



United States Environmental Protection Agency General Permit for New or Modified Minor Sources of Air Pollution in Indian Country

<https://www.epa.gov/tribal-air/tribal-minor-new-source-review>

Background Document: General Air Quality Permit for New or Modified Minor Source Stone Quarrying, Crushing, and Screening Facilities in Indian Country

Last Modified: February 13, 2017

Version 1.0

1. Stone Quarrying, Crushing, and Screening Source Category Definition

A stone quarrying, crushing, and screening (SQCS) facility is any stationary or portable non-metallic mineral processing facility which uses rock crushers, grinding mills, screening operations, bucket elevators, belt conveyors, bagging operations, storage bins, storage piles, truck loading stations, or railcar loading stations to process rock, sand, gravel, or mineral aggregate or that mines rock, stone, sand and gravel for construction. As diesel fuel is the most commonly used fuel at SQCS facilities, for the sake of simplicity, the permit is written to exclude the use of the General Permit by sources that combust fuels other than diesel fuel/biodiesel. The proposed General Air Quality Permit for New or Modified Minor Source Stone Quarrying, Crushing, and Screening Facilities in Indian Country only covers SQCS operations that are located at New Source Review (NSR) minor sources.

2. Source Category Characterization

The operations and equipment at a typical SQCS facility are described in [AP 42](#), Chapters 11.19.1, Sand and Gravel Processing and 11.19.2, Crushed Stone Processing and Pulverized Mineral Processing.¹ SQCS facilities are part of a larger industrial process where stone, sand, gravel, rock, and minerals are removed from the earth and prepared for industrial, commercial and residential use. Quarried stone normally is delivered to the processing plant by truck, and is dumped into a hoppers feeder, usually a vibrating grizzly type, or onto screens. The feeder or screens separate large boulders from finer rocks that do not require primary crushing, reducing the load to the primary crusher.²

In sand and gravel processing, deposits of sand and gravel are mined and processed with screens, washing, and clarifiers to segregate the material into different particle sizes. Sometimes, crushing equipment is utilized to reduce particle sizes. In rock crushing operations, rock is loosened by drilling and blasting and then loaded by front-end loader or power shovel into large haul trucks that transport the material to the processing operations. Processing operations may include: crushing, screening, size classification, material handling and storage operations. Rock is loaded into bins and sent through screens, sorted for size, and conveyed to one or more rock crushers until all of the raw material is reduced to the desired size. Each crusher machine has associated screening and conveying equipment. After crushing, the rock is sorted according to size in screeners and

¹ AP-42, Chapters 11.19.1, Sand and Gravel Processing and 11.19.2, Crushed Stone Processing and Pulverized Mineral Processing, <http://www.epa.gov/ttn/chief/ap42/ch11/index.html>.

² Emission Inventory Improvement Program, Point Source Committee (Joint EPA – STAPPA/ALAPCO Initiative), “Technical Assessment Paper: Available Information for Estimating Emissions from Stone Mining and Quarrying Operations,” May 1998, <http://www.dep.wv.gov/dag/planning/inventory/Documents/EIIP%20V02%20Ch13%20Stone%20Mining%20and%20Quarrying%20Operations.pdf>.

conveyed to storage piles by conveyors. Front end loaders and trucks are used to move finished materials offsite. Rock types processed by the crushed stone industry include: limestone, granite, dolomite, traprock, sandstone, quartz, quartzite, and lesser amounts of calcareous marl, marble, shell, and slate.

Electricity for the motors running the crushers, screens, and conveyors is provided either by grid electric power or by diesel generators. Criteria pollutant emissions of concern are primarily particulate matter (PM) from crushing and screening, and particulate matter and nitrogen oxides (NO_x) from diesel generators. For sources with available water, water sprays may be used to control particulate emissions. In sand processing, water is typically used in clarifiers to sort the sand by size, and the sand is processed wet. Dry particulate control methods (baghouses) may also be used to control particulate emissions.³ SQCS facilities are distributed almost uniformly around the country in proportion to population density, as the need for sand, gravel, and mineral aggregates is widespread, the technology is simple, and the barriers to starting a business are low. Information gathered from state permits indicates that this source category is not uniform in size or emissions.

3. State Minor Source Permit Programs

The U.S. Environmental Protection Agency (EPA) researched state air quality permitting websites for examples of general permits and permits by rule for sand and gravel facilities and rock crushing facilities. The EPA examined these documents for their applicability in developing a general permit for Indian Country. The EPA incorporated elements from these permits in developing the documents and regulations in the General Permit for SQCS facilities. The EPA examined general permit documents for sand and gravel facilities for the States of [Florida](#) and [Indiana](#). The EPA also examined general permit documents for rock crushing and screening facilities for the States of [Alaska](#), [Arizona](#), [Florida](#), [Indiana](#), [Washington](#), and [Wisconsin](#) in developing this General Permit. The EPA chose general permits from these states because of characteristics they possess:

- Readily available;
- Clear throughput limits; and
- Organization of the regulations followed the typical form for federal NSR permits:
 - Limitations and standards, and
 - Monitoring, testing, recordkeeping, and reporting requirements.

Very few states issue air general permits for sand and gravel facilities. Although Indiana issues both a sand and gravel permit and a rock crushing permit, their respective throughput limits are nearly identical. Many states issue air general permits for rock crushing facilities, and the EPA found that other states general permits for rock crushing and screening facilities are similar in content to the permits from the states listed above. The state general permits for SQCS facilities vary from the streamlined (Indiana, at four pages) to the extremely detailed and complex (Arizona, at 104 pages). None of the state permits limit throughput based on co-location with another source, such as a hot mix asphalt plant.

