

CENTER FOR RESPONSIBLE SHALE DEVELOPMENT PERFORMANCE STANDARDS AND REGULATORY STANDARDS ACROSS THE APPALACHIAN BASIN

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October 8, 2017

WATER STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
1	<p>1.1 Operators shall maintain zero direct or indirect intentional discharges of shale wastewater (including drilling, flowback and produced waters) to surface water except as provided by this Standard.</p> <p>1.2 Discharge may occur only through a permitted centralized waste treatment (CWT) facility (no shale wastewater may be sent either directly or indirectly to POTWs for discharge). Requirements:</p> <ul style="list-style-type: none"> • CWT in substantial compliance with NPDES permit. • CWT must meet or exceed CRSD-determined shale wastewater effluent performance standard (based on current best available technology). • CWT must employ a combination of distillation and biological treatment, and reverse osmosis, if CRSD determines necessary, for all fluids discharged (CRSD may authorize different technologies providing equivalent/superior treatment). <p>1.3 Operator obligations for certification/use of a new CWT for discharge:</p> <ul style="list-style-type: none"> • Operator must compile and deliver to CRSD all publicly available information pertaining to the CWTs performance and permit compliance. • Provide the permitting agency the current CRSD list of chemicals believed to occur in the region’s wastewater. • Demonstrate to CRSD that testing at the CWT satisfies the Initial Confirmatory Testing Program or a facility-specific Protocol approved by CRSD. • Operator shall have CWT complete WET Testing pursuant to the WET Testing Program or an alternative facility-specific Protocol approved by CRSD. <p>1.4 As long as Operator delivers shale wastewater to a CWT:</p> <ul style="list-style-type: none"> • Conduct effluent monitoring as specified in the CRSD Ongoing Monitoring Program or facility-specific Protocol approved for that CWT by CRSD. • Every 6 months, compile and deliver to CRSD publically available information about the CWT’s performance and permit compliance. • Complete WET testing at a frequency on a specified basis, unless CRSD determines that ongoing WET testing is not necessary. <p>1.5 Operators will immediately cease deliveries of shale wastewater to a CWT if: (a) the CRSD Board determines that discharges from the CWT may increase the risk of harm to human health or the environment; or (b) the CWT exhibits substantial non-compliance with its NPDES permit. Deliveries may not resume until Operator demonstrates that appropriate corrective measures at CWT have been made.</p> <p>1.6 Operator reporting:</p> <ul style="list-style-type: none"> • Data from all testing and any additional information gathering required under this standard, shall be analyzed, compiled, and submitted to CRSD. • Discoveries of potential non-compliance with an existing NPDES discharge permit as part of the monitoring and auditing requirements required under this Standard, are required to be immediately reported to the CWT, the permitting agency, and CRSD. 	<p>Prohibits direct discharge from the wellpad of wastewater associated with production, field exploration, drilling, well completion, or well treatment (i.e., produced water, drilling muds, drill cuttings, and produced sand) into waters of the United States.¹</p> <p>Prohibits discharge of wastewater pollutants associated with production, field exploration, drilling, well completion, or well treatment for unconventional oil and gas extraction (including, but not limited to, drilling muds, drill cuttings, produced sand, produced water) into publicly owned treatment works (“POTWs”).²</p> <p>This zero-discharge rule for POTWs is not applicable to CWT facilities.³</p>	<p>Operators must control and dispose of wastewater consistent with Pennsylvania’s Clean Streams Law/NPDES program.⁴</p> <p>Except for existing grandfathered POTWs, wastewater from any source associated with fracturing, production, field exploration, drilling or well completion of natural gas wells can only be discharged into waters of the Commonwealth from a permitted CWT or a POTW if the wastewater is first treated at a permitted CWT.⁵</p> <ul style="list-style-type: none"> • Discharge from permitted CWTs of such wastewater may not exceed a monthly average of: 500 mg/L total dissolved solids (TDS); 250 mg/L total chlorides; 10 mg/L total barium; 10 mg/L total strontium.⁶ • Note: By voluntary agreement with PADEP, operators agreed to no longer allow wastewater to be sent to existing grandfathered POTWs in Pennsylvania.⁷ 	<p>Ohio imposes a general ban on the discharge of brine or other fluids associated with oil and gas extraction to surface water “that causes or could reasonably be anticipated to cause damage or injury to public health or safety or the environment.”⁸</p> <p>Beginning January 1, 2014, no one may store, recycle, treat, process or dispose of brine “or other waste substances associated with the exploration, development, well stimulation, production operations, or plugging of oil and gas resources without an order or a permit” from Ohio DNR.⁹</p> <ul style="list-style-type: none"> • Exemption for facilities in operation prior to January 1, 2014, where the Ohio DNR chief has approved of the operation and the facility has obtained any required permit or authorization from Ohio EPA.¹⁰ <p>Brine disposal can only occur in one in the following ways:¹¹</p> <ul style="list-style-type: none"> • Injection into permitted underground injection control (UIC) wells; • Approved surface application; • In association with a method of enhanced recovery; • In any other manner not specified that is approved by a permit or order issued by Ohio DNR. <p>Through guidance issued in May 2012, Ohio EPA specified it does not allow direct nor indirect discharge of brine to surface waters in the state.¹²</p>	<p>Operators may dispose of wastewater by underground injection well, NPDES permit/POTWs, or re-use, so long as the operator has an applicable permit.¹³</p>

