continuous measurements of the pressure loss of the gas stream as it passes through the scrubber. The manufacturer must have certified the monitoring device to be accurate at ± two hundred and fifty (250) pascals ± inch water gauge pressure. The operator must annually calibrate the monitoring device according to the manufacturer's instructions. Second, the operator must install, calibrate, maintain, and operate a device to continuously measure the scrubbing liquid flow rate to the wet scrubber. The manufacturer must certify that the monitoring device is accurate within ± five percent (5%) of the design scrubbing liquid flow rate to the wet scrubber. Finally, the operator must calibrate the monitoring device on an annual basis in accordance with the manufacturer's instructions.

The operator must record daily any changes in scrubber pressure drop and scrubbing liquid flow rate. Pressure drop and liquid flow rate must be monitored using the equipment described above. These measurements must also be recorded during each run of a performance test and included in the applicable reports (see Section 1.4.6 of this Chapter 1.0).

An operator need not comply with the opacity requirements if a wet scrubber is used on an affected source. Instead, the operator must install, calibrate, and record the pressure drop across the scrubber and install, calibrate, and record the flow rate of the scrubbing liquid. These surrogate indicators of scrubber performance can be used to isolate common performance problems, including throat wear, pluggage, decreased liquid to gas ratio, and decreased pressured drop.

g. Reporting and Recordkeeping

There are different reporting and recordkeeping requirements for different types of sources. The operator of an affected facility must submit a report containing the results of all performance tests conducted to demonstrate compliance with the standards in Subpart OOO.[49] This includes reports of opacity observations made using Method 9 and reports of observations using Method 22. Such reports are due within sixty (60) days after achieving maximum production rate at which the facility will be operated, but no later than one hundred and eighty (180) days after initial startup.

Sources subject to Subpart OOO are not required to provide notice to the Division of the initial startup of an affected facility pursuant to Subpart OOO, but are required to obtain the necessary construction permits and send in any relocation notices to the Division.[50] Sources

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[49] 40 C.F.R. 60.676(f), as amended June 9, 1997.

[50] 40 C.F.R. 60.676(h), as amended June 9, 1997.

subject to Subpart OOO must provide notification of the actual date of initial startup of each affected facility to the Division.[51] A single notification may be provided if a combination of affected facilities startup on the same day.

There are certain reporting requirements for an existing source that is replaced with an equal or smaller size replacement. Table 1.2 details these requirements. The information must be sent to the Division when a source requests an exemption for replacement of the existing facility with the facility of equal or smaller size. The information must be postmarked sixty (60) days or as soon as practicable before the change is commenced.[52] The information should also be sent to the Office of Air Quality Planning and Standards[53] where the information is used for the purpose of reviewing the standard.

If an operator uses a wet scrubber, an initial performance test must be performed.[54] During this test, the operator must record the measurements of the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate. After the initial performance test, the operator must submit semiannual reports to the Division detailing any occurrences when the scrubber pressure loss (or gain) and liquid flow rate differ by more than ± thirty percent (30%) from the average determined during the most recent performance test.[55] The operator must have some type of continuous recording equipment to identify these occurrences on a continuous basis. Noncontinuous recording of the data is not adequate. The semiannual wet scrubber reports must be postmarked within thirty (30) days following the end of the second and fourth calendar quarters.[56] It should be noted, that if a wet scrubber is used the purpose of the different measurement and reporting requirements is to substitute these parameters for the other indicators of opacity. Therefore, to avoid unnecessary reporting of occurrences due to instrument noise or other nonrepresentative factors, only occurrences of six (6) minutes or greater need to be reported.

Any screening operation, bucket elevator, or belt conveyor that processes saturated material and is subject to the no visible emission requirement in section 40 C.F.R. 60.672(h) and subsequently processes unsaturated materials shall submit a report of the change within thirty (30) days following such change.[57] The screening operation, bucket elevator, or belt conveyor is then subject to the ten percent (10%) opacity limit and the associated emission test requirements. If a screening operation, bucket elevator, or belt conveyor that processes unsaturated materials subsequently processes saturated material shall submit a report of this change to the Division

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[51] 40 C.F.R. 60.676(i), as amended June 9, 1997.

[52] 40 C.F.R. 60.7(a)(4).

[53] Send it to Office of Air Quality Planning and Standards, Emission Standards Division in Research Triangle Park, North Carolina.

[54] 40 C.F.R. 60.676(c).

[55] 40 C.F.R. 60.676(d).

[56] 40 C.F.R. 60.676(e).

[57] 40 C.F.R. 60.676(g), as amended June 9, 1997.

within thirty (30) days following such change and the processes are subject to the no visible emission limit.

The operator must maintain a permanent file of required notifications, reports, measurements, and records for review by the Division and U.S. EPA. This permanent file must be retained by the operator for at least two (2) years, but it can be retained off-site. The Inspector must request and verify these notifications and records. If the records are located off-site, the operator should make them available during the inspection. The Inspector can notify the operator prior to inspection, or if it is a unannounced inspection, the Inspector should request that the operator obtain the records for a specified date at a later time.

The Inspector should do a complete records check during the inspection, including reviewing the following records. The following written notifications to the Division must be reviewed:

- date of construction or reconstruction of any affected facility;[58]
- date of anticipated startup of any affected facility;[59]
- date of actual startup of any affected facility;[60]
- any physical or operational change to an existing facility which may increase the emissions rate of any air pollutant to which a standard applies, unless that change is specifically exempted.[61]

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[58] 40 C.F.R. 60.7(a)(1).

[59] 40 C.F.R. 60.7(a)(2).

[60] 40 C.F.R. 60.7(a)(3).

[61] 40 C.F.R. 60.14(e).

