



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

<http://www.epa.gov/air/tribal/tribalnsr.html>

Background Document: General Air Quality Permit for New or Modified Minor Source Graphic Arts and Printing Operations in Indian Country

Version 1.0

Last Modified: July 1, 2016

1. Graphic Arts and Printing Operations Source Category Definition

A graphic arts and printing operation is any facility which uses offset lithographic, sheet-fed, letterpress, rotogravure, and flexographic methods to apply ink and other coatings to paper, cardboard, metal, and other surfaces by means of a printing press. The General Air Quality Permit for New or Modified Minor Source Graphic Arts and Printing Operations only covers graphic arts and printing operations that are located at minor New Source Review (NSR) sources.

2. Source Category Characterization

The operations and equipment at a typical graphic arts and printing operation are described in AP 42, Chapters 4.9.1, General Graphic Printing, and 4.9.2, Publication Gravure Printing.¹ Graphic arts and printing operations are a segment of the larger surface coating industry. In graphic arts and printing operations, coatings are applied to a wide variety of substrates by means of a printing press. The substrates or surfaces can be newsprint, coated and uncoated paper, cardboard, metal, sheet plastics, fabrics, and other thin, flexible materials. The inks are composed of: pigments, which impart the color; binders, which are composed of resins, polymers, oils, or resins and which bind the pigment to the substrate; and solvents, which dissolve and disperse the pigments and binder to enable application. Depending on the type of process and inks, heat may be used to 'set' the inks. Incinerators may be used to destroy volatile organic compounds (VOC) evaporated from the inks during printing. Solvent compounds are used both during press operations to maintain print quality and during cleanup of the presses.

Lithography is characterized by a planographic image carrier, in which the image and nonimage areas are on the same plane. The image area is ink wettable and water repellent, and the nonimage area is chemically repellent to ink. In "offset" lithography, the image is applied to a rubber-covered "blanket" cylinder and then transferred onto the substrate. In "sheet-fed" printing, individual sheets of paper or substrate are sent through the press, and one color of ink is added during each pass. In "web" printing, a continuous roll of paper or substrate (the 'web') is fed through the press, and then cut after printing is finished. Web printing can be used to apply multiple inks and coatings to a substrate to produce a multi-color product in a single pass. Multicolor web offset printing employs "heatset" inks that dry very quickly. After receiving inks, the web passes through a dryer tunnel at about 400-500 degrees Fahrenheit, where the ink is dried. The web then passes over chiller rolls, prior to folding and cutting. Newspapers are produced using web offset printing methods, but a web newspaper printing line contains no dryer, because the ink contains very little solvent, and somewhat porous paper is generally used.

In letterpress printing, the image area is raised, and the ink is transferred to the paper directly from the image surface. The image carrier may be made of metal or plastic. Letterpress printing can use either solvent-borne, or

¹ AP 42, Chapters 4.9.1, General Graphic Printing and 4.9.2, Publication Gravure Printing, April 1981, <http://www.epa.gov/ttn/chief/ap42/ch04/index.html>.

non-solvent-borne inks, depending upon the process. Some letterpress newspaper and sheet-fed printing processes use oxidative drying inks, which are not a source of VOC emissions. Publication letterpress printing uses a paper web that is printed on one side at a time and dried after each color is applied. The inks employed are heatset inks, usually of about 40 volume percent solvent.

In gravure printing, the image area is engraved, or "intaglio" relative to the surface of the image carrier, which is a copper-plated steel cylinder that is usually also chrome plated to enhance wear resistance. The gravure cylinder rotates in an ink trough or fountain. The ink is picked up in the engraved area, and ink is scraped off the nonimage area with a blade. The image is transferred directly to the web when it is pressed against the inked cylinder by a rubber covered impression roll, and the product is then dried. Rotary gravure (web fed) systems are known as "rotogravure" presses. Rotogravure can produce illustrations with excellent color control, and it may be used on coated or uncoated paper, film, foil, and almost every other type of substrate. The inks used in rotogravure publication printing contain from 55 to 95 volume percent low boiling solvent (average is 75 volume percent), and they must have low viscosities. Rotogravure is similar to letterpress printing in that the web is printed on one side at a time and must be dried after application of each color.