Center for Responsible Shale Development
Performance Standards and Regulatory Standards Across the Appalachian Basin

WATER STANDARDS

NO.	CRSD PERFORMANCE STANDARD	PENNSYLVANIA	OHIO	WEST VIRGINIA
2.1	Operators shall maintain a plan to recycle flowback and produced water, for usage in drilling or fracturing a well, to the maximum extent possible.	Recycling allowed: Operators must prepare, prior to drilling, a source reduction strategy in connection with flowback and produced waters, or prepare a waste stream characterization. ¹⁴	Recycling allowed: Operators must submit as part of its drilling permit a plan for disposal of drilling wastewater and obtain approval from Ohio DNR. ¹⁵	<ul style="list-style-type: none"> WVDEP encourages operators to recycle flowback and produced wastewater.¹⁶ Re-use of wastewater must be reported in water management plan.¹⁷
2.2	By September 24, 2014 or date of an operator's initial application for certification (whichever is later), Operators must recycle a minimum of 90% of the flowback and produced water, by volume, from its wells in all core operating areas in which an Operator is a net water user.	No required recycling minimum.	No required recycling minimum.	No required recycling minimum.
3.1	Any new pits designed shall be double-lined and equipped with leak detection.	<p><u>Chapter 78a Unconventional Well Requirements:</u>¹⁸</p> <ul style="list-style-type: none"> Pits are no longer permitted at unconventional well sites to store contaminated drill cuttings and waste fluids. Operators have 6 months to properly close the pits (<i>i.e.</i>, until April 8, 2017).¹⁹ Open top structures may not be used to store brine and other fluids produced during operation of the well.²⁰ Any pit used to store production fluids shall be properly closed within one year (<i>i.e.</i>, by October 8, 2017).²¹ 	Ground pits on the well pad permitted; must be constructed and maintained to prevent escape of brine. ²²	Single-lined pits on the well pad permitted. ²³
3.2	Operators, by March 20, 2014 or initial date of application for certification (whichever is later), shall contain drilling fluid, when using oil-containing drilling fluids to drill a well, in a closed loop system at the well pad (e.g. no ground pits).	<p><u>Chapter 78a Unconventional Well Requirements:</u></p> <ul style="list-style-type: none"> Pits are no longer permitted at unconventional well sites to store contaminated drill cuttings and waste fluids. Operators have 6 months to properly close the pits (<i>i.e.</i>, until April 8, 2017).²⁴ Open top structures may not be used to store brine and other fluids produced during operation of the well.²⁵ Any pit used to store production fluids shall be properly closed within one year (<i>i.e.</i>, by October 8, 2017).²⁶ 	Ground pits permitted. ²⁷	Ground pits permitted. ²⁸
3.3	Operators, by March 20, 2015 or initial date of application for certification (whichever is later), shall contain drilling fluid and flowback water in a closed loop system at the well pad, eliminating the use of pits for all wells.	Closed loop system not required, see 3.2 above.	Closed loop system not required, see 3.2 above.	Closed loop system not required, see 3.2 above.
4.1	When utilizing centralized impoundments for the storage of flowback and/or produced waters, Operators shall ensure that free hydrocarbons are removed from the water prior to storage and that new impoundments are double-lined with an impermeable material, equipped with leak detection and take measures to reasonably prevent hazards to wildlife. Total hydrocarbons should be substantially removed.	<p>Impoundments must be double-lined and equipped with leak detection (including upgradient and downgradient monitoring wells).²⁹</p> <p><u>Chapter 78a Unconventional Well Requirements:</u></p> <p>Operators using centralized impoundments must, within three years (October 8, 2019), obtain a residual waste permit or close the impoundment.³⁰</p>	Impoundments constructed utilizing a synthetic liner pursuant to Ohio DNR specifications may be used for the temporary storage of waste substances used in the construction, stimulation, or plugging of a well. ³¹	<ul style="list-style-type: none"> Centralized pits holding >5,000 barrels of wastewater must have leak detection monitoring, may not store non-aqueous phase hydrocarbons (<i>i.e.</i> visible, floating hydrocarbons), and accumulation of such hydrocarbons must be skimmed and disposed of properly.³² WVDEP requires centralized pits to be double-lined and installation of an upgradient and downgradient water quality monitoring system.³³