Table 1.2
Reporting and Recordkeeping Requirements for Existing Equipment Replaced with Equipment of Equal or Smaller Size

Each operator must submit to the Division the following information:	
Crusher, Grinding Mill, Bucket Elevator, Bagging Operation, and Enclosed Truck or Railcar Loading Station	
Existing Facility	1) rated capacity in tons per hour; 2) description of control device used to reduce particulate matter emissions; 3) list of all other equipment controlled by same control device as existing equipment; and 4) estimated age of facility.
Replacement Facility	1) rated capacity in tons per hour (tph).
Screening Operation	
Existing Facility	1) total surface area of top screen; 2) description of control device used to reduce particulate matter emissions; 3) list of all other equipment controlled by same control device as existing equipment; and 4) estimated age of facility.
Replacement Facility	1) rated capacity in tons per hour (tph).
Conveyor Belt	
Existing Facility	1) width of existing belt; 2) description of control device used to reduce particulate matter emissions; 3) list of all other equipment controlled by same control device as existing equipment; and 4) estimated age of facility.
Replacement Facility	1) width of replacement belt.
Storage Bin	
Existing Facility	1) rated capacity in tons of the existing storage bin; 2) description of control device used to reduce particulate matter emissions; 3) list of all other equipment controlled by same control device as existing equipment; and 4) estimated age of facility.
Replacement Facility	1) rated capacity in tons of the replacement storage bin.

- date that initial performance test opacity observations are anticipated;[62]
- reschedules date for initial performance test opacity observations if visibility or other conditions prevent opacity observations from being performed concurrently with the initial performance test.;[63]
- proposed “reconstructions” of or modifications to existing facilities;[64]
- thirty (30) day advance notification of any performance test of an affected facility;[65] and
- proposed replacements of existing facilities with facilities of equal or smaller size.[66]

The Inspector must review the following written reports to the Division:

- initial performance test results of all affected facilities;[67]
- initial performance test opacity results of all affected facilities;[68]
- the results of all performance tests of affected facilities to demonstrate compliance including opacity observations results (Method 9) and/or Method 22 observation results;[69]
- semiannual reports of occurrences when scrubber pressure drop and liquid flow rate differ from the average of the last performance test by ± thirty percent (30%) (see Addendum B for example form);[70] and
- fugitive particulate emission control plan.[71]

Finally, the Inspector must review the following records on file:

- startup, shutdown, and malfunction occurrences and their durations for all facilities;[72]
- malfunctions of air pollution control equipment serving affected facilities;[73]

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[62] 40 C.F.R. 60.7(a)(6).

[63] 40 C.F.R. 60.11(e)(1).

[64] 40 C.F.R. 60.15(d).

[65] 40 C.F.R. 60.8(d).

[66] 40 C.F.R. 60.676(a).

[67] 40 C.F.R. 60.8(a).

[68] 40 C.F.R. 60.11(e)(2).

[69] 40 C.F.R. 60.676(f).

[70] 40 C.F.R. 60.676(d).

[71] AQCC Regulation No. 1 Section III.D.1.b. & d.

[72] 40 C.F.R. 60.7(b).

[73] 40 C.F.R. 60.7(b).

- any periods during which continuous monitoring systems or monitoring devices (i.e., scrubber pressure drop and liquid flow rate measurement devices) are inoperative;[74]
- all measurements of monitoring devices, calibration checks, and all adjustments and maintenance performed on these devices including:
  i) daily continuous measurements of scrubber pressure drop and liquid flow rate, and
  ii) scrubber monitoring device annual calibration checks.[75]

5. Glossary of Terms

Affected facility: any facility at a nonmetallic mineral processing plant that must comply with this Subpart OOO.

Bagging operation: the operation by which bags are filled with minerals.

Ball mill: a type of grinding mill that consists of a drum containing steel, flint, or porcelain balls that is slowly rotated and as the stones are added to the drum, the balls hit the stones and break them into smaller sizes.

Belt conveyor: a device that moves the material from one place to another using a continuous belt that is carried on a series of idlers and routed around a pulley at each end.

Bucket elevator: a device that carries minerals up using buckets attached to a continuous single or double strand chain or belt.

Capacity: the cumulative rated capacity of all initial crushers at the plant.

Capture system: the equipment used to capture and transport particulate matter emissions to a control device; capture systems include enclosures, hoods, ducts, fans, and dampers.

Classifying: the method by which the operator separates the larger stones from the smaller stones; the classification is based upon the size of material the operator desires.

Coarse material: larger sized nonmetallic mineral material; screen size or diameter of typical coarse material.

Commenced: for a new source it means that the operator has undertaken a continuous program of construction or modification or that the operator has entered into a contract to do the construction within a reasonable time.

Compression: a method used to crush stones where the stones are pressed or compressed until the stones break.

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[74] 40 C.F.R. 60.7(b).

[75] 40 C.F.R. 60.7(d), 60.676(c), 60.674.

Construction: fabrication, erection, or installation of an affected facility.

Control device: the air pollution control equipment used to decrease particulate matter emissions released from one or more of the process operations at the plant.

Conveying system: a device used to transport material from one piece of equipment or location to another location within a plant; conveying systems include feeders, belt conveyors, bucket elevators, and pneumatic systems.

Crusher: is a machine used to crush rocks and stones to the size desired by the operator; types of crushers include jaw, gyratory, cone, roll, rod mill, hammermill, and impactor.

Eccentric: a mechanical device consisting of a disk through which a shaft is keyed eccentrically and a circular strap is constrained to move in a straight line so as to produce a reciprocating motion.

Enclosed truck or railcar loading station: that section of the plant where minerals, usually finished, are loaded by an enclosed conveying system into enclosed trucks or railcars.

Existing source: for Subpart OOO it is a source that was constructed before August 31, 1983; existing sources are not subject to Subpart OOO.

Fine material: smaller sized nonmetallic mineral material; size for example, material that can pass through XX mesh screen.

Fluid energy mill: type of grinding mill that suspends and conveys rock particles, the lighter particles flow out of the mill, the heavier are returned to the crusher.

Fugitive emission: particulate matter that is not collected by a capture system and instead is released to the atmosphere at the point of generation.

Grinding mill: a machine used for the fine crushing of minerals; Subpart OOO includes the air conveying system, air separator, and air classifier as part of the grinding mill; types of grinding mills include hammer, roller, rod, pebble, ball, and fluid energy.

Grizzly: a type of screening operation that separates stones and prevents larger stones from entering the crusher; it consists of a set of uniformly spaced bars, rods, or rails.