The state sand and gravel permits typically have throughput limits, but these vary by state. The assumptions and methodology for arriving at these throughput limitations are not discussed in the permit application documents, and, except for the Washington state rock crushing general permit, the technical support documents used in developing the throughput limits are not readily available. The EPA assumes that each state is calculating the throughput limits based on different equipment configurations and control scenarios.

³ AP-42, Chapters 11.19.1, Sand and Gravel Processing and 11.19.2, Crushed Stone Processing and Pulverized Mineral Processing, <http://www.epa.gov/ttn/chief/ap42/ch11/index.html>.

Most of the state sand and gravel permit applications mention that the permit cannot be issued to sources whose potential to emit (PTE) of particulate matter 10 microns or less (PM₁₀), NO_x, or carbon monoxide (CO) is greater than 100 tons per year (tpy). The applications do state that rock throughput, fuel throughput, and/or engine displacement shall be limited, but the methodology and emissions calculations underlying the relationship between the emission threshold(s) and the raw material throughput/fuel usage limit(s) are not clearly stated (except for the Washington state rock crushing permit). However, it is clear that these rock throughput limits, fuel usage limits, and engine displacement limits are intended to keep emissions below the major source thresholds. The Alaska rock crushing permit contains no rock throughput limits, but requires the applicant to calculate the PTE of their facility to verify that it is below 100 tpy prior to submitting the application. Similarly, the Florida sand and gravel permit does not contain any raw material throughput limits, but merely requires that the facility's PTE be less than 100 tpy for any criteria pollutant. However, these two permits are an exception. The state permits typically limit raw materials throughput and fuel usage as a surrogate for limiting emissions.

As previously mentioned, many of the state permits regulate emissions from engines, but the type of regulation varies. Some state permits that regulate combustion emissions (Alaska and Arizona) delineate between stationary engines and nonroad (portable) engines.⁴ They do not regulate combustion emissions from the engines at rock crushing facilities which change location more frequently than once per year because, by definition, those engines are nonroad (portable) engines. They also do not regulate the amount of fuel used by mobile sources, such as trucks and front end loaders. The Florida and Wisconsin rock crushing permits do regulate combustion emissions, but assume that all combustion is from stationary engines. For all of the state permits mentioned here, combustion emissions from stationary engines at rock crushing facilities are regulated by limiting the amount of fuel that can be combusted per year, or the engine displacement. The fuel usage limits vary from state to state, and underlying calculations are not provided, so it is not clear what the intended emissions limit is for each state permit. The Indiana and Washington state permits do not regulate combustion emissions.

Most state permits (Arizona, Florida, Indiana, Washington, and Wisconsin) require control of particulate emissions, but the Alaska permit does not. In Alaska, the water sprays typically used to control particulate may freeze on the aggregate and the equipment, creating unsafe and unworkable conditions. All state sand and gravel permits require that the operator have a fugitive dust control plan and that fugitive emissions from roadways and storage piles be controlled. The Alaska permit qualifies this and requires fugitive emissions control if the facility is within 1,000 feet of a residence. The State of Washington conducted dispersion modeling for a rock crusher processing 5,300,000 tons of material per year, and determined that a 150-foot setback from the rock crusher to the property lines would ensure no violation of the 24-hour National Ambient Air Quality Standards for PM₁₀ (150 µg/m³).⁵ The state permit for Alaska contains a 400-foot setback provision for the crusher and any diesel engine from the nearest residence. All of the state sand and gravel permits include opacity limitations, most require an operation and maintenance plan, and all include some variation of the monitoring and recordkeeping requirements found in typical minor source permits. The [South Coast Air Quality Management District](#) of California provides a comprehensive set of regulations⁶ for control of fugitive dust in areas of serious or severe nonattainment for PM₁₀ and particulate matter 2.5 microns or less (PM_{2.5}). A fugitive dust control plan is included in the permit.

⁴ Stationary engines include all internal-combustion engines that are used either in a fixed application, or in a portable (or transportable) application in which the engine will stay at a single site for at least a full year. "Emission Regulations for Stationary and Mobile Engines" US EPA, EPA420-F-02-034, September 2002.

⁵ Washington State Dept. of Ecology, "Suitability of Rock Crushing Operations for Air Quality General Order of Approval: Evaluation of Control Technology, Ambient Impacts, and Potential Approval Criteria," June 2006.

⁶ South Coast Air Quality Management District, Rule 1157 "PM10 Emission Reductions from Aggregate and Related Operations," <http://www.aqmd.gov/rules/reg/reg11/r1157.pdf>.

Several of the state general permits incorporate the requirements of New Source Performance Standards (NSPS) [Subpart OOO](#) (Standards of Performance for Nonmetallic Mineral Processing Plants) into the text of the permit, while other states (Florida, Indiana) incorporate the Subpart OOO requirements by reference. Requirements for NSPS [Subpart IIII](#) (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) and National Emissions Standards for Hazardous Air Pollutants (NESHAP) [Subpart ZZZZ](#) (National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines) are not generally included in state permits for sand and gravel facilities.