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5.1	Operators shall establish an Area of Review (AOR), prior to drilling a well, which encompasses both the vertical and horizontal legs of the planned well. Within the AOR, the operator must conduct a comprehensive characterization of subsurface geology, including a risk analysis, that demonstrates the presence of an adequate confining layer(s) above the production zone that will prevent adverse migration of hydraulic fracturing fluids. As part of the risk analysis, and before proceeding with hydraulic fracturing, the operator must also conduct a thorough investigation of any active or abandoned wellbores within such area of review or other geologic vulnerabilities (e.g., faults) that penetrate the confining layer and adequately address identified risks.	<p><u>Chapter 78a Unconventional Well Requirements:</u></p> <ul style="list-style-type: none"> Operators shall establish an Area of Review (AOR) which identifies the surface and bottom hole locations of any active well, inactive well, orphan well, abandoned well, or plugged and abandoned well located within 1,000 feet. The operator must submit a report to PADEP summarizing the AOR.³⁴ 	<p>No specific Area of Review requirement.</p> <ul style="list-style-type: none"> Note: As part of the permit application, operators are required to submit detailed horizontal well pad site plans certified by a professional engineer that are reviewed by Ohio DNR prior to the construction of the well pad.³⁵ The well pad site plan must include, for example:³⁶ <ul style="list-style-type: none"> Plugged wells, producing wells, and idle and orphaned wells located within 100 feet of the proposed well site boundary. All surface waters and water wells within 100 feet of the proposed well site boundary. All areas within 100 feet of and within the well site boundary that are located within the 5-year time of travel for a public drinking water supply and within the emergency management zone of a public water system intake. Geotechnical report, including a summary of subsurface exploration data specifically relevant to the geotechnical investigation and interpretation as it pertains to the design and construction of the proposed well site. 	<p>No specific Area of Review requirement.</p> <ul style="list-style-type: none"> Note: Each well permit application for a horizontal well, must identify all wells within 1,200 feet of the surface location of the new well and within 500 feet of the horizontal section of the wellbore.³⁷ For a permit application for a horizontal well with a depth of 3,000 feet or more that penetrates a coal seam, must identify all wells within 2,400 feet of the surface location of the new well and 500 feet of the horizontal section of the wellbore.³⁸ Each well permit application for a horizontal well must also identify existing water wells or developed springs used for human or domestic animal consumption within 250 feet of the new well.³⁹
6.1	Operators shall develop and implement a plan for monitoring existing water sources, including aquifers and surface waters within a 2,500 foot radius of the wellhead (or greater distance, if a need is clearly indicated by geologic characterization), and demonstrate that water quality and chemistry measured during a pre-drilling assessment are not impacted by operations.	<p>Pre-drilling water survey may be completed by an operator to avoid a presumption of liability for contamination of a water supply within 2,500 feet of the vertical wellbore.⁴⁰</p> <p><u>Chapter 78a Unconventional Well Requirements:</u></p> <ul style="list-style-type: none"> If the proposed well site is within 100 feet of any watercourse, any high quality or exceptional value body of water, or any wetland 1 acre or larger, the applicant must demonstrate that the well site will protect those waters in accordance with §78a.15(b.1).⁴¹ 	The operator must submit as part of its drilling permit the results of sampling water wells within 1,500 feet of the proposed horizontal wellhead prior to commencement of drilling. ⁴²	Operators must sample and analyze water from any one known and existing well or spring within 1,500 feet of the proposed well. ⁴³
6.2	Operators must conduct periodic monitoring for at least one year following completion of the well. Such monitoring must be extended if results indicate potentially adverse impacts on water quality or chemistry by operations.	No required post-completion water monitoring.	No required post-completion water monitoring.	No required post-completion water monitoring.