Gyratory crusher: a type of crusher that uses a vertical fixed jaw and an inclined moving jaw, and crushes the rock by compression; it is larger in capacity than the jaw crusher; the types include pivoted spindle, fixed spindle, and cone.

Hammermill (grinding mill): a type of grinding mill that uses swinging hammers attached to rotor discs and as rock particles are fed into the grinder, the particles are impacted and shattered by the hammer.

Hot mix asphalt facility: any facility used to manufacture hot mix asphalt by heating and drying the aggregate and mixing it with asphalt cement.

Impaction: a method used to crush stones where the stones are hit against each other or hit against a surface until the stones break.

Impact crusher: a type of crusher that uses the force of fast rotating impellers or hammers to strike and shatter free falling rock particles; the types include hammermill and impactors.

Jaw crusher: a type of crusher that uses a vertical fixed jaw and an inclined moving jaw, and crushes the rock by compression; it is smaller in capacity than the gyratory crusher.

Mesh: an interlocking or intertwining arrangement or construction of threads, cords, or metal rods.

Modification: is any physical change in an existing facility or any change in the method of operation of an existing facility that increases the particulate matter emissions from the facility; modified sources are subject to Subpart OOO requirements.

New source: for Subpart OOO it is a source that was constructed or modified on or after August 31, 1983; new sources are subject to Subpart OOO requirements.

New Source Performance Standard: is a U.S. EPA standard that applies to stationary sources constructed on or after the standard was published.

Nonmetallic mineral processing plant: any combination of equipment that is used to crush or grind any nonmetallic mineral; this includes lime plants, power plants, steel mills, asphalt concrete plants, portland cement plants, or any other facility that processes nonmetallic minerals.

Pebble mill: a type of grinding mill that consists of a drum containing ceramic pebbles that is slowly rotated and as the stones are added to the drum, the pebbles hit the stones and break them into smaller sizes.

Portable plant: is a plant that is mounted on a chassis or skid and can be moved by lifting or pulling the plant; there cannot be any cable, chain, turnbuckle, bolt, or other means of attaching the machine to a structure or anchor.

Portland cement plant: any facility that manufactures portland cement using either a wet or dry process.

Primary crusher: is any crusher into which minerals can be fed without any prior crushing of the mineral.

Reconstruction: is the replacement of parts of processing equipment at a nonmetallic mineral processing plant that subject a source to Subpart OOO.

Revolving screen: a type of screening operation that separates stones when the screen is rotated; it consists of a cylindrical frame around which is wrapped a screening surface.

Rod mill: a type of grinding mill that uses steel rods in a rotating cylindrical drum to grind smaller rock particles to a fine size.

Roll crusher: a type of crusher that uses either a single or double roll to crush the rocks by compression.

Roller mill: a type of grinding mill that uses rollers that swing inside a stationary ring and trap the rock particles between the rollers and the ring and grinds the particles.

Screening: the process by which a mixture of different sized stones are separated according to size by dropping the stone on a screen; the smaller material falls through the screen and the larger material is kept on the surface of the screen.

Secondary crusher: the crusher after the primary crusher that crushes the minerals to an even finer material.

Separating: a process used to separate the larger sized stones from the smaller stones; the larger stones are sent back to be crushed or grinded again, and the smaller stones are sent on to the next stage.

Shaking screen: a type of screening operation that separates stones when the screen is mechanically shaken, usually the coarse material; it consists of a rectangular screen with a perforated plate or wire cloth surface.

Stack emission: is the particulate matter that is released to the atmosphere from a capture system.

Storage bin: a facility used to store the minerals prior to further processing or loading.

Tertiary crusher: the crusher after the secondary crusher that crushes the minerals to an even finer material, usually this is the last crushing stage.

Title V Operating Permit: a permit all major sources must obtain, and minor sources will eventually need to obtain, from the Division that governs the operations at a facility.

Transfer point: a point in a conveying system where the mineral is transferred to or from a belt conveyor, unless the material is being transferred to a stock pile or where a conveyor belt enters or exits the processing equipment.

Vibrating screen: a type of screening operation that separates stones when the screen is vibrated; it consists of a flat or convex screening surface that is rapidly vibrated.

Washing: A wet screening process that removes unwanted material from the desired material.

Index

Addendum A

Summary Report -- Opacity
Excess Emissions and Monitoring System Performance

Summary Report -- Opacity
Excess Emission and Monitoring System Performance

Pollutant: Particulate matter
Reporting period dates: From _____ to _____
Company: ____________________
Emission Limitation: ____________________
Address: ____________________
Monitor Manufacturer and Model No. ____________________
Date of Latest CMS Certification or Audit: ____________________
Process Unit(s) Description: ____________________
____
Total source operating time period per day[1] ____________________

Emission Data Summary[1]	
1. Duration of excess emissions in reporting period due to: a. Startup/shutdown b. Control equipment problems c. Process problems d. Other known causes e. Unknown causes	 _____ _____ _____ _____ _____
2. Total duration of excess emission	_____
3. (Total duration of excess emissions) X (100) [Total source operating time]	_____%[2]
CMS Performance Summary[1]	
1. CMS downtime in reporting period due to: a. Monitor equipment malfunctions b. Non-monitor equipment malfunctions c. Quality assurance calibration d. Other known causes e. Unknown causes	 _____ _____ _____ _____ _____
2. Total CMS downtime	_____
3. (Total CMS downtime) X (100) [Total source operating time]	_____%[2]

[1]For opacity, record all times in minutes. For gases, record all times in hours.
[2]For the reporting period: if total duration of excess emissions is 1 percent or greater of the total operating time or the total CMS downtime is 5 percent or greater of the total operating time, both the summary report form and excess emission report must be submitted.

On a separate page, describe any changes since last quarter in CMS, process or controls. I certify that the information contained in this report is true, accurate, and complete.

Responsible Official ____________________ Title ____________________

Signature ____________________ Date ____________________

Checklists

for

Nonmetallic Mineral

Processing Plants

Developed By:

Stationary Sources Branch
Air Pollution Control Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80222

(303) 692-3269

Pre-Inspection Checklist for Nonmetallic Mineral Processing Equipment

1.0 Plant Background Information: The following information should be obtained **before** the Inspector visits the plant. This information can be found in the construction or operating permit(s), any reporting, or any enforcement action information for the plant, or by contacting the plant contact. In addition, the Inspector should obtain a map, detailed flow diagram, or layout of the plant showing the locations of all potentially affected and affected facilities under Subpart OOO.