4. Requirements for General Permits

4.1 Documents for General Permits

The EPA developed a standardized set of permit documents in support of the General Permit for SQCS facilities located in Indian country. These consist of the following documents:

- Questionnaire: Assists the facility owner or operator in determining whether they are eligible for a General Air Quality Permit;
- Request for Coverage under the General Air Quality Permit: States the criteria for qualification, gathers information on the source, the facility's actual emissions for those sources undergoing modifications, facility location, and source contact, and requests technical information on facility equipment, throughput, and attainment status;
- Instructions: Guides the applicant in filling out the Request for Coverage under the General Air Quality Permit;
- General Air Quality Permit, Terms and Conditions: Contains the requirements and regulations with which the source must comply. The emission limitations, monitoring, recordkeeping and reporting requirements are in the permit, including requirements for sources located in nonattainment areas; and
- PTE Calculator Spreadsheet: Allows applicants to calculate their PTE, based on owner inputs of the specific equipment present at their source, assuming continuous operation throughout the year. The PTE Calculator spreadsheet generates potential emissions, based on these inputs. The spreadsheet illustrates the correlation between equipment, raw material throughput, and emissions.

4.2 Exemption and Qualification for General Permits

Facilities applying for the General Permit must meet the emission limitations established for the General Permit.

New facilities with a PTE (or modifications to existing facilities with an increase in potential emissions) lower than the minor NSR thresholds specified in the provisions of the Federal Indian Country Minor NSR Rule at 40 CFR 49.153 are exempt from the minor NSR program. The minor NSR thresholds are listed in Table 1 below. Facilities applying for the General Permit may calculate their PTE using the PTE calculator provided to determine if they are below these thresholds and, thus, exempt from the minor NSR program.

Table 1: Minor NSR Thresholds in 40 CFR 49.153

Pollutant	Attainment Area	Nonattainment Area
CO	10 tons per year (tpy)	5 tpy
PM	10 tpy	5 tpy
PM10	5 tpy	1 tpy
PM2.5	3 tpy	0.6 tpy
Sulfur Dioxide (SO ₂)	10 tpy	5 tpy
NO _x	10 tpy	5 tpy
Volatile Organic Compounds	5 tpy	2 tpy

Under EPA policy, true and synthetic minor NSR sources qualify for the General Permit. Facilities will be required to compare their PTE to the NSR major source thresholds to determine if they qualify for the General Permit. The NSR major source threshold for attainment areas is 250 tpy of any criteria pollutant. The NSR major source thresholds for nonattainment areas are summarized in Table 2 below:

Table 2: NSR Major Source Thresholds for Nonattainment Areas

Pollutant	Nonattainment Classification	NSR Major Source Threshold
Ozone	Marginal	100 tpy of VOC or NO _x
	Moderate	100 tpy of VOC or NO _x
	Serious	50 tpy of VOC or NO _x
	Severe	25 tpy of VOC or NO _x
	Extreme	10 tpy of VOC or NO _x
PM ₁₀	Moderate	100 tpy
	Serious	70 tpy
CO	Moderate	100 tpy
	Serious	50 tpy
SO ₂ , NO _x , PM _{2.5}	No nonattainment classification	100 tpy

If the facility's PTE is above the NSR major source threshold of 250 tpy, or above the applicable nonattainment area thresholds listed in Table 2 (for any pollutant for which the area in which the source is locating or modifying is designated nonattainment), then the facility does not qualify for the General Permit. Sources that will be synthetic minor sources and relying on the conditions in the General Permit to qualify as minor sources should use the conditions in the General Permit (such as limits on production and throughput) to determine their PTE and eligibility for the General Permit. However, until coverage under the General Permit is obtained, the source is a major source. The following documents are available to assist sources in the screening and application process:

- Questionnaire;
- Request for Coverage under the General Air Quality Permit;
- Instructions for the Request for Coverage under the General Air Quality Permit; and
- PTE calculator.

For facilities not exempt from the minor NSR program and having a PTE below the NSR major source thresholds, the facilities will further evaluate if they could meet the throughput limits and operating requirements

established in this General Permit. The specific requirements for the General Permit are discussed in Sections 4.3 and 4.4. The emissions associated with the throughput limits are lower than the NSR major source thresholds and were derived as described below in Section 5.

4.3 Specific Permit Requirements for General Permits

The terms and conditions of the General Permit were established according to the required permit content and analyses in the Federal Indian Country Minor NSR Rule. The required permit content is listed in 40 CFR 49.155(a) – *What information must my permit include?* Below we describe the basis for the permit conditions.

40 CFR 49.155(a)(1) – General Requirements

The rule establishes general requirements that each permit must identify: the effective date of the permit; the date by which the owner/operator must commence construction in order for the permit to remain valid; the emission units subject to the permit and their associated emission limitations; and monitoring, recordkeeping, and reporting requirements to assure compliance with the emission limitations.

The General Permit contains all of this required information, except for the emission units subject to the permit. Because of the nature of general permits we believe it is more appropriate to identify the emission units covered by the General Permit in the Approval of the Request for Coverage. The General Permit incorporates the Approval of the Request for Coverage into the General Permit. Each permit contains a separate section that specifically identifies the emission limitations and standards, monitoring and testing, recordkeeping, and reporting and notification requirements.

CFR 49.155(a)(2) – Emission Limitations

The permit must contain the emission limitations determined by the reviewing authority under 40 CFR 49.154(c) for each affected emissions unit. 40 CFR 49.154(c) – *How will the reviewing authority determine the emission limitations that will be required in my permit?* – identifies the case-by-case control technology review that must be used by the reviewing authority to determine the appropriate level of control. In carrying out the case-by-case control technology review, the reviewing authority must consider the following factors:

1. Local air quality conditions;
2. Typical control technology or other emission reduction measures used by similar sources in surrounding areas;
3. Anticipated economic growth in the area; and
4. Cost-effective emission reduction alternatives.