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6.3	In the event that monitoring establishes a possible link between an Operator’s activities and contamination of a water source, the Operator shall develop and implement an investigative plan and, if a positive link is established, implement a corrective action plan.	PADEP may issue orders necessary to aid in enforcement of statutory, regulatory and permit requirements. ⁴⁴ <u>Chapter 78a Unconventional Well Requirements:</u> A well operator who affects a public or private water supply by pollution or diminution must restore or replace the affected supply. ⁴⁵	Ohio DNR is responsible for enforcing the oil and gas regulations and the terms and conditions of permits and registration certificates, and orders adopted or issued pursuant thereto. ⁴⁶ Ohio DNR has the authority to require an owner/operator of an oil and gas well to replace the water supply of landowner whose water supply has been substantially disrupted by contamination, diminution or interruption resulting from the oil and gas operation. ⁴⁷	WVDEP is responsible for enforcing offenses to article 6 (oil and gas) or violations of the oil and gas permit. ⁴⁸ Unless waived by the landowner, an operator must replace the water supply of a landowner where WVDEP determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil and gas operation. ⁴⁹
6.4	The testing and monitoring plan should provide for additional monitoring in the event a well is re-stimulated.	See 6.1 above.	See 6.1 above.	See 6.1 above.
7.1	Operators shall design and install casing and cement to completely isolate the well and all drilling and produced fluids from surface waters and aquifers, to preserve the geologic seal that separates fracture network development from aquifers, and prevent vertical movement of fluids in the annulus.	String(s) of casing shall be run and permanently cemented to prevent migration of gas or fluids into sources of fresh groundwater. ⁵⁰	A well shall be constructed using sufficient steel or conductor casing in a manner that supports unconsolidated sediments, that protects and isolates all underground sources of drinking water, as identified by Ohio DNR, and that provides a base for a blowout preventer or other well control equipment that is necessary to control formation pressures and fluids during the drilling of the well and other operations to complete the well. ⁵¹	Case and cement horizontal wells to prevent the migration of gas and other fluids into the fresh ground-water and coal seams, and prevent pollution of or diminution of fresh groundwater; installation and use of blow out preventer and other well control equipment. ⁵²
7.2	Operators will not use diesel fuel in their hydraulic fracturing fluids. ⁵³	No prohibition on diesel (see endnote 53).	No prohibition on diesel (see endnote 53).	No prohibition on diesel (see endnote 53).