Plant ID/permit number(s): ____________________

____

____

____

Plant Name and Address: ____________________

____

____

Name of plant contact: ____________________

Telephone number: ____________________

Plant contact address: ____________________

____

____

Indicate which of the following nonmetallic minerals are processed at the plant. If none are processed, this checklist does not apply.

____ crushed and broken stone (limestone, dolomite, granite, traprock, sandstone, quartz, quartzite, marl, marble, slate, shale, oil shale, and shell)
____ sand and gravel
____ clay (kaolin, fireclay, bentonite, Fuller's earth, ball clay, and common clay)
____ rock salt
____ gypsum
____ sodium compounds (sodium carbonate, sodium chloride, and sodium sulfate)
____ pumice
____ gilsonite
____ talc and pyrophyllite
____ boron (borax, ernite, and colemanite)
____ barite
____ fluorospar
____ feldspar
____ diatomite
____ perlite
____ vermiculite
____ mica
____ kyanite (andalusite, sillimanite, topaz, and dumortierite)

Indicate whether the facility is or includes one of the following and obtain the applicable checklists:

Type of Plant/Facility	Nonmetallic Mineral Processing Facility (yes/no)	Applicable Checklists
_____ Portland cement plant If yes, go to next column If no, go to next row	____ a nonmetallic mineral processing facility is located before the portland cement plant	1. nonmetallic mineral processing facility 2. portland cement plant
	_____ a nonmetallic mineral processing facility is not located before the portland cement plant	1. portland cement plant
_____ Hot asphalt facility If yes, go to next column If no, go to next section	_____ a nonmetallic mineral processing facility is located before the hot asphalt facility or there are crushers and grinding mills at the hot mix asphalt facility	1. nonmetallic mineral processing facility 2. hot asphalt facility
	_____ a nonmetallic mineral processing facility is or crushers and grinding mills are not located before the hot asphalt facility	1. hot asphalt facility

This source was in compliance on _________________ (date)

___ This source is fixed **or**

___ This source is portable because it is:

- ___ mounted on a movable chassis or skid **and**
- ___ is not attached to any anchor slab or structure by any means other than electric cabling

The capacity (maximum permitted throughput) in mg/hr of this facility is: ________ __________

This **entire plant** is __________________ (exempt or nonexempt) from these requirements, because you answered yes to any one of the following questions.

Applies (yes/no)	Type of facility	Capacity
_____	Fixed sand and gravel plant	23 mg/hr (25 tph) or less

_____	Fixed crushed stone plant	23 mg/hr (25 tph) or less
_____	Portable sand and gravel plant	136 mg/hr (150 tph) or less
_____	Portable crushed stone plant	136 mg/hr (150 tph) or less
_____	Common clay plant	9 mg/hr (10 tph) or less
_____	Pumice plant	9 mg/hr (10 tph) or less

2.0 Obtain a List of the Potentially Affected or Affected Equipment

Indicate the potentially affected or affected equipment known to be at the plant using the map, detailed flow diagram, or layout of the plant. If more spaces are required, copy this page.

Type of Equipment	Description(s) or ID Number(s)	Date(s) of Manufacture	Rated Capacity
Crusher(s)	1. 2. 3.	1. 2. 3.	1. 2. 3.
Grinding mill(s)	1. 2. 3.	1. 2. 3.	1. 2. 3.
Bucket elevator(s)	1. 2. 3.	1. 2. 3.	1. 2. 3.
Screening operation(s)	1. 2. 3.	1. 2. 3.	1. 2. 3.
Conveyor belt(s)	1. 2. 3.	1. 2. 3.	1. 2. 3.

Bagging operation(s)	1. 2. 3.	1. 2. 3.	1. 2. 3.
Storage bin(s)	1. 2. 3.	1. 2. 3.	1. 2. 3.
Enclosed truck/railcar loading	1. 2. 3.	1. 2. 3.	1. 2. 3.
Other units			

Transfer point(s)	1.	1.	1.
	2.	2.	2.
	3.	3.	3.
	4.	4.	4.
	5.	5.	5.
	6.	6.	6.
	7.	7.	7.
	8.	8.	8.
	9.	9.	9.
	10.	10.	10.
	11.	11.	11.
	12.	12.	12.
	13.	13.	13.
	14.	14.	14.
	15.	15.	15.
	16.	16.	16.
	17.	17.	17.
	18.	18.	18.
	19.	19.	19.
	20.	20.	20.
	21.	21.	21.
	22.	22.	22.
	23.	23.	23.
	24.	24.	24.
	25.	25.	25.
	26.	26.	26.
	27.	27.	27.

The following facilities are exempt, because an existing facility was replaced by a like facility of equal or smaller size. If the entire production line was replaced the equipment is not exempt.

Type of Equipment	Existing Facility			Replacement Facility		
	Description(s) or ID Number(s)	Capacity	Date Manufactured	Description(s) or ID Number(s)	Capacity	Date Manufacture d
Crusher(s)						
Grinding mill(s)						
Bucket elevator(s)						
Screening operation(s)						
Conveyor belt(s)						
Bagging operation(s)						
Storage bin(s)						
Transfer point(s)						
Enclosed truck/railcar loading						

Does the operator have any schedules for replacement of existing facilities with new facilities? If yes, explain. ____

____

Inspection Checklist for Nonmetallic Mineral Processing Equipment

1.0 Pre-Entry Observations: These are the two observations made prior to entering the plant. In taking visible emission observations, extreme care should be taken to ensure that the emission point is correctly identified at the time of observation.

Check if any of the following **plant or property surroundings** are observed and explain:

___ obvious vegetation damage near the plant: ________________________

___ deposits on cars parked on an off property: ________________________

___ conditions around product and waste piles: ________________________

___ heavy dusting of standing trees or buildings: ________________________

___ proximity of sources to potential receptors: ________________________

___ tracking of material onto public roads leading from the plant: ________________________

The following **visible emission observations** were taken **prior** to entering the plant (make the necessary copies of this page). Attach the observation data sheet.