In addition, the reviewing authority must require a numerical limit on the quantity, rate or concentration of emissions for each regulated NSR pollutant emitted by each affected emissions unit, for which such a limit is technically feasible. The emission limitation required may also be included as pollution prevention techniques, design standards, equipment standards, work practices, operational standards or any combination thereof. However, the emission limitations must assure that each affected emission unit will comply with all requirements of 40 CFR parts 60, 61, and 63, as well as any federal or tribal implementation plans that apply to the unit. Finally, the emission limitations required may not rely on a stack height that exceeds good engineering practice or any other dispersion technique, except as allowed by 40 CFR 51.118(b).

To address the requirements for establishing emission limitations, the following consideration were used for setting the limits in the General Permit for SQCS facilities:

1. Local air quality conditions – To address this requirement, the General Permit requires sources locating in ozone and carbon monoxide nonattainment areas to meet more stringent requirements on fuel use – the main source of CO, NO_x, and VOC emissions at SQCS facilities. This will also ensure these sources are not major sources in those areas. Also, PM emission may be a concern for SQCS facilities, but the majority of those emissions are fugitive. The permit contains a requirement to take corrective action if fugitive dust is visible beyond the property line. This will aid in reducing the local PM air quality impacts.
2. Typical control technology or other emission reduction measures used by similar sources in surrounding areas – For sources locating in attainment areas we looked at the control requirements specified by 40 CFR parts 60, 61 and 63. These regulations establish minimum technology and emission limitations that must be met nationally and also meet the requirements of 40 CFR 49.154(c)(4) to ensure compliance with parts 60, 61, and 63. For this General Permit we considered regulations that apply to the equipment at SQCS facilities:
 - 40 CFR 60 Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Facilities;
 - 40 CFR 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984;
 - 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines; and
 - 40 CFR 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

These regulations cover emissions from the following equipment at SQCS facilities:

- Engines;
- Material handling equipment; and
- Fuel storage tanks.

The General Terms and Conditions in the General Permit are a standardized set of boilerplate conditions included with general permits. The conditions in the Specific Terms and Conditions section of the General Permit are developed from the Federal Indian Country Minor NSR Rule, NSPS, NESHAP, and the state permit examples.

The derivation of applicability thresholds and the production and fuel usage limits in the applicability questionnaire, application, and conditions in the General Permit are discussed fully in Section 5. The minor NSR thresholds are based on provisions of the Federal Indian Country Minor NSR Rule at 40 CFR 49.153 and are also discussed fully in Section 5.

Review of the regulations and other existing general permits resulted in permit conditions requiring emissions from all crushers, screens, drop points, and other possible release points to be controlled by wet suppression, limiting fugitive emissions from crushers to 12% opacity, limiting fugitive emissions from all other processes to 7% opacity, requiring fugitive emissions to be controlled by a fugitive dust control plan, requiring new stationary engines to be certified to Tier standards, and requiring existing stationary engines to meet maintenance requirements, a 49 ppm CO at 15% O₂ limit, or a 23 ppm CO at 15% O₂ limit based on engine size.

In addition, the stationary engines are limited to using diesel and biodiesel as fuels. All liquid fuels are limited to no more than 0.0015 percent sulfur by weight. These conditions represent the standard fuels used for this equipment and the standard sulfur content these fuels must attain. Although we reviewed the NSPS requirements for tanks, we did not include any limits in the permit as the tanks used by SQCS facilities will not need to meet the control requirements of the NSPS. The questionnaire limits eligibility for the General Permit to tanks less than 151m³ that store liquids with a true maximum vapor pressure less than 4.0 psi.

The General Permit includes the following requirements from the applicable NSPS and NESHAP requirements:

- 40 CFR 60.674(b) – requirements for wet suppression systems;
 - Table 2 to Subpart OOO of 40 CFR 60 – requirements for fugitive emissions;
 - 40 CFR 60.4204 and 60.4201(a) – certification to Tier standards;
 - 40 CFR 62.6603, 63.6640, and Table 2d to 40 CFR 63 Subpart ZZZZ – Emission limitation and operating standards;
 - 40 CFR 63.6612, 63.6625, 63.6630 and Table 5 to 40 CFR 63 Subpart ZZZZ – Initial compliance requirements;
 - 40 CFR 63.6640 and Table 6 to 40 CFR 63 Subpart ZZZZ – Continuous compliance requirements; and
 - 40 CFR 63.6604 – fuel requirements.
3. Anticipated economic growth in the area – The reviewing authority may consider anticipated economic growth when determining whether coverage under the General Permit is justifiable. Considering, however, that the General Permit sets emission standards that are consistent with what is required by SQCS facilities across the country in both attainment and nonattainment areas, we expect that this will rarely be a factor.
 4. Cost-effective emission reduction alternatives – The General Permit sets emission standards that are consistent with what is required by SQCS facilities across the country, based on the particular attainment status where the source is locating. As such, the chosen technologies are considered widely available and consideration of more cost-effective alternatives is not necessary at this time. We intend to periodically review technology costs in the future to determine when more stringent, cost-effective technologies become widely available.
 5. Co-location with another source – The General Permit allows for a SQCS facility to be co-located with a hot mix asphalt (HMA) plant also operating under a general permit. In addition, sources may request to take voluntarily lower material throughput limits to keep a co-located source below the Title V threshold. The material throughput limits and fuel consumption limits for co-located SQCS and HMA plants are specified in the respective permits.