In flexographic printing, as in letterpress, the image area is above the surface of the plate. The distinction is that flexography uses a rubber image carrier and alcohol-based inks. The process is usually web fed and is employed for medium or long multicolor runs on a variety of substrates, including heavy paper, fiberboard, and metal and plastic foil. Flexography can use steam set inks, which are low-viscosity inks of a paste consistency that are gelled by water or steam and produce no significant emissions. Water-based inks, usually pigmented suspensions in water, are also available for some flexographic operations. Solvent-based inks are used primarily in publication printing. Flexography publication printing uses very fluid inks of about 75 volume percent organic solvent which are alcohol or alcohol-based.

Printing operations can give off significant emissions of VOCs. Such emissions vary with printing process, ink formulation and coverage, press size and speed, and operating time. Emission points from printing include: the ink fountains/inking mechanism, the dampening/roller cleaning system, the plate and blanket cylinders, the dryer (if any), the chill rolls, and the final printed product. Overall solvent emissions can be computed using material balance equations. Thermal incinerators and carbon adsorbers are used to control VOC emissions from printing operations. VOC emissions can also be reduced by using waterborne inks.

3. State Minor Source Permit Programs

The U.S. Environmental Protection Agency (EPA) researched state air quality permitting websites for examples of permits by rule and general permits for printing operations. 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 printing operations. The EPA examined permit by rule and general permit documents for printing operations in Connecticut, Florida, Indiana, Maryland, Missouri, Nebraska, New York, Ohio, Oklahoma, Pennsylvania, Texas, and Wisconsin in developing this General Permit. The EPA chose general permits and permits by rule 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.

The state general permits and permits by rule for printing facilities vary from the streamlined (Indiana, at two pages for a graphic arts operation) to the detailed (Nebraska and Texas at 22 pages, and Oklahoma at 26 pages). The state printing permits typically limit either pollutant emissions or materials usage.

Some of the state general permits (Connecticut, Florida, New York, Oklahoma, and Pennsylvania) specify de minimis levels below which no permit is needed. The upper levels of emissions for which general permits will be issued vary widely. Connecticut, Florida, Nebraska, New York, Oklahoma, Pennsylvania, and Wisconsin issue general permits for printing for true minor sources or sources with potentials to emit (PTEs) above major source levels (synthetic minor sources), but the permits limit emissions to less than major source levels. Missouri and Ohio issue general permits for printing operations whose PTE of VOC is less than 40 tons per year (tpy), while Indiana, Maryland, and Texas issue permits to sources whose PTE of VOC does not exceed 25 tpy. Indiana, New York, and Texas have special restrictions on VOC emissions for printing operations located in ozone nonattainment areas. Indiana's Source Specific Operating Agreements and Maryland's general permit for printing operations are perhaps the most stringent, limiting emissions of VOC to less than 5 tpy.

Some states that limit emissions (Florida and Ohio) also specify materials throughput limits for each specific type of printing operation (heatset offset lithographic, non-heatset offset lithographic, digital, screen, letterpress, water-based ink, ultraviolet cured inks, flexographic, and rotogravure). These material throughput limits vary by state. States that limit materials usage calculate the materials throughput limits based on assumptions about the VOC and hazardous air pollutant (HAP) content of typical materials. These vary slightly from state to state. The state permits account for emissions from other sources (heaters, etc.) located at the printing shop to varying degrees, mostly by limiting emissions from the printing operations to a margin (20% or greater) below major source levels.

There are three federal regulations that can apply to graphic arts and printing operations. These are the New Source Performance Standards (NSPS) Subpart QQ, NSPS Subpart FFF, and the National Emission Standard for Hazardous Air Pollutants (NESHAP) Subpart KK. None of the state permits incorporate the text of the NSPS or NESHAP into the text of the permit, but some states (Connecticut, Nebraska, Oklahoma, and Texas) incorporate the Subpart QQ, Subpart FFF, and Subpart KK requirements by reference, or simply require that sources comply with the requirements of the federal NSPS and NESHAP regulations.

Table 4 in Section 5.2.2 contains a summary of the printing permit requirements by state.