Emission Point (E.P.) (stack, silo, screen etc.)	Method Used (Method 9 or 22)	Opacity	Location & Distance from E.P. (i.e., 20 feet north of E.P.)

2.0 Performance Test Results: Answer the following questions based upon the most recent performance test conducted.

If wet scrubber is used:

Average scrubber pressure drop ________________
Scrubbing liquid fluid rate ________________

3.0 Recordkeeping and Reporting: Review the following notifications, reports, and records. All of these documents must be kept for two years.

Written notifications sent to the Division were reviewed (yes/no):

___ date of construction or reconstruction of any affected facility no later than 30 days after begun
___ date of actual startup of any affected facility within 15 days of startup date
___ any physical or operational change to an existing facility which may increase the emissions rate of any air pollutant to which a standard applies, unless that change is specifically exempted no later than 60 days or as soon as practicable before change occurs
___ date upon which demonstration of continuous monitoring system performance begins no later than 30 days prior to the date
___ date that initial performance test opacity observations are anticipated no later than 30 days
___ reschedules dates for initial performance test opacity observations if visibility or other conditions prevent opacity observations from being performed concurrently with the initial performance test
___ proposed "reconstructions" of existing facilities no later than 30 days before date
___ thirty (30) day advance notification of any performance test of an affected facility
___ proposed replacements of existing facilities with facilities of equal or smaller size

Written reports sent to the Division were reviewed (yes/no):

___ initial performance test results of all affected facilities
___ initial performance test opacity results of all affected facilities
___ the results of all performance tests of affected facilities to demonstrate compliance including opacity observations results (Method 9) and/or Method 22 observation results
___ semiannual reports of occurrences when continuous monitoring system or monitoring device scrubber pressure drop and liquid flow rate differ from the average of the last performance test by ± thirty percent (30%)
___ fugitive particulate emission control plan

Records kept on file were reviewed (yes/no):

- ___ startup, shutdown, and malfunction occurrences and their durations for all facilities
- ___ malfunctions of air pollution control equipment serving affected facilities
- ___ any periods during which continuous monitoring systems or monitoring devices (i.e., scrubber pressure drop and liquid flow rate measurement devices) are inoperative
- ___ all measurements of monitoring devices, calibration checks, and all adjustments and maintenance performed on these devices including:
  - ___ daily continuous measurements of scrubber pressure drop and liquid flow rate, and
  - ___ scrubber monitoring device annual calibration checks

If wet scrubber is used the following must be reviewed (yes/no):

- ___ initial performance test results
- ___ submit semiannual reports submitted to the Division detailing any occurrences when the scrubber pressure loss (or gain) and liquid flow rate differ by more than ± thirty percent (30%) from the averaged determined during the most recent performance test
- ___ records from continuous recording equipment to identify on a continuous basis and report occurrences of six (6) minutes or greater

Inspection Checklists for

Individual Pieces

of Equipment

Crushers

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of __________________
This is a __________________ source (new or existing)
This source must be in compliance as of __________________ (date)
This source was in compliance on __________________ (date)
The crusher is which of the following: (check)

___ jaw crusher
___ gyratory crusher (pivoted spindle, fixed spindle, or cone)
___ roll crusher (single roll or double roll)
___ impact crusher (hammermill or impactor)

2.0 Air Pollution Control Equipment: If a control device is used, go to the appropriate checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

___ wet suppression system
___ hooded capture system and send to control device

3.0 Measuring Fugitive Emissions: Fugitive emissions at crushers are most apparent at crusher feed and discharge points. Make sure to separate fugitive emission opacity from water mist generated by wet suppression systems.

Requirement	Crusher inlet	Crusher outlet	Crusher discharge to belt conveyor
Method 9 observations taken (yes/no)			
Emissions were equal to or less than fifteen percent opacity (yes/no)			
Emissions were greater than fifteen percent opacity: **violation** (yes/no)			

If wet suppression was used at the time of inspection, Inspector either:

___ chose the point in the plume beyond which the water mist disappears **or**

____ chose the point in the plume of greatest opacity when the wet dust suppression system is not being operated

Grinding Mills

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83		
Existing (before 8/31/83)		

This source had an initial startup date of _______________
This is a _______________ source (new or existing)
This source must be in compliance as of _______________ (date)
This source was in compliance on _______________ (date)
The crusher is which of the following: (check)

___ hammermill
___ roller mill
___ rod mill
___ pebble or ball mill
___ fluid energy mill

2.0 Air Pollution Control Equipment: If a control device is used, go to the appropriate checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

___ wet suppression system
___ hooded capture system and send to control device

3.0 Measuring Fugitive Emissions: Fugitive emissions at grinding mills are generated at the inlet, outlet, air conveying system, air separator, and air classifier. If grinding mill is vented to an air pollution control equipment at which nonaffected facilities are attached, the tests are conducted while the nonaffected facilities are not operating, unless the nonaffected facility is a dryer flue.

Requirement	Grinding mill inlet	Grinding mill outlet	Air conveying system	Air separator	Air classifier
Method 9 observations taken (yes/no)					
Emissions were equal to or less than fifteen percent opacity (yes/no)					

Emissions were greater than fifteen percent opacity: **violation** (yes/no)					

___ Dryer flue gases are vented to the affected grinding mill (yes/no). If yes, can prorate the emissions between the dryer flue and grinding mill

Screening Operations

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of __________________
This is a __________________ source (new or existing)
This source must be in compliance as of __________________ (date)
This source was in compliance on __________________ (date)
This screening operation is which of the following: (yes/no)

- ___ grizzlies
- ___ shaking screen
- ___ vibrating screen
- ___ revolving screen

2.0 Air Pollution Control Equipment: If a control device is used, go to the appropriate checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

- ___ wet suppression system
- ___ hooded capture systems and send to control device; if yes, inspect the following:
- ___ check screens for signs of ill-fitting seals or gaps in hood integrity

3.0 Measuring Fugitive Emissions: If the screen is not operating during inspection, observe immediate area of the screen for signs of excess emissions during operation; if excessive should reinspect when operating.