WATER STANDARDS

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7.3	<p>Operators will publically disclose the chemical constituents intentionally used in well stimulation fluids.</p> <p>Disclosures will include: information identifying the well, the operator and the dates of the well stimulation; the type and total volume of the base fluid; the type and amount of any proppant; all chemical additive products used in a well stimulation, including the name under which the product is marketed or sold, the vendor, and a descriptor of additive's purpose or purposes (e.g. biocide, breaker, corrosion inhibitor, etc.); the common name and CAS registry number for each chemical ingredient used in a stimulation fluid; the actual or maximum concentration of each chemical ingredient, expressed as a percent by mass of the total stimulation fluid.</p> <p>Chemical ingredients should be disclosed in a manner that does not link them to their respective chemical additive products.</p> <p>Disclosure of the above information will be offered to the relevant state agency and will also be posted on FracFocus.org.</p> <p>If an operator, service company or vendor claims that the identity of a chemical ingredient is entitled to trade secret protection, the operator will include in its disclosures a notation that trade secret protection has been asserted and will instead disclose the relevant chemical family name.</p> <p>Operators will implement measures consistent with state law to assist medical professionals in quickly obtaining trade secret information from the operator, service company or vendor holding the trade secret that may be needed for clinical diagnosis or treatment purposes.</p>	<p>Operators are required to comply with the following chemical disclosures (within 30 days to PADEP and within 60 days to FracFocus):⁵⁴</p> <ul style="list-style-type: none"> • A descriptive list of the chemical additives in the stimulation fluids, including any acid, biocide, breaker, brine, corrosion inhibitor, crosslinker, demulsifier, friction reducer, gel, iron control, oxygen scavenger, PH adjusting agent, proppant, scale inhibitor and surfactant; • Trade name, vendor and a brief descriptor of the intended use or function of each chemical additive in the stimulation fluid; • List of the chemicals intentionally added to the stimulation fluid, by name and CAS number; • Maximum concentration, in percent by mass, of each chemical intentionally added to the stimulation fluid; and • Total volume of the base fluid; list of water sources used under the approved water management plan and the volume of water used; pump rates and pressure used in the well; total volume of recycled water used. <p>Note: Operator is not required to disclose: (a) chemicals that are not disclosed to it by the manufacturer, vendor or service provider; (b) chemicals that were not intentionally added to the stimulation fluid; or (c) chemicals that occur incidentally or are otherwise unintentionally present in trace amounts.⁵⁵</p> <p>Trade Secrets: the specific identity of a chemical, the concentration of a chemical, or both, that is trade secret or confidential proprietary information is not required to be disclosed.⁵⁶ Exemptions:</p> <ul style="list-style-type: none"> • Disclosure to medical professional in emergency situations and upon request from the operator, service provider, or vendor, the medical professional will execute a confidentiality agreement as soon as circumstances present.⁵⁷ • Disclosure to PADEP, public health official, emergency manager, or responder upon written request for need of information in order to respond to a spill, release, or a complaint from a person who may have been directly affected by such a spill or release.⁵⁸ 	<p>Within 60 days of well completion, must submit to the Ohio DNR or FracFocus the following:⁵⁹</p> <ul style="list-style-type: none"> • Trade name and the total amount of all products, fluids, and substances, and the supplier of each product, fluid, or substance (not including cement and its constituents and lost circulation materials) intentionally added to facilitate the drilling of any portion of the well until the surface casing is set and properly sealed. • Identification of each additive used and brief description of additive's purpose. • List of all chemicals intentionally added to all products, fluids, or substances and include each chemical's corresponding CAS number and the maximum concentration of each chemical. • If recycled fluid was used, the total volume of recycled fluid and the well that is the source of the recycled fluid or the centralized facility that is the source of the recycled fluid. <p>Note: Must make reasonable efforts to obtain the required information from the company or supplier and not required to report chemicals that occur incidentally or in trace amounts.⁶⁰</p> <p>Trade Secret: May withhold the identity, amount, concentration, or purpose of a product, fluid, or substance or of a chemical component in a product, fluid, or substance as a trade secret.⁶¹</p> <ul style="list-style-type: none"> • Disclosure to medical professional required in order to assist in the diagnosis or treatment of an individual who was affected by an incident associated with the production operations of a well.⁶² • Property owner, an adjacent property owner, or any person or agency of Ohio that is or may be adversely affected by product or chemical affected by trade secret protection may challenge such a protection in state court and the court is to conduct an in camera review of the trade secret claims.⁶³ 	<p>Operators must submit to WVDEP and FracFocus the following:⁶⁴</p> <ul style="list-style-type: none"> • Additives used in the hydraulic fracturing or stimulation process, including each additive's specific trade name, supplier, and purpose. • List of the chemical components of each additive, along with each chemical's CAS number, its maximum concentration in the additive, and its maximum concentration (in mass percent) in the fracturing fluid, including the carrier (base) fluid, and the volume of the carrier fluid used. • Trade Secret: trade secret protection allowed for chemical components, but must disclose upon request to a health care professional in a medical emergency or for diagnostic or treatment purposes.⁶⁵

WATER STANDARDS

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7.4	Operators will also work toward use of more environmentally neutral additives for hydraulic fracturing fluid.	Operators must prepare and submit a waste stream source reduction strategy report. ⁶⁶	No requirement.	No requirement.
7.5	Mechanical integrity tests shall be performed when refracturing an existing well.	<u>Chapter 78a Unconventional Well Requirements:</u> Operators must conduct quarterly inspections of wells to ensure compliance with well construction and operating requirements. ⁶⁷	Well pressure testing requirements. ⁶⁸	Casing must possess an internal pressure rating 20% greater than the anticipated maximum pressure. ⁶⁹
8.1	Operators shall design each well pad to minimize the risk that drilling related fluids and wastes come in contact with surface waters and fresh groundwater.	<u>Chapter 78a Unconventional Well Requirements:</u> <ul style="list-style-type: none"> Unconventional well sites must be “designed and constructed to prevent spills to the ground surface or spills off the well site.”⁷⁰ 	<ul style="list-style-type: none"> Operators must utilize best management practices in well site construction.⁷¹ The well site must be designed and constructed in a manner that protects public health and safety and minimizes damage to natural resources by managing stormwater, protecting surface water and minimizing soil erosion. This rule requires engineer certified plans and Ohio DNR oversight.⁷² 	<ul style="list-style-type: none"> Operators must implement erosion and sediment control plans and site construction plans in well site development.⁷³ Operators must prevent surface and underground water pollution.⁷⁴
8.2	In preparation for any spill or release event, Operators shall prior to commencement of drilling, develop and implement an emergency response plan, ensure local responders have appropriate training in the event of an emergency, and work with the local governing body, in which the well is located, to verify that local responders have appropriate equipment to respond to an emergency at a well.	<u>Chapter 78a Unconventional Well Requirements:</u> <ul style="list-style-type: none"> Operators must develop and implement an emergency response plan for each well site that provides for equipment, procedures, training and documentation to properly respond to emergencies.⁷⁵ An operator must provide a copy of the emergency response plan to PADEP, PEMA, and the county emergency management agency. A copy must be provided to the PFBC and the landowner upon request.⁷⁶ 	Signage and security measures at well site required. ⁷⁷	Safety plan must accompany each drilling permit that details: weekly training sessions; location of schools and public buildings within 1 mile radius of the well; a plan to notify affected residents of an emergency event. Safety plan must also be provided to local emergency responders. ⁷⁸
8.3	In addition, in the event of spill or release, beyond the well pad, operators shall immediately provide notification to the local governing body and any affected landowner.	<u>Chapter 78a Unconventional Well Requirements:</u> <ul style="list-style-type: none"> Operators must notify PADEP by telephone as soon as practicable for (1) a spill or release of a regulated substance causing or threatening pollution of the waters of the Commonwealth, in the manner required under 25 Pa. Code § 91.33 (relating to incidents causing or threatening pollution); or (2) a spill or release of 5 gallons or more of a regulated substance over a 24-hour period that is not completely contained by secondary containment.⁷⁹ 	Operator must provide Ohio EPA verbal notification within 30 minutes of knowledge of the release unless notification within that time frame is impractical due to uncertain circumstances. ⁸⁰	Operators must immediately notify WVDEP of a spill. ⁸¹