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 graphic arts and printing operations located in Indian country. These consist of the following documents:

- Questionnaire: Assists the facility owner or operator in determining whether they are eligible for the General Permit;
- Request for Coverage Form under the General 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 Form for the General Permit;
- General 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
- Potential to Emit (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 emissions increase in potential emissions) lower than the minor NSR thresholds specified in the provisions of the Federal Indian Country Minor NSR rule (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
Carbon Monoxide (CO)	10 tpy	5 tpy
PM	10 tpy	5 tpy
PM ₁₀	5 tpy	1 tpy
PM _{2.5}	3 tpy	0.6 tpy
Sulfur Dioxide (SO ₂)	10 tpy	5 tpy
Nitrogen Oxides (NO _x)	10 tpy	5 tpy
Volatile Organic Compounds (VOC)	5 tpy	2 tpy

Under current EPA policy, true or synthetic minor NSR sources qualify for the General Permit for graphic arts and printing operations. Therefore, facilities will be required to compare their PTE to the NSR major source thresholds to determine if they qualify for the General Permit for graphic arts and printing operations. 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

Pollutant	Nonattainment Classification	NSR Major Source Threshold
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 that is designated nonattainment in the area the source will locate), then the facility does not qualify for the General Permit. 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.

The questionnaire and the application for the graphics arts and printing operations permits contain questions designed to limit the availability of this General Permit to minor source graphic arts and printing operations. 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 can meet the emission limitations established in this General Permit. The specific requirements for the General Permit are discussed in Sections 4.3 and 4.4. Section 5 provides background on the emissions limitations provided in the graphic arts and printing operations General Permit.

Facilities with HAP emissions at or above the major source thresholds are not eligible for a general permit under the minor NSR program. The major source thresholds for HAPs are 10 tons per rolling 12-month period for a single HAP and 25 tons per 12-month rolling period for any combination of HAPs. If, after construction or modification, the facility's HAP emissions exceed the major source thresholds, then the facility will need to apply for a site-specific permit.

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 is a description of 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, 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.

40 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. In this General Permit for graphic arts and printing operations, limits are placed on VOC emissions, as these are the primary pollutants emitted by these types of facilities. 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 graphic arts and printing operations:

1. Local air quality conditions – To address this requirement, the General Permit requires sources locating in ozone nonattainment areas to meet more stringent VOC emission limits. This will also ensure these sources are not major sources in those areas.
2. Typical control technology or other emission reduction measures used by similar sources in surrounding areas – For sources locating in attainment areas, the EPA looked at the control requirements required 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 sources locating in nonattainment areas, the EPA looked at the control requirements specified by California’s Air Quality Management Districts.² For this General Permit, the EPA considered the following regulations and control technique guidelines that apply to equipment at graphic arts and printing facilities:³

² South Coast Air Quality Management District, Rule 1130 – Graphic Arts, http://www.aqmd.gov/rules/reg/reg11_tofc.html.

³ This General Permit does not include requirements for emergency engines. However, sources can qualify for the General Permit with “exempt” emergency generator engines present at sources pursuant to section 49.153(c) of the Federal Indian Country Minor NSR rule. Under the Federal Indian Country Minor NSR rule, emergency generator engines are “exempt” provided the combined maximum engine power of all emergency generator engines at the permitted source is below 1,000

- 40 CFR 60 Subpart QQ: Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing;
- 40 CFR 60 Subpart FFF: Standards of Performance for Flexible Vinyl and Urethane Coating and Printing;
- South Coast Air Quality Management District (SCAQMD), Rule 1130, "Graphic Arts";
- Control Techniques Guidelines (CTGs) for Flexible Package Printing, EPA 453/R-06-003, U.S. Environmental Protection Agency, September 2006; and
- CTGs for Offset Lithographic Printing and Letterpress Printing, EPA-453/R-06-002, U.S. Environmental Protection Agency, September 2006.

These regulations and guidelines cover emissions from the following equipment at graphic arts and printing operations:

- Publication rotogravure printing presses;
- Rotogravure printing lines used to print or coat flexible vinyl or urethane products;
- Product and packaging rotogravure presses;
- Flexographic printing presses;
- Lithographic printing presses; and
- Letterpress printing.

The conditions in the Emission Limitations and Standards section of the General Permit were developed from the NSR Rule, NSPS, CTGs, SCAQMD Rule 1130, and the state permit examples. The derivation of the emission limitations in the General Permit are discussed in Section 5. The minor NSR thresholds are based on provisions of the *Review of New Sources and Modifications in Indian Country* rule at 40 CFR 49.153 and are provided in Table 1.