Requirement	Point of maximum opacity in the plume
Method 9 observations taken (yes/no)	
Emissions were equal to or less than fifteen percent opacity (yes/no)	
Emissions were greater than fifteen percent opacity: **violation** (yes/no)	

Storage Bins

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of _________________ (date)
This is a _________________ source (new or existing)
This source must be in compliance as of _________________ (date)
This source was in compliance on _________________ (date)

2.0 Air Pollution Control Equipment: If a control device is used, go to the appropriate checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

- ___ air pollution cyclone system positioned above bin charging (loading) point
- ___ baghouse system
- ___ wet suppression system

3.0 Measuring Fugitive Emissions:

Requirement	Vent discharge point for loading **OR**	Vent discharge point for unloading **AND**	Area around the vent
Method 9 observations taken (yes/no)			
Emissions were equal to or less than fifteen percent opacity (yes/no) (greater than is violation)			
Emissions were equal to or less than seven percent opacity from the baghouse attached to only an individual, enclosed storage bin: (yes/no)			

If dust has accumulated around the vent discharge points or the vent determine reason for excess emissions and explain: __________________________________
____
____
____

4.0 Measuring Stack Emissions

If there are multiple bins with combined stack emissions, the stack emissions from this stack:

____ contain particulate matter equal to or less than 0.05 g/dscm; and

____ exhibit equal to less than 7% opacity (unless emissions are from facility using a wet scrubbing control device)

Bucket Elevators

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of _________________
This is a _________________ source (new or existing)
This source must be in compliance as of _________________ (date)
This source was in compliance on _________________ (date)

2.0 Air Pollution Control Equipment: If a control device is used, go to the appropriate checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

___ capture system at the top of the elevator where the bucket discharges
___ baghouse system

3.0 Measuring Fugitive Emissions:

Requirement	Entire length of elevator enclosure	Capture system at top of elevator	Access door(s) to elevator interior
Method 9 observations taken (yes/no)			
Emissions were equal to or less than fifteen percent opacity (yes/no)			
Emissions were greater than fifteen percent opacity: **violation** (yes/no)			

Belt Conveyors

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of _________________
This is a _________________ source (new or existing)
This source must be in compliance as of _________________ (date)
This source was in compliance on _________________ (date)

2.0 Air Pollution Control Equipment: If a control device is used, go to the appropriate checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

___ wet suppression system
___ hooding, capturing, and conveying to control device

3.0 Measuring Fugitive Emissions:

Answer yes or no to the following questions

___ Moisture content of material is sufficient to prevent material from becoming airborne
If yes, the following visible emission observation can be waived, and explain: ____
____

___ Belt conveyor is in operation during the Method 9 observation
If no, schedule another time to take Method 9 observation at this belt conveyor, explain: ____
____

Requirement	Transfer point onto belt conveyor	Transfer point off belt conveyor	Transfer point to a **storage pile**
Method 9 observations taken (yes/no)			**exempt**
Emissions were equal to or less than fifteen percent opacity (yes/no)			**exempt**

Emissions were greater than fifteen percent opacity: **violation** (yes/no)			**exempt**

Bagging Operations

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of ________________
This is a ________________ source (new or existing)
This source must be in compliance as of ________________ (date)
This source was in compliance on ________________ (date)

2.0 Air Pollution Control Equipment:

Air Pollution Control Equipment: If a control device is used, go to the appropriate checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

___ local exhaust system and vented to baghouse
___ hood face velocities

3.0 Measuring Fugitive Emissions:

Requirements	Observations of Building if Bagging Operations are Enclosed	Observations of Bagging Operations	
		Bagging Operation	Powered Vents if used
Method 22 observations taken (yes/no)			
Emissions were equal to or less than ___ percent opacity (yes/no)			
Emissions were greater than ___ percent opacity: **violation** (yes/no)	do observations inside building		
Method 9 observations taken (yes/no)			
Emissions were equal to or less than fifteen percent opacity (yes/no)			
Emissions were greater than fifteen percent opacity: **violation** (yes/no)			

Enclosed Truck or Railcar Loading Operations

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of __________________
This is a __________________ source (new or existing)
This source must be in compliance as of __________________ (date)
This source was in compliance on __________________ (date)
The truck or railcar loading operation __________________ (is or is not) enclosed, if it is not enclosed, these requirements do not apply. Explain: _________________
____
____

2.0 Air Pollution Control Equipment: If a control device is used, go to Checklist for type of control equipment and complete.

Indicate if any of the following controls are used: (yes/no)

____ shrouds, telescoping feed tubes, or windbreaks
____ exhaust system vented to baghouse

3.0 Measuring Fugitive Emissions:

Requirement	Immediately above Transfer Point	Air Vents	Feed Tube
Method 9 observations taken (yes/no)			
Emissions were equal to or less than fifteen percent opacity (yes/no)			
Emissions were greater than fifteen percent opacity: **violation** (yes/no)			

Wet Screening Operations and Subsequent Screening Operations

1.0 Compliance Date

Type of Source	Initial Notification Due	Date Source Must be in Compliance
New or modified or reconstructed on or after 8/31/83	30 to 60 days from initial startup	date of initial startup
Existing (before 8/31/83)	none required	need not comply

This source had an initial startup date of __________________
This is a __________________ source (new or existing)
This source must be in compliance as of __________________ (date)
This source was in compliance on __________________ (date)

2.0 Emission Requirements

_____ Wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to the next crusher, grinding mill, or storage bin has no visible emissions: (yes/no), if yes, **violation**.

_____ Screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations, where such operations process saturated materials up to the first crusher, grinding mill, or storage bin in the production line have no visible emissions: (yes/no), if yes, **violation**

3.0 Measuring Fugitive Emissions:

_____ Wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to the next crusher, grinding mill, or storage bin have no visible emissions and no Method 9 observations are required

_____ Screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations, where such operations process saturated materials up to the first crusher, grinding mill, or storage bin in the production line have no visible emissions and no Method 9 observations are required

Inspection Checklists for

Air Pollution Control Devices

Operating Pulse Jet Baghouse

Complete one checklist for each baghouse. Complete the table and indicate that each inspection item was inspected and whether the requirements were met.