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL ⁸²	PENNSYLVANIA ⁸³	OHIO ⁸⁴	WEST VIRGINIA ⁸⁵
9	<p><u>Reduced Emissions Completions (REC)</u></p> <ul style="list-style-type: none"> Beginning on 1/1/14 – direct all pipeline-quality gas during completion of development wells and re-completion or workover of any well into a pipeline for sale. No venting allowed – must be flared in accordance with CRSD Performance Standard No. 10. Acceptable reasons for flaring – low content of flammable gas and safety reasons. Unacceptable reasons for flaring – i) lack of pipeline connection except for exploratory or extension wells; ii) inadequate water disposal capacity; iii) inadequate or lack of flowback equipment or operating personnel. 	<p><u>NSPS Subparts OOOO & OOOOa</u>⁸⁶</p> <p><u>Non-wildcat, non-delineation wells, non-low pressure wells:</u>⁸⁷</p> <ul style="list-style-type: none"> During initial flowback stage, operator must route the flowback into a well completion vessel(s) or storage vessel(s) and must commence operation of a separator (unless technically infeasible). Gas present in the initial flowback stage is not subject to control under this section. During separation flowback stage, operator must: <ul style="list-style-type: none"> route all recovered liquids from the separator to: <ul style="list-style-type: none"> a well completion vessel(s) or storage vessels; or re-inject the liquids into the well or another well; or route recovered liquids to a collection system. Route the recovered gas from the separator to: <ul style="list-style-type: none"> into a gas flow line or collection system; or re-inject the recovered gas into the well or another well; or use the recovered gas as an on-site fuel source; or use the recovered gas for another useful purpose. If it is technically infeasible to route the recovered gas during the separation flowback stage, then the operator must capture and direct recovered gas to a completion combustion device, except in conditions that may result in a fire hazard or explosion, or where high heat emissions from a completion combustion device may negatively impact tundra, permafrost or waterways. Completion combustion devices must be equipped with a reliable continuous pilot flame. <ul style="list-style-type: none"> Must have a separator onsite during the entirety of the flowback period, except: <ul style="list-style-type: none"> A well that is not hydraulically fractured or refractured with liquids, or that does not generate condensate, intermediate hydrocarbon liquids, or produced water such that there is no liquid collection system at the well site is not required to have a separator onsite. There is a general duty to safely maximize resource recovery and minimize releases to the atmosphere during flowback and subsequent recovery. <p><u>For wildcat, delineation, non-wildcat low pressure, and non-delineation low pressure wells:</u>⁸⁸</p> <ul style="list-style-type: none"> Route all flowback to a completion combustion device (except in conditions which may result in a fire hazard or explosion). Completion combustion devices must be equipped with a reliable continuous pilot flame; or Route all flowback to a well completion vessel and commence operation of a separator (unless it is technically infeasible for a separator to function). Any gas present in the flowback before the separator can function is not subject to this section. Capture and direct recovered gas to a completion combustion device (except in conditions that may result in a fire hazard or explosion). Completion devices must be equipped with a reliable continuous pilot flame. 	<p><u>Exemption Category No. 38</u>⁸⁹</p> <ul style="list-style-type: none"> Well drilling, completion and work-over activities are exempted from permitting requirements.⁹⁰ No state-specific REC requirements in addition to NSPS Subparts OOOO & OOOOa. Open flaring is only allowed under the following circumstances: <ul style="list-style-type: none"> Flaring used at exploration wells to determine whether oil and/or gas exists in geological formations or to appraise the physical extent, reserves, and likely production rate of an oil or gas field. Flaring used for repair, maintenance, emergency or safety purposes. Flaring used for other operations at a wellhead or facility to comply with 40 CFR Part 60, Subpart OOOO requirements. 	<p>No state-specific REC requirements in addition to NSPS Subparts OOOO & OOOOa.</p> <p>Flaring required except for gas releases by a properly functioning relief device and gas released by controlled venting for testing, blowing down and cleaning out wells.⁹¹</p>	<p>No state-specific REC requirements in addition to NSPS Subparts OOOO & OOOOa.</p> <p>Compliance with NSPS Subpart OOOO and OOOOa requirements is required by General Permit G70-D.⁹²</p>