40 CFR 49.155(a)(3) – Monitoring Requirements

The General Permit must include monitoring that is sufficient to assure compliance with the emission limitations that apply to the source. The General Permit requires monitoring that assures that the wet suppression system is operating properly, that a visible emissions survey is conducted on a weekly basis, that fugitive emissions surveys are conducted weekly, and that stationary engines with oxidation catalyst monitor the inlet temperature

and pressure drop. The General Permit also requires initial and continuing testing of compliance with the opacity limits.

40 CFR 49.155(a)(4) – Recordkeeping Requirements

The General Permit must include recordkeeping that is sufficient to assure compliance with the emission limitations and monitoring requirements, including certain statements listed in 40 CFR 49.155(a)(4)(i) and (ii). In addition to the recordkeeping requirements in 40 CFR 49.155(a)(4)(i), the General Permit also requires records of the amount of crushed rock, sand, and gravel produced each month, monthly fuel use, visible emission surveys, fugitive emission surveys, corrective actions taken, results of corrective actions taken, results of source tests, maintenance activities of stationary engines, and oxidation catalyst performance data, as applicable, for stationary engines.

40 CFR 49.155(a)(5) – Reporting Requirements

The General Permit includes the reporting requirements listed in 40 CFR 49.155(a)(5)(i) and (ii) related to annual reports and reporting of deviations.

40 CFR 49.155(a)(6) – Severability Clause

The General Permit includes a severability clause to ensure the continued validity of the other portions of the permit in the event of a challenge to a portion of the permit.

40 CFR 49.155(a)(7) – Additional Provisions

The General Permit contains the additional provision required for each permit. These conditions are found in the General Provisions of the General Permit.

4.3.1 Requirements for Sources Located in Nonattainment Areas

We did not include any additional requirements for sources locating in ozone nonattainment areas, other than the limits on monthly fuel use. We are not aware of any more stringent state/local control requirements for SQCS facilities in nonattainment areas. The limits on monthly fuel use will ensure that the General Permit applies to minor sources locating in these nonattainment areas.

4.4 Information on Completing Screening Processes that Have to Be Satisfied to Request Coverage under the General Permit

Prior to obtaining coverage under this General Permit, owners and operators must satisfactorily complete the screening processes for their source that are specified for threatened and endangered species and historic properties. Attached to the Request for Coverage Forms for the general permits, the EPA provides guidance to assist sources in completing these processes.

5. Emission Limitations⁷ and Surrogate Throughput Limits

5.1 Developing the Surrogate Limits and Limitations

The General Permit includes a rock, sand, and gravel throughput limit that applies to sources in both attainment and nonattainment areas that serves as a surrogate emissions limitation. The General Permit also includes surrogate fuel use limits that apply based on the particular ozone attainment or nonattainment classification in the area the source will locate. These surrogate limits correspond to a particular tpy emission rate, as discussed below.

The tpy emission rates used to determine eligibility for the General Permit for sources located in attainment and nonattainment areas corresponds to the source-wide PTE at which a source would become a major source and subject to Title V permitting (referred to hereafter as “the Title V major source threshold”). In attainment areas, the Title V major source threshold is 100 tpy for any criteria pollutant, 10 tpy for a single hazardous air pollutant (HAP), and 25 tpy for any combination of HAPs. The Title V major source threshold in nonattainment areas varies by the pollutant and the nonattainment classification.

The rock, sand and/or gravel throughput limit was established based on the Title V major source thresholds and assumptions about the equipment configuration at a “typical” rock, sand and/or gravel crushing facility. The assumptions about equipment configuration have a significant impact on the level of pollutants emitted. The rock, sand and/or gravel crushing permit materials from only two states (Indiana and Washington) contained information on the equipment configurations used in determining the PTE and rock throughput limits. The Indiana permit had figures for the number of crushing and screening machines for three different permit levels, but there was no information on other equipment (conveyors, storage piles, loading and unloading, etc) or how the emissions are calculated. The technical support document for the Washington Department of Ecology rock crushing permit contains more information on equipment and emissions calculations. The Washington Department of Ecology surveyed rock crushing operations and found that a typical rock crusher had three crushers, three screens, and six conveying operations. Their calculations include emissions from this equipment, as well as transfer operations and haul roads. The “typical facility” calculations supporting this General Permit use this same equipment configuration, and also include emissions from storage piles and truck unloading and loading operations. The EPA developed a limit calculator spreadsheet of PTE calculations showing pollutant emissions for the emission units at the “typical” rock, sand and/or gravel crushing and screening facility described above using AP 42 emission factors. Since AP 42 emission factors are not available for all types of operations at a rock, sand and/or gravel crushing facility, the EPA estimated some emission factors for primary and secondary crushing and screening, based on existing emission factors for tertiary crushing and screening and the relative surface area of the rock produced in each process. The calculations for these estimated emission factors are included in the PTE Calculator and Limit Calculator spreadsheets. The EPA then used the Limit Calculator spreadsheet to calculate the materials throughput limits for the SQCS General Permit, based on the emission limitations.

Chapter 11.19.1 (Sand and Gravel Processing) of AP 42 does not contain emission factors for the materials handling operations that occur at sand and gravel plants. The discussion in AP 42 on sand processing plants indicates that this material is excavated in a wet condition, and is processed with water. Under these conditions, particulate emissions would be minimal. In contrast, rock, sand and/or gravel crushing operations process a raw material that is dry and releases additional fine particulate matter when it is crushed, screened and handled. Emission factors for rock crushing operations have been developed, and emission estimates can be quantified, based on the amount of

⁷ The definition of emission limitation used in this Background Document is the one provided in the Federal Indian Country NSR rule (described in Section 4.3) and includes requirements established by the reviewing authority that relate to the operation of a source, which allows for the use of production throughput limits.

material and the steps in the process. The materials throughput limits in this General Permit are based on emissions from rock crushing, not sand and gravel processing. As there are no particulate emission factors for wet sand and gravel processing, no upper throughput limit for sand processing can be calculated. The raw materials limits in the General Permit, which are based on the particulate emissions from a specific configuration of rock crushing equipment, have been used for sand and gravel plants.