If baghouse that controls emissions only from an individual enclosed storage bin, the Method 9 observations shall be 1 hour.

yes/no	Inspection Items and Requirements	Results and Comments
____	Method 9 observation of fabric filter discharge; check for bag problems (abrasion, chemical attack, high temperature damage, improper cleaning); visible emissions should be $\leq$ 7% opacity	
____	Method 9 observation of fugitive emissions from solids handling operation if reentrainment is occurring	
____	Method 9 observation of fugitive emissions from process equipment	
____	Counterflow check of audible air infiltration into fan, baghouse, and ductwork; and check physical condition of hoods	
____	Check static pressure drop across baghouse using onsite gauges; compare with baseline data	
____	Compare compressed air pressures at reservoir with baseline values; check for audible leaks of compressed air at fittings; check operation of diaphragm valves, record number of valves that do not appear to be working properly	
____	Check inlet gas temperatures using onsite gauges	
____	Observe and describe corrosion of fabric filter shell and hoppers	
____	Evaluate bag failure records, gas inlet temperature records, pressure drop data, and other maintenance information	

Operating Shaker and Reverse Air Baghouse

Complete one checklist for each baghouse. Complete the table and indicate that each inspection item was inspected and whether the requirements were met.

If baghouse that controls emissions only from an individual enclosed storage bin, the Method 9 observations shall be 1 hour.

yes/no	Inspection Items and Requirements	Results and Comments
____	Method 9 observation of fabric filter stack or individual compartment discharge points; check for bag problems (abrasion, chemical attack, high temperature damage, improper cleaning); visible emissions should be $\leq$ 5% opacity	
____	Method 9 observation of fugitive emissions from solids handling operation if reentrainment is occurring	
____	Method 9 observation of fugitive emissions from process equipment	
____	Counterflow check of audible air infiltration into fan, baghouse, and ductwork; and check physical condition of hoods	
____	Check static pressure drop across collector using onsite gauges	
____	Check static pressure drop across each compartment during cleaning; values should be zero for shaker collectors	
____	Confirm that reverse air fan or shaker motor is operating	
____	Check inlet gas temperatures using onsite gauges	
____	Observe and describe corrosion of fabric filter shell and hoppers	
____	Evaluate bag failure records, gas inlet temperature records, pressure drop data, and other records	

Nonoperating Pulse Jet Baghouse

Complete one checklist for each baghouse. Complete the table and indicate that each inspection item was inspected and whether the requirements were met. (Note: presence of abnormal conditions cannot alone be used as a basis for an NOV)

If baghouse that controls emissions only from an individual enclosed storage bin, the Method 9 observations shall be 1 hour.

yes/no	Inspection Items and Requirements	Results and Comments
_____	Confirm that unit is out of service and will not be brought on line during period of inspection	
_____	Request plant personnel to open one or more access hatches on the clean side of the unit; evaluate quantity and pattern of clean side deposits; if clean side deposits (enough to make a footprint) inspect for bag failure problems due to: abrasion, improper cleaning, improper blow tube alignment, chemical attack, high temperature damage, leakage around top of bag	
_____	Check for orientation of blow tubes and extension nipples, if present	
_____	Check for obvious poorly seated bags and gaps in tube sheet welds	
_____	Request that plant personnel open side access hatches if available to look for any bag-to-bag abrasion at bottom and for damage of fabric against side flanges and internal walkways	
_____	Check for bag abrasion against side flanges, internal walkways, and other bags; check for bowed and bent bag/cage assemblies; deflector serves to protect the bags from abrasive materials	
_____	Check the condition of any deflector plates on the gas inlet; erosion could contribute to premature failures	
_____	Check for obvious erosion of ductwork leading to baghouse; eroded ductwork could lead to reduced pollutant capture at the generation source and operating temperatures below the acid dewpoint	
_____	Check operation of bag cleaning equipment	

Nonoperating Shaker and Reverse Baghouse

Complete one checklist for each baghouse. Complete the table and indicate that each inspection item was inspected and whether the requirements were met. (Note: presence of abnormal conditions cannot alone be used as a basis for an NOV)

If baghouse that controls emissions only from an individual enclosed storage bin, the Method 9 observations shall be 1 hour.

yes/no	Inspection Items and Requirements	Results and Comments
____	Confirm that unit is out of service and will not be brought on line during period of inspection	
____	Request plant personnel to open access hatch of compartments; use the hatch just above the elevation of the tube sheet; evaluate quantity and pattern of clean side deposits; if clean side deposits (enough to make a footprint) inspect for bag failure problems due to: abrasion, improper cleaning, chemical attack, high temperature damage, leakage around top of bag	
____	Observe bag tension throughout the portion of the compartment that is visible from access hatch; check tension of bags that can be reached without entering compartment	
____	Check for leaks around thimble connections or snap ring connections	
____	Check for obvious bag abrasion on internal flanges	
____	Check for tube sheet weld failures; gap in tube sheet welds are usually visible because the high velocity gas stream passing through the gap moves the dust deposits away from that portion of the tube sheet	

Spray Tower Scrubbers

Complete one checklist for each scrubber. Complete the table and indicate that each inspection item was inspected and whether the requirements were met. Performance of Spray Tower Scrubber is dependent upon liquor flow rate, any problems that reduce flow rate should be fully examined. (Note: observations and data do not provide conclusive evidence of noncompliance with mass emission standards (a stack test is required); these can be used as surrogate indicators of compliance.)

yes/no	Inspection Items and Requirements	Results and Comments
____	Method 9 observation of stack for period of not less than 6 minutes; calculate average opacity and describe cycles in the average opacity	
____	Method 9 observation of all bypass stacks and vents and any fugitive emissions from process equipment	
____	Presence of rainout close to the stack or mud lips at the discharge point	
____	Presence of fan vibration	
____	Liquor flow rate and pressure drop indicated by onsite monitors; compare with average of last compliance test	
____	Pump discharge pressure and motor current indicated by onsite gauges	
____	Audible pump cavitation	
____	Nozzle header pressure indicated by onsite gauge	
____	Physical condition of shell and ductwork; corrosion often caused by operation at pH levels lower than desired; measure liquor pH using in-plant instruments	
____	Recirculation pond layout and pump intake position	
____	Physical condition of nozzles observed through access hatch; anything that affects the nozzles will reduce performance	