Review of the regulations and other existing permits resulted in permit conditions requiring:

- Source-wide VOC emissions from all printing lines to be limited to specific levels, depending upon the attainment status of the facility's location;
- Limits on VOC emissions from individual printing presses:
 - The permittee must not allow uncontrolled VOC emissions from an individual printing press (printing line) to exceed 25 tpy (compliance with this condition shall not consider the reduction in emissions from any add-on control technology);
- Standards for flexible packaging printing operations:
 - Except as allowed by add-on control, the permittee must not apply any coating, inks or adhesives in flexible packaging printing operations (including flexographic and rotogravure operations) unless the VOC content is equal to or less than:
 - 0.16 pounds (lbs) VOC/lb material (or 16% VOC by weight or 160 grams/liter (g/L)), as applied less water; OR

hp in attainment areas or 500 hp in ozone nonattainment areas classified as serious or lower. There are no exemptions for emergency generator engines located in ozone nonattainment areas classified as severe or extreme. Therefore, your source does not qualify for the General Permit if it contains an emergency engine and is located in a severe or extreme ozone nonattainment area.

- 0.5 lbs VOC/lb coating solids, as applied less water;
 - Standards for offset lithographic and letterpress printing operations:
 - Except as allowed by add-on control, the permittee shall limit VOC emissions from lithographic and letterpress printing as follows:
 - On-press, as applied, fountain solution for *heatset web offset lithographic printing* shall not exceed:
 - 16 g/L (or 1.6% by weight) of VOC when using alcohol in the fountain; OR
 - 30 g/L (or 3 % by weight) of VOC when using alcohol in the fountain, if the fountain solution is refrigerated to below 60°F; O
 - 50 g/L (or 5% by weight) of VOC when using no alcohol in the fountain solution.
 - On-press, as applied, fountain solution for *sheet-fed offset lithographic printing* shall not exceed:
 - 50 g/L (or 5% by weight) of VOC when using alcohol in the fountain; OR
 - 85 g/L (or 8.5% by weight) of VOC when using alcohol in the fountain, if the fountain solution is refrigerated to below 60°F; OR
 - 50 g/L (or 5% by weight) of VOC when using no alcohol in the fountain solution.
 - On-press, as applied, fountain solution for *coldset web offset lithographic printing* shall not exceed:
 - 50 g/L (or 5% by weight) of VOC. The use of alcohol containing fountain solutions is prohibited for use in non-heatset web-fed operations;
 - Add-on control option:
 - In lieu of complying with the VOC content limits in the General Permit, the permittee may comply by using a VOC emissions collection and control system, provided the emissions control system collects at least 85 percent, by weight, of the emissions generated and:
 - Has a destruction efficiency of at least 95 percent, by weight; or
 - Has an output of less than 50 parts per million (ppm) calculated as carbon with no dilution;
 - Standards for cleaning operations:
 - The VOC content of cleaning materials used for cleaning operations shall not exceed 70% by weight;
 - Standards for combustion equipment, except engines:
 - The combined maximum heat input rating of all combustion equipment (including ovens, dryers and oxidizers, but excluding engines) shall not exceed 10 million British thermal units (MMBtu)/hour (hr).
 - Each combustion unit located at a permitted source in a severe or extreme severe ozone nonattainment area shall meet these additional requirements:
 - Combustion equipment shall burn only gaseous fuels, and
 - The NO_x emissions from each combustion unit shall not exceed 30 ppm_{dv} at 3% oxygen or 0.036 lbs/MMBtu based on a 15-minute average. If the combustion unit is also used as a control device to oxidize air contaminants, then compliance shall be determined when only burning gaseous fuel and not when other air contaminants are present;
 - Exemption for sheet-fed offset lithographic printing:

- The requirements for Offset Lithographic and Letterpress Printing Operations do not apply to sheet-fed presses with sheet sizes of 11 inches by 17 inches or smaller OR any press with a total fountain solution reservoir of less than 1 gallon (3.785 liters);
 - Exemption for flexible packaging printing operations:
 - For graphic arts and printing operations located in areas designated as ozone attainment, unclassifiable and attainment/unclassifiable, marginal ozone nonattainment, or moderate ozone nonattainment, the permittee may use up to 110 gallons (416 liters) per calendar year of VOC-containing material that does not meet the requirements for Flexible Packaging Printing Operations.
 - All VOC-containing material (e.g., inks, adhesives, coatings, thinners, and clean-up solvents) must be stored in closed containers with labels that clearly identify the contents of the containers;
 - All waste materials containing VOC (e.g., soiled rags) must be stored in sealed containers until properly disposed;
 - Sources must implement procedures to minimize spills of any VOC-containing material during handling and transfer to and from containers, enclosed systems, waste receptacles and other equipment; and
 - Sources located in serious, severe or extreme ozone nonattainment areas meet certain additional requirements.
3. Anticipated economic growth in the area – The Reviewing Authority may consider anticipated economic growth when determining whether coverage under the permit is justifiable. Considering, however, that the permit sets emission standards that are consistent with what is required by graphic arts and printing facilities across the country in both attainment and nonattainment areas, the EPA expects that this will rarely be a factor.
4. Cost-effective emission reduction alternatives – The permit sets emission standards that are consistent with what is required of graphic arts and printing 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. The EPA intends to periodically review technology costs in the future to determine when more stringent, cost-effective technologies become widely available.

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

This General Permit must include monitoring that is sufficient to assure compliance with the emission limitations that apply to the source. For graphic arts and printing operations, the permit requires monitoring of all VOC-containing material on at least a weekly basis. For a permitted source located in a serious, severe, or extreme ozone nonattainment area, the permittee must monitor usage of all VOC-containing material on a daily basis. The permit requires initial performance testing of add-on control equipment and initial performance testing for combustion units in severe and extreme ozone nonattainment areas.

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, the General Permit requires a monthly log of inks, coatings, adhesives, fountain-solution alcohol, thinners, cleaners, and any other VOC-containing materials used at the facility. For each VOC-containing material the list must identify the type of material (ink, coating, adhesive, cleaning material etc.), the density of

the material in pounds (lbs)/gallon (gal) or grams/liter, and the VOC content of the material in percent by weight, grams/liter or lb/gal. In addition:

- For each fountain solution, the log must identify whether the solution is alcohol-based or non-alcohol-based;
- For each coating, ink or adhesive used in flexible packaging printing operations, the log must identify the lbs VOC/lb material OR the lbs VOC/lb solids; and
- For each coating, ink or adhesive for a permitted source located in a serious, severe, or extreme ozone nonattainment area, the log must identify the VOC content in grams/liter or lbs/gal.

The permittee must maintain monthly usage records in gallons or liters of graphic arts materials and cleaning solutions showing the type and amount used of each graphic-arts ink, coating, adhesive, fountain solution, blanket wash, and all other cleaning solutions or VOC-containing materials. The permittee must maintain monthly records of uncontrolled VOC emissions from each printing press and the resulting 12-month rolling total of VOC emissions each calendar month. The permittee must also maintain monthly records of VOC emissions from the combination of all graphic arts and printing operations and the resulting 12-month rolling total of VOC emissions for the previous eleven (11) months.

The results of each performance test conducted must be recorded and records maintained in the following areas:

- The date of each test;
- Each test plan;
- Any documentation required to approve an alternate test method;
- Conditions during the test;
- The results of each test; and
- The name of the company or entity conducting the analysis.

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

The permit includes the reporting requirements listed in 40 CFR 49.1559(a)(5)(i) and (ii) related to annual reports and reporting of deviations.

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

The 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. This condition is found in the General Provisions of the General Permit.

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

The permit contains the additional provision required for each permit. These conditions are found in the General Provisions, Changes to this General Permit, and Obtaining Coverage under this General Permit sections of the General Permit.

4.3.1 Requirements for Sources Located in Nonattainment Areas

The EPA has included additional requirements for graphic arts and printing operations locating in ozone nonattainment areas. The VOC emission limitations for the entire source vary, depending upon the severity of

the location's ozone nonattainment classification. The permit also requires lower VOC content for inks, coatings, fountain solutions, and adhesives for sources located in serious, severe, or extreme ozone 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 or endangered species and historic properties. Appendices A and B to the Request for Coverage contain the EPA's guidance to assist source owners and operators in completing these processes.