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO ⁹³	WEST VIRGINIA ⁹⁴
10	<p><u>Flaring During Well Completions, Re-Completions, Workovers</u></p> <ul style="list-style-type: none"> When flaring is permitted during well completion, re-completions or workovers of any well (pursuant to Standard No. 9) meet the following requirements: <ul style="list-style-type: none"> Raised/elevated flares or engineered combustion device with a reliable continuous ignition source. 98% destruction efficiency. Development well: flaring no more than 14-days (for life of well). Exploratory/Extension wells: flaring no more than 30-days (for life of well). No visible emissions from flares except for periods not to exceed a total of five minutes during any two consecutive hours. 	<p><u>NSPS Subparts OOOO & OOOOa</u></p> <ul style="list-style-type: none"> Completion combustion devices (e.g. flares) are required to have a continuous ignition source.⁹⁵ 	<p><u>Exemption Category No. 38⁹⁶</u></p> <ul style="list-style-type: none"> Open flaring during completions requires compliance with NSPS Subpart OOOO. <p><u>Post-Completion Requirements</u></p> <ul style="list-style-type: none"> Enclosed flare (raised/elevated flares or engineered combustion device) must be used for permanent installations. All permanent enclosed flaring operations must be designed and operated in accordance with the requirements of 40 CFR § 60.18. Open Flaring is only allowed under the following circumstances: <ul style="list-style-type: none"> Flaring used at exploration wells to determine whether oil and/or gas exists in geological formations or to appraise the physical extent, reserves and likely production rate of an oil or gas field. Flaring used for repair, maintenance, emergency or safety purposes. Flaring used for other operations at a wellhead or facility to comply with 40 CFR Part 60, Subpart OOOO requirements. <p><u>Other Requirements</u></p> <ul style="list-style-type: none"> Opacity is limited to 20% or less for an aggregated 3 minute period in any 1 hour and cannot be equal to or greater than 60% opacity at any time.⁹⁷ 	<p>Requires “properly functioning relief device.”⁹⁸</p>	<ul style="list-style-type: none"> “Temporary” flaring allowed for 30-days before a permit is required.⁹⁹ 20% opacity limitation and PM emissions limit set according to a formula.¹⁰⁰