_____	Note the means used to dispose of purged liquor	

Mechanically Aided Scrubbers

Complete one checklist for each scrubber. Complete the table and indicate that each inspection item was inspected and whether the requirements were met. (Note: observations and data do not provide conclusive evidence of noncompliance with mass emission standards (a stack test is required); these can be used as surrogate indicators of compliance.) Performance of a Mechanically Aided Scrubber depends on liquor flow rate; any problems reducing flow rate should be fully examined: pump discharge pressure, nozzle header pressure, pump motor currents, and audible pump cavitation.

yes/no	Inspection Items and Requirements	Results and Comments
____	Method 9 observation of stack for period of not less than 6 minutes; calculate average opacity and describe cycles in the average opacity	
____	Method 9 observation of all bypass stacks and vents and any fugitive emissions from process equipment	
____	Presence of rainout close to the stack or mud lips at the discharge point	
____	Presence of fan vibration	
____	Pump discharge pressure and motor current indicated by onsite gauges	
____	Audible pump cavitation	
____	Nozzle header pressure indicated by onsite gauge	
____	Physical condition of shell and ductwork; corrosion often caused by operation at pH levels lower than desired; measure liquor pH using in-plant instruments	
____	Recirculation pond layout and pump intake position	
____	Static pressure increase across scrubber and liquor flow rate monitored by onsite gauges; compare with average of last compliance test	

_____	Note the means used to dispose of purged liquor	

Gas-Atomized Scrubbers

Complete one checklist for each tower scrubber. Complete the table and indicate that each inspection item was inspected and whether the requirements were met. (Note: observations and data do not provide conclusive evidence of noncompliance with mass emission standards (a stack test is required); these can be used as surrogate indicators of compliance.) Performance of a Gas Atomized Scrubber depends on liquor flow rate; any problems reducing flow rate should be fully examined: pump discharge pressure, nozzle header pressure, pump motor currents, and audible pump cavitation.

yes/no	Inspection Items and Requirements	Results and Comments
____	Method 9 observation of stack for period of not less than 6 minutes; calculate average opacity and describe cycles in the average opacity	
____	Method 9 observation of all bypass stacks and vents and any fugitive emissions from process equipment	
____	Presence of rainout close to the stack or mud lips at the discharge point	
____	Presence of fan vibration	
____	Static pressure drop across scrubber and liquor flow rate monitored by onsite gauges; compare with average of last compliance test	
____	Pump discharge pressure and motor current indicated by onsite gauges	
____	Audible pump cavitation	
____	Nozzle header pressure indicated by onsite gauge	
____	Physical condition of shell and ductwork; corrosion often caused by operation at pH levels lower than desired; measure liquor pH using in-plant instruments	
____	Recirculation pond layout and pump intake position	

_____	Physical condition of nozzles observed through access hatch; anything that affects the nozzles will reduce performance; liquor turbidity is related to likelihood that the nozzle will be plugged or erosion	
_____	Note the means used to dispose of purged liquor	

Large Diameter Cyclones

Complete one checklist for each cyclone. Complete the table and indicate that each inspection item was inspected and whether the requirements were met. (Note: observations and data do not provide conclusive evidence of noncompliance with mass emission standards (a stack test is required); these can be used as surrogate indicators of compliance.)

yes/no	Inspection Items and Requirements	Results and Comments
____	Method 9 observation of stack for a sufficient period to fully characterize conditions during normal process cycles; if visible emissions have increased > 5% since baseline period or if within 5% of regulatory limit, do a more detailed inspection	
____	Method 9 observation of any fugitive emissions from process equipment and material handling operations; can be partially due to air infiltration into ductwork or collector -- check process area and ductwork	
____	Presence of accumulated dust in the vicinity of the stack; accumulated solids near stack generally imply high mass emissions of large particles	
____	Presence of obvious holes and dents in cyclone shell; can disrupt gas vortex and cause increases in the static pressure	
____	Air filtration sites on cyclone shell, cyclone hopper, solids discharge valve, and inlet ductwork	
____	Obvious corrosion of cyclone	
____	Static pressure drop across the cyclone as indicated by onsite gauge; static pressure provides indication of flow rate and removal efficiency generally increases with static pressure	

Multiple Cyclones Collectors

Complete one checklist for each cyclone. Complete the table and indicate that each inspection item was inspected and whether the requirements were met. (Note: observations and data do not provide conclusive evidence of noncompliance with mass emission standards (a stack test is required); these can be used as surrogate indicators of compliance.)

yes/no	Inspection Items and Requirements	Results and Comments
____	Method 9 observation of stack for a sufficient period to fully characterize conditions during normal process cycles; if visible emissions have increased > 5% since baseline period or if within 5% of regulatory limit, do a more detailed inspection	
____	Method 9 observation of any fugitive emissions from process equipment and material handling operations; can be partially due to air infiltration into ductwork or collector -- check process area and ductwork	
____	Air filtration sites on collector shell, cyclone hopper, solids discharge valve, and inlet ductwork	
____	Static pressure drop across the cyclone as indicated by onsite gauge; static pressure provides indication of flow rate and removal efficiency generally increases with static pressure	
____	Inlet gas temperature as indicated by onsite gauge	

Wet Suppression System

Complete one checklist for each wet suppression system. Complete the table and indicate that each inspection item was inspected and whether the requirements were met.

yes/no	Inspection Items and Requirements	Results and Comments
_____	Spray towers and nozzles located for maximum dust suppression	
_____	Check condition of spray nozzles and spray patterns; high water turbidity may cause increased nozzle pluggage if water is recycled	
_____	Check nozzle header pressure with baseline data or last compliance test	
_____	Check timing cycle and actuators for intermittent operation; water added to crusher inlets should be adequate to wet reduced ore size	
_____	Check for use of wetting agents / surfactants	
_____	Are wetting agents / surfactants used at manufacturer's specifications or at similar rates of last compliance test	
_____	Location of sprays versus file information	
_____	Check to see if antifreeze is used in winder if required	