5. Emission Limitations⁴

5.1 Developing the Emission Limitations

The General Permit includes source-wide VOC emission limitations. The VOC limitations vary depending upon the ozone attainment status of the area where the source will locate. The emission limitations in Table 3 are for sources located in attainment and nonattainment areas and are approximately 50 – 70% of the corresponding NSR major source threshold in Table 2. To determine compliance with the limitations, the source is required to calculate their emissions on a monthly based on the quantity of VOC-containing materials they use per their type of printing operation. VOC emissions are calculated using the type of printing operation, the amount and VOC content of the materials, and assumptions about the percentage of VOC released from those materials. The VOC calculations are based on material balance, and can be calculated using the PTE Calculator provided by the EPA.

These limits on PTE are well below the levels at which a source would become a major source and subject to Title V permitting. Limits on emissions of HAPs are not included in the permit. Since the promulgation of 40 CFR 63, Subpart KKK in May of 1996, the HAP content of commercially-available printing inks, coatings, adhesives, solvents, and other materials has decreased to the point where a violation of the HAP major source thresholds (10 tpy) for a single HAP and 25 tpy for any combination of HAPs) is unlikely. The permit also contains material-specific VOC limitations that were derived from the NSPS regulations, the state permits, and the SCAQMD Rule 1130.

In this General Air Quality Permit for New or Modified Minor Source Graphic Arts and Printing Operations, limits are placed on VOC emissions from the graphic arts and printing facilities, in order to limit emissions to below the NSR major source thresholds. The source-wide VOC emission limitations varies according to the ozone attainment status and nonattainment classification of the location in which the facility is located. Table 3 contains emission rates intended to enable graphic arts and printing operations to meet the permit's emission limitations and remain a minor source. In terms of emission limitations, an owner wanting to construct a new printing operation in an attainment area would be limited to installing equipment with a PTE of VOC less than 75 tpy. In addition, the combined maximum heat input rating of all combustion equipment (including ovens, dryers and oxidizers, but excluding engines) must not exceed 10 MMBtu/hr. Each combustion unit located at a permitted source in a severe or extreme severe ozone nonattainment area must burn only gaseous fuels, and the NO_x emissions from each combustion unit must meet certain emission standards. The General Permit also

⁴ The definition of emission limitation used in this background document is the one provided in the Federal Indian Country Minor NSR rule at 40 CFR 49.152 and includes requirements established by the reviewing authority that limit the quantity of air pollutants, and includes any requirement relating to the operation of a source.

requires that no one printing line emit more than 25 tpy of VOC. Applicants can calculate the PTE of their proposed facility using the PTE calculator provided at <http://www.epa.gov/air/tribal/tribalnsr.html>. Attachment A provides an example emissions calculation for printing operations.

Table 3: Emissions Rates for Graphic Arts and Printing Operations

Pollutant of Concern	Attainment, Unclassifiable or Attainment/Unclassifiable Areas	Nonattainment Areas
VOC	80.6 tpy	52.8 tpy (marginal and moderate ozone areas)
		27.8 tpy (serious ozone areas)
		15.5 tpy (severe ozone areas)
		7.5 tpy (extreme ozone areas)
NO _x	9.0 tpy	5.7 tpy (marginal, moderate, and serious ozone areas)
		6.2 tpy (severe and extreme areas)
CO	5.3 tpy	5.3 tpy
SO ₂	0.2 tpy	0.2 tpy
PM	0.5 tpy	NA
PM ₁₀	0.5 tpy	0.5 tpy
PM _{2.5}	0.5 tpy	0.5 tpy

5.2 Emission Limitations

Two considerations form the basis for the upper eligibility emission limitations for the General Permit:

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

Facilities in attainment areas with a PTE of any criteria pollutant equal or greater than 250 tpy are NSR major sources. Facilities with a 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. We have established emission limitations to keep sources' emissions below major source levels. We have also limited eligibility for the General Permit to area sources of HAP emissions, so that we did not have to evaluate and determine the emission limitations that would assure compliance with the requirements in 40 CFR part 63 for major sources of HAP emissions.