Although fuel usage limits are included in the permit, it is unknown whether an SQCS facility issued a general permit would be restricted by the fuel limit. Stationary rock crushers typically use utility electric power, while portable rock crushers use generators, which are nonroad engines. Nonroad engines are not subject to the Prevention of Significant Deterioration Program, Title V, or NSPS Subpart IIII, unless the engines remain in one place for more than one year, in which case they become stationary engines. For purposes of developing the General Permit, no limits have been included precluding the rock crushers from remaining in place for more than one year, so emissions from any stationary engines are counted when considering the pollutant thresholds.

The General Permit includes the rock throughput and fuel usage limits listed in Table 6 for SQCS plants located in attainment, unclassifiable or attainment/unclassifiable areas and nonattainment areas. The production limits and fuel usage limits for attainment, unclassifiable or attainment/unclassifiable areas and nonattainment areas are set at different levels because the EPA has selected different emissions limitations for attainment, unclassifiable or attainment/unclassifiable areas and nonattainment areas. The rock throughput and fuel usage limits are set at levels intended to keep the sources emissions below the NSR major source thresholds in Table 2, with an adequate margin to account for other pollutants emitted by the source. Table 3 shows the emission rates used to determine the rock throughput and fuel usage limits in the permit for SQCS facilities located alone. PM₁₀ is the controlling pollutant. The throughput calculations are contained in Attachment A. Table 4 shows the emission rates used to determine the rock throughput and fuel usage limits in the permit for SQCS facilities co-located with HMA plants.

Table 3: Emission Rates Used to Determine Production and Fuel Usage Limitations for Stone Quarrying, Crushing and Screening Facilities Located Alone

Pollutant of Concern	Attainment, Unclassifiable or Attainment/Unclassifiable Areas	Nonattainment Areas
CO	19 tpy	19 tpy (moderate and serious areas)
PM ₁₀ *	63 tpy	63 tpy (moderate and serious areas)
PM _{2.5} *	63 tpy	63 tpy
NO _x	88 tpy	88 tpy (marginal and moderate ozone areas)
		45 tpy (serious ozone areas)
		22.5 tpy (severe ozone areas)
		9 tpy (extreme ozone areas)
VOC	7 tpy	7 tpy (ozone areas)

*Note: The emission thresholds for these pollutants include fugitive emissions.

Table 4: Emission Rates Used to Determine Production and Fuel Usage Limitations for Stone Quarrying, Crushing and Screening Facilities Co-Located with Hot Mix Asphalt Facility

Pollutant of Concern	Attainment, Unclassifiable or Attainment/Unclassifiable Areas	Nonattainment Areas
CO	78 tpy	78 tpy (moderate)
		Not applicable
PM ₁₀	63 tpy	63 tpy (moderate)
		63 tpy (serious)
PM _{2.5}	30 tpy	30 tpy
SO ₂	18 tpy	18 tpy
NO _x	90 tpy	Not applicable (serious and above ozone areas)
		90 tpy (marginal and moderate ozone areas)
VOC	27 tpy	Not applicable (serious and above ozone areas)
		27 tpy (marginal and moderate ozone areas)

5.2 Emission Limitations

Two considerations form the basis for the upper eligibility emission limitations for general permits:

1. Are there any EPA regulation-based emission limitations?
2. Where do state programs establish eligibility limits?

5.2.1 EPA Regulation-Based Emissions Limitations

The only EPA regulation-based emissions limitations for rock crushing and screening facilities are the emission limitations from the exhaust of affected facilities equipped with capture systems of 0.014 grains per dry standard cubic foot of exhaust. Affected facilities are each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station. In general, facilities in attainment areas with PTE of any criteria pollutant equal or greater than 250 tpy are NSR major sources. Facilities with PTE of any criteria pollutant equal to or greater than 100 tpy or HAP emissions greater than 10 tpy for a single HAP and 25 tpy for total HAPs are subject to Title V operating permit program.

5.2.2 State Program Limits

The upper limits in state permits vary in that they either limit pollutant emissions or raw material and fuel throughput. Only the Indiana permit limits both emissions and raw material throughput. Indiana limits emissions of PM₁₀ from smaller SQCS facilities to less than 25 tpy, and limits emissions of PM₁₀ from large facilities to less

than 100 tpy. Alaska and Florida limit PM₁₀ emissions to less than 100 tpy. As mentioned previously, the rock throughput limits corresponding to the 100 tpy limit on PM₁₀ emissions vary from state to state, and the underlying assumptions and calculations are not explicitly stated. Since nearly all states require control of emissions from rock crushing equipment, and fugitive emissions as well, this may account for some of the variation seen in throughput limits from state to state. The Alaska permit⁸ does not contain throughput limits, but instead requires that applicants calculate their PTE of PM₁₀. This is a source-specific approach, and requires skilled permitting staff to verify that the calculations are accurate. The Indiana rock crushing permit,⁹ with its 100 tpy limit on PM₁₀ emissions, and similar emission control requirements, sets the throughput threshold at 3,000,000 tpy. The Wisconsin general permit¹⁰ is similar to the Indiana general permit in that it has a 100 tpy limit on PM₁₀ emissions, emission control requirements, and sets the throughput limit at 250,000 tons per month (equivalent to 3,000,000 tpy). A comparison of requirements for attainment and nonattainment areas is not possible due to lack of a distinction made in most state programs. The Arizona general permit¹¹ limits emissions of PM₁₀ to 13.64 tpy, but this may be due to the fact that nearly half of the counties in Arizona have been designated nonattainment for PM₁₀. The Arizona permit is one example of a SQCS permit designed for an area designated as nonattainment for PM₁₀. Table 5 shows the limits imposed by rock crushing and screening permits for the states reviewed.