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO ¹⁰¹	WEST VIRGINIA ¹⁰²
11.1	<p><u>Diesel Non-road Drilling Rig Engines</u></p> <ul style="list-style-type: none"> • Meet EPA Tier 2 standards by March 20, 2013. • 25% of owner/operator engine utilization (hp) meeting EPA Tier 4 standards for PM by March 20, 2015. • 75% of owner/operator engine utilization (hp) meeting EPA Tier 4 standards for PM by September 24, 2015. • 95% of owner/operator engine utilization meeting EPA Tier 4 standards for PM by September 24, 2016. • Use ultra-low sulfur diesel (15 ppm of sulfur) at all times. 	<ul style="list-style-type: none"> • U.S. EPA regulates emissions from non-road diesel engines according to varying “tiered” levels based on the engine’s manufacturing date.¹⁰³ • Starting in 2010, diesel produced for use in non-road engines required to meet ultra-low sulfur (15 ppm of sulfur) requirement.¹⁰⁴ • Only ultra-low sulfur diesel fuel will be available. 	<p>Non-road engines are exempt from permitting requirements under Exemption Category No. 38.¹⁰⁵</p>	<p>Non-road engines exempt from permitting requirements provided engines meet 20% opacity limitation.¹⁰⁶</p>	<p>Non-road engines are exempt from permitting requirements.¹⁰⁷</p>
11.2(a)	<p><u>Diesel Non-road Fracturing Pump Engines</u></p> <ul style="list-style-type: none"> • Meet EPA Tier 2 standards by March 20, 2014. • 25% of owner/operator engine utilization (hp) meeting EPA Tier 4 standards for PM by September 24, 2015. • 75% of owner/operator engine utilization (hp) meeting EPA Tier 4 standards for PM by September 24, 2016. • 95% of owner/operator engine utilization meeting EPA Tier 4 standards for PM by September 24, 2017. • Use ultra-low sulfur diesel (15 ppm of sulfur) at all times. 	<ul style="list-style-type: none"> • U.S. EPA regulates emissions from non-road diesel engines according to varying “tiered” levels based on the engine’s manufacturing date.¹⁰⁸ • Starting in 2010, diesel produced for use in non-road engines required to meet ultra-low sulfur (15 ppm of sulfur) requirement.¹⁰⁹ • Only ultra-low sulfur diesel fuel will be available. 	<p>Non-road engines are exempt from permitting requirements under Exemption Category No. 38.¹¹⁰</p>	<p>Non-road engines exempt from permitting requirements provided engines meet 20% opacity limitation.¹¹¹</p>	<p>Non-road engines are exempt from permitting requirements.¹¹²</p>
11.2(b)	<p><u>Diesel Heavy-Duty Vehicle Fracturing Pump Engines</u></p> <ul style="list-style-type: none"> • 50% of engines meeting EPA 2007 and Later Model Year Highway Heavy-Duty Vehicles and Engines emissions standards for PM by March 20, 2013. • 80% of engines meeting EPA 2007 and Later Model Year Highway Heavy-Duty Vehicles and Engines emissions standards for PM by September 24, 2017. • Use ultra-low sulfur diesel (15 ppm of sulfur) at all times. 	<ul style="list-style-type: none"> • U.S. EPA regulates engine emissions from highway heavy-duty vehicles based on the vehicle’s model year.¹¹³ • Starting in 2006, highway diesel fuel required to meet ultra-low sulfur (15 ppm of sulfur) requirement.¹¹⁴ • Only ultra-low sulfur diesel fuel will be available. 	<p>Preempted.¹¹⁵</p>	<p>Preempted.¹¹⁶</p>	<p>Preempted.¹¹⁷</p>

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
12.1	<p><u>Existing Compressor Engines</u></p> <ul style="list-style-type: none"> By March 20, 2014 – 1.5 g/hp-hr NOx emission limitation for existing compressor engines greater than 100 hp. 	<p><u>NSPS Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)</u></p> <ul style="list-style-type: none"> Applies to constructed, reconstructed, and modified engines after June 12, 2006.¹¹⁸ Emissions limitations for engines manufactured between 2007/2008 and 2010/2011 greater than 100 hp:¹¹⁹ <ul style="list-style-type: none"> 2.0 g/hp-hr for NOx. 4.0 g/hp-hr for CO. 1.0 g/hp-hr for VOCs. <p>Compressor engines are also subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE) at 40 CFR. 63, Subpart ZZZZ (i.e., the “RICE MACT”)¹²⁰</p>	<p><u>Previous Exemption Category No. 38</u></p> <ul style="list-style-type: none"> Existing compressor engines (those installed prior to August 10, 2013) – exempt from any permitting or emission limitation requirements if less than 100 hp. <p><u>Previous GP-5</u></p> <ul style="list-style-type: none"> Prior to February 2013 - compressor engines greater than or equal to 100 hp and less than 1500 hp were subject to the previous GP-5 emissions limitations: <ul style="list-style-type: none"> 2.0 g/hp-hr NOx. 2.0 g/hp-hr CO. 2.0 g/hp-hr VOCs. 	<p><u>Previous Oil and Gas Well-Site Production Operations, General Permit 12</u></p> <ul style="list-style-type: none"> Engines must comply with NSPS Subpart JJJJ standards.¹²¹ Specific emissions limitations:¹²² <ul style="list-style-type: none"> 20% opacity, 6-min average. Particulate Emissions (PE): <ul style="list-style-type: none"> 0.310 lb/MMBtu for engines ≤ 600 hp. 0.062 lb/MMBtu for engines > 600 hp. 2.6 tons of SO₂/year. Total combined engine power less than or equal to 1,300 hp:¹²³ <ul style="list-style-type: none"> 2.0 g/hp-hr NOx or 160 ppmvd at 15% O₂ for engines ≥ 100 hp. 4.0 g/hp-hr CO or 540 ppmvd at 15% O₂ for engines ≥ 100 hp. 1.0 g/hp-hr VOCs or 86 ppmvd at 15% O₂ for engines ≥ 100 hp. Total combined