5.2.2 State Program Limits

The state permits either limit pollutant emissions or raw material throughput. Only the Florida, Ohio, and Wisconsin permits limit both pollutant emissions and raw material throughput. The state permit limits on actual VOC emissions vary widely. For sources in ozone attainment areas, state VOC permit limits are:

- Indiana limits actual VOC emissions of VOC to 2.74 tpy;
- Ohio limit is less than 10 or 25 tpy of VOC, depending upon the size of the source;
- Texas limit is 25 tpy of VOC;
- Missouri limit is 40 tpy of VOC;
- Florida limit is 80 tpy of VOC; and
- Other states limit actual VOC emissions in attainment areas at 100 tpy.

The limits also vary widely for sources in ozone nonattainment areas. For printing plants located in severe ozone nonattainment areas, state VOC permit limits are:

- Indiana limits VOC emissions to less than 1.4 tpy;
- New York limits VOC emissions to less than 25 tpy; and
- Pennsylvania limits VOC emissions to less than 50 tpy.

Missouri and Oklahoma do not issue their permit by rule to sources in nonattainment areas.

Seven of the states (Connecticut, Florida, Maryland, New York, Oklahoma, Pennsylvania, and Texas) have de minimis exemptions, varying from less than 2.7 tpy of VOC to less than 15 tpy of VOC. Several of the state permits also include limits on usage of HAP, presumably intended to keep sources minor for HAPs.

Table 4 shows the pollutant emission limits and materials usage limits contained in graphic arts and printing permits issued by states.

Table 4: State Permits: Eligibility Restrictions, Throughput Limits, and Emission Limitations

State	Permitting Level(s) Allowed	Eligibility Restrictions	De Minimis Exemption?	Materials Throughput Limits	Criteria Pollutant Emission Limitations?	Hazardous Air Pollutant Emission Limitations?
Connecticut	General permit issued to synthetic minor sources.	None specified.	PTE for any criteria pollutant < 15 tpy and PTE for any HAP < 10 tpy.	None specified.	PTE > 100 tpy and limit < 100 tpy.	PTE > 10/25 tpy and limit < 10/25 tpy.
Florida	General permit issued to minor sources with actual emissions less than major source levels.	None specified.	Facilities that use less than 667 gals of materials containing HAP are exempt and print line-specific materials usage thresholds.	Use < 1,333 gals/year (gal/yr) of materials containing HAP and print line-specific materials usage thresholds.	Actual emissions: < 80 tpy VOC, without use of controls.	Actual emissions: < 8/20 tpy, without use of controls.
Indiana	Source specific operating agreement issued for synthetic minor sources.	None specified.	None specified.	None specified.	15 pounds (lbs)/day of VOC in attainment areas and 7 lbs/day VOC in severe nonattainment area.	None specified.
Maryland	General permit issued to true minor sources.	Issued only for non-heatset, sheetfed offset lithographic printing operations.	Roller widths less than 18 inches.	Less than 1,000 gal/yr of fountain solution and no materials containing: methylene chloride, dichloromethane, heavy aliphatic petroleum distillate, or dipropylene glycol butyl ether.	None specified.	None specified.

State	Permitting Level(s) Allowed	Eligibility Restrictions	De Minimis Exemption?	Materials Throughput Limits	Criteria Pollutant Emission Limitations?	Hazardous Air Pollutant Emission Limitations?
Missouri	Permit by rule issued to true minor and synthetic minor sources.	Facilities shall not utilize heat set, thermo set, or oven-dried inks and facility shall not be located in an ozone nonattainment area.	None specified.	Emissions shall be calculated based on mass-balance, assuming 100% evaporation of any VOC or HAP.	Actual emissions: < 40 tpy VOC.	Actual emissions: < 10 tpy of all HAPs.
Nebraska	Class II general permit issued to true minor sources and synthetic minor sources.	None specified.	None specified.	None specified.	Actual emissions: < 100 tpy.	Actual emissions: < 10/25 tpy.
New York	General permit issued for true minor sources.	Not issued to sources subject to a NESHAP.	Facilities with de minimis emissions (< 3 tpy or 20 lbs/day VOC) are exempt.	None specified.	Severe ozone nonattainment areas - actual emissions < 25 tpy VOC; moderate ozone nonattainment areas - actual emissions < 50 tpy VOC; and ozone attainment areas - actual emissions < 100 tpy VOC.	Actual emissions: < 10/25 tpy.