Table 5: State Rock Crushing and Screening Permit Throughput Limits and Emission Limitations

State	Rock Throughput Limits	Criteria Pollutant Emission Limitations	Engine Fuel or Size Limit	Setback Required?	Fugitive Dust Controls Required?	Particulate Emissions Controls Required?
Alaska	Min: 5 tons per hour Max: None	All: 100 tpy	Less than 1,100 bhp	1,000 feet	No	No
Arizona	Min: 25 tons per hour Max: None	PM ₁₀ : 13.64 tpy NO _x , CO: 90 tpy	None	None	Yes	Yes
Florida	Min: None Max: None	All: 100 tpy	275,000 gal diesel/year	None	Yes	Yes
Indiana (small)	Min: None Max: 1,000,000 tpy	PM ₁₀ : 25 tpy	None	None	Yes	Yes
Indiana (large)	Min: None Max: 3,000,000 tpy	PM ₁₀ : 100 tpy	None	None	Yes	Yes
Washington	Min: None Max: 14,500 tons per day, 1,500,000 tpy	None	None	150 feet	Yes	Yes

⁸ For more information, go to: <http://dec.alaska.gov/air/ap/docs/MG9%20Final%20Permit%204-8-09.pdf>.

⁹ For more information, go to: http://www.in.gov/idem/5157.htm#oag_permits_ssoa.

¹⁰ For more information, go to: <http://dnr.wi.gov/files/PDF/pubs/am/AM381.pdf>.

¹¹ For more information, go to: <http://www.azdeg.gov/environ/air/permits/download/gncspermit.pdf>.

State	Rock Throughput Limits	Criteria Pollutant Emission Limitations	Engine Fuel or Size Limit	Setback Required?	Fugitive Dust Controls Required?	Particulate Emissions Controls Required?
Wisconsin	Min: None Max: 250,000 tons per month	PM ₁₀ : 100 tpy	20,000 gal/month (6,870 gal/month in ozone non-attainment area)	None	Yes	Yes

5.3 Calculating the Surrogate Throughput Limits

For new or modified SQCS facilities, the Title V major source thresholds are used as the emission rates for calculating throughput limits, with an adequate margin to account for other pollutants emitted by the source. The EPA evaluated the emission rates at which a new or modified source would become a major source under Title V. This is 100 tpy for PM₁₀, PM_{2.5}, NO_x, VOC, and CO in attainment areas (the tpy number varies for nonattainment areas for these pollutants). The EPA established limits for PM₁₀, PM_{2.5}, NO_x, and CO to meet the emission rates in Table 3 of this document. The EPA back-calculated the throughput of materials and usage of fuels that yielded emissions at these limits by using the equipment profile from the Washington Department of Ecology permit support document and emission factors from AP 42, Chapter 11.9.2. These results are shown in Table 6 for SQCS facilities located alone. PM₁₀ and NO_x are the limiting pollutants. The equivalent materials throughput and fuel usage limits are incorporated into the permit documents as the upper limits for materials throughput and fuel usage for attainment and nonattainment areas. Using these limits will also ensure that major source NSR will not be triggered for any new or modified source. Sample calculations showing the methodology used are in Attachment C.

Table 6: Surrogate Rock Throughput and Fuel Usage Upper Limits for a SQCS Facility Located Alone

Attainment Status	Upper Rock Throughput Limit (tons per month)	Upper Fuel Usage Limit (gallons per month)
Ozone Attainment, Unclassifiable and Attainment/Unclassifiable Areas and Marginal/Moderate Areas for Ozone	1,100,000	24,200
Serious Nonattainment Areas for Ozone	1,100,000	12,000
Severe Nonattainment Areas for Ozone	1,100,000	5,500
Extreme Nonattainment Areas for Ozone	1,100,000	1,900

The EPA used the same procedures for calculating the equivalent materials throughput and fuel usage limits for a SQCS operation co-located with a HMA operation and voluntarily taking lower limits to avoid the Title V program. These limits are incorporated into the permit documents as the upper limits for materials throughput and fuel usage for co-located SQCS/HMA plants. These results are shown in Table 7.

Table 7: Surrogate Rock Throughput and Fuel Usage Upper Limits for a SQCS Facility Co-Located with a HMA Plant

Upper Rock Throughput Limit (tons per month)	Upper Fuel Usage Limit (gallons per month)
730,000	18,275

References

40 CFR 49.1 – 40 CFR 49.173, Indian Country Air Quality Planning and Management.

<http://www.gpo.gov/fdsys/pkg/CFR-2011-title40-vol1/pdf/CFR-2011-title40-vol1-part49.pdf>

40 CFR 52.21, Prevention of Significant Deterioration of Air Quality.

<http://www.gpo.gov/fdsys/pkg/CFR-2007-title40-vol3/xml/CFR-2007-title40-vol3-sec52-21.xml>

40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=f2c4f71bd50d2a8883adafec36732010&rgn=div6&view=text&node=40:6.0.1.1.1.98&idno=40>

40 CFR Part 60, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants.

<http://www.gpo.gov/fdsys/granule/CFR-2012-title40-vol7/CFR-2012-title40-vol7-part60-subpartOOO/content-detail.html>

40 CFR Part 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutant for Reciprocating Internal Combustion Engines (RICE).