State	Permitting Level(s) Allowed	Eligibility Restrictions	De Minimis Exemption?	Materials Throughput Limits	Criteria Pollutant Emission Limitations?	Hazardous Air Pollutant Emission Limitations?
Ohio	Permit by rule issued for true minor sources.	Only for small and mid-sized printing operations that do not utilize add-on emission control equipment.	None specified.	There are print line-specific materials usage thresholds.	Small: actual emissions < 10 tpy VOC and mid-Size: actual emissions < 25 tpy VOC.	Small: actual emissions < 5/10 tpy and mid-Size: actual emissions < 5/12.5 tpy.
Oklahoma	Permit by rule and general permit issued for true minor sources.	Permit by rule: PTE of VOC > 5 tpy and < 40 tpy and general permit: PTE of VOC > 40 tpy and < 100 tpy; facilities located in nonattainment areas.	Facilities with de minimis emissions (less than 5 tpy VOC) are exempt.	None specified.	Actual emissions < 100 tpy.	Actual emissions: < 10/25 tpy.
Pennsylvania	General permit issued for true minor and synthetic minor sources.	General permits only for sheet-fed offset lithographic printing press operations and non-heatset web offset lithographic	Facilities with de minimis emissions (less than 2.7 tpy VOC, 1 tpy single HAP, 2.5 tpy total HAP) are exempt.	None specified.	Actual emissions: < 100 tpy for PM, PM ₁₀ , SO ₂ , NO _x , CO; < 50 tpy for VOC; and < 25 tpy NO _x in severe nonattainment areas.	Actual emissions: < 10/25 tpy.

State	Permitting Level(s) Allowed	Eligibility Restrictions	De Minimis Exemption?	Materials Throughput Limits	Criteria Pollutant Emission Limitations?	Hazardous Air Pollutant Emission Limitations?
		printing press operations.				
Texas	Permit by rule issued for true minor and synthetic minor sources.	Vary based on location.	Permit not required for source with de minimis emissions and the threshold varies by county.	None specified.	PTE of SO ₂ , PM ₁₀ , VOC < 25 tpy and PTE of NO _x , CO < 250 tpy.	PTE < 10/25 tpy.
Wisconsin	General permit issued for true minor and synthetic minor sources.	None specified.	None specified.	Varies depending upon the type of printing operation.	Synthetic minor: PTE > 100 tpy and limit < 100 tpy. True minor: PTE < 100 tpy limit < 100 tpy and, 10 tpy for digital printing.	Synthetic minor: PTE > 10/25 tpy and Limit < 10/25 tpy. True minor: PTE < 10/25 tpy and Limit < 10/25 tpy.

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Attachment A:
Emissions Calculations for Printing Operations

Sample calculation for a non-heatset offset lithographic press:

Ink #1: VOC = Actual usage (lbs/yr) x % VOC x % flash off x 8,760 hrs/operating hrs/yr x 1 ton/2,000 lbs
 = 500 x 0.10 x 0.05 x 8,760/4,100 x 1/2,000
 = 0.0027 tpy

Ink #2: VOC = Actual usage (lbs/yr) x % VOC x % flash off x 8,760 hrs/operating hrs/yr x 1 ton/2,000 lbs
 = 500 x 0.10 x 0.05 x 8,760/4,100 x 1/2,000
 = 0.0027 tpy

Fountain Solution: VOC = Actual usage (lbs/yr) x % VOC x % flash off x 8,760 hrs/operating hrs/yr x 1 ton/2,000 lbs
 = 1000 x 0.50 x 1.00 x 8,760/4,100 x 1/2,000
 = 0.534 tpy

Blanket Wash: VOC = Actual usage (lbs/yr) x % VOC x % flash off x 8,760 hrs/operating hrs/yr x 1 ton/2,000 lbs
 = 500 x 0.50 x 1.00 x 8,760/4,100 x 1/2,000
 = 0.267 tpy

Cleanup Solvent: VOC = Actual usage (lbs/yr) x % VOC x % flash off x 8,760 hrs/operating hrs/yr x 1 ton/2,000 lbs
 = 150 x 1.00 x 1.00 x 8,760/4,100 x 1/2,000
 = 0.160 tpy

Total VOC emissions from this printing line = 0.967 tpy of VOC