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<http://www.dep.wv.gov/daq/planning/inventory/Documents/EIIP%20V02%20Ch13%20Stone%20Mining%20and%20Quarrying%20Operations.pdf>

Federal Register Vol. 76, No. 127, July 1, 2011, Pages 38748-38808, “Review of New Sources and Modifications in Indian Country; Final Rule” (Indian Country NSR Rule).

<http://www.gpo.gov/fdsys/pkg/FR-2011-07-01/pdf/2011-14981.pdf>

Florida Department of Environmental Protection, “Nonmetallic Mineral Processing Plant (Crusher) Air General Permit Registration Form.” <http://www.dep.state.fl.us/air/emission/mineral.htm>

Indiana Department of Environmental Management, “OA-08 Crushed Stone Processing Plants.”

http://www.in.gov/idem/5157.htm#oag_permits_gsd

South Coast Air Quality Management District, Rule 1157 “PM₁₀ Emission Reductions from Aggregate and Related Operations.” <http://www.aqmd.gov/rules/reg/reg11/r1157.pdf>

Washington Department of Ecology, “Suitability of Rock Crushing Operations for Air Quality General Order of Approval.” http://www.ecy.wa.gov/programs/air/AOP_Permits/Boiler/TTODd/PDFS/ROCKCRUSHER.PDF

Wisconsin Dept. of Natural Resources, “Air Program Fact Sheet - General Permits for Crushers.” <http://dnr.wi.gov/files/PDF/pubs/am/AM381.pdf>

**Attachment A:
Sample Emissions Calculations for Rock Throughput and Fuel Usage
Limits for Ozone Attainment and Nonattainment Areas for SQCS Facilities Located Alone**

Emissions from Crushing, Screening, and Conveying:

Type of Operation	Emission Factors (lbs/ton)
	PM ₁₀
Truck Unloading – Fragmented Stone	0.000016
Primary Crushing	0.00014
Screening of Primary Crusher Output	0.00019
Conveyor Transfer Point (2 drop points)	0.000046 x 2
Secondary Crushing	0.00027
Screening of Secondary Crusher Output (Controlled)	0.00037
Conveyor Transfer Point (2 drop points)	0.000046 x 2
Tertiary Crushing	0.00054
Screening of Tertiary Crusher Output	0.00074
Conveyor Transfer Point (2 drop points)	0.000046 x 2
Fines Crushing	0.0012
Fines Screening	0.0022
Conveyor Transfer Point (2 drop points)	0.000046 x 2
Dry Sand and Gravel Screening	0.0022
Dry Sand and Gravel Conveying (4 drop points)	0.000046 x 4
Truck Loading – Conveyor, crushed stone	0.0001
<i>Total PM₁₀ Emissions Factor</i>	0.008518

Emission factors from AP 42 Table 11.19.2-2, for controlled sources

PM₁₀ for SQCS operations:

$$\begin{aligned}
 \text{PM}_{10} &= \text{Monthly throughput limitation} \times \text{emissions factor} \times 12 \text{ months/year} \times \text{lbs to ton conversion} \\
 \text{PM}_{10} &= 1,100,000 \text{ (tons/month)} \times 0.008518 \text{ (lbs/ton)} \times 12 \text{ months/year} \times 1/2,000 \text{ (tons/lb)} \\
 &= 56.2 \text{ tpy}
 \end{aligned}$$

NO_x Emissions from Engines by Ozone Area:

Ozone Attainment Areas and Marginal or Moderate Ozone Nonattainment Areas:

$$\begin{aligned}
 \text{NO}_x &= \text{Monthly throughput limitation} \times 12 \text{ months/year} \times \text{fuel heat content} \times \text{emissions factor} \times \text{lbs to ton conversion} \\
 \text{NO}_x &= 24,200 \text{ (gallons/month)} \times 12 \text{ months/year} \times 1.37 \text{ MMBtu/gal} \times 4.41 \text{ (lb/MMBtu)} \times \\
 &\quad 1/2,000 \text{ (tons/lb)} \\
 &= 88.2 \text{ tpy}
 \end{aligned}$$

Serious Ozone Nonattainment Areas:

NO_x = Monthly throughput limitation x 12 months/year x fuel heat content x emissions factor x lbs to ton conversion

NO_x = 12,000 (gallons/month) x 12 months/year x 1.37 MMBtu/gallon x 4.41 (lb/MMBtu) x 1/2,000 (tons/lb)
= 43.7 tpy

Severe Ozone Nonattainment Areas:

NO_x = Monthly throughput limitation x 12 months/year x fuel heat content x emissions factor x lbs to ton conversion

NO_x = 5,500 (gallons/month) x 12 months/year x 1.37 MMBtu/gallon x 4.41 (lb/MMBtu) x 1/2,000 (tons/lb)
= 20.1 tpy

Extreme Ozone Nonattainment Areas:

NO_x = Monthly throughput limitation x 12 months/year x fuel heat content x emissions factor x lbs to ton conversion

NO_x = 1,900 (gallons/month) x 12 months/year x 1.37 MMBtu/gallon x 4.41 (lb/MMBtu) x 1/2,000 (tons/lb)
= 6.9 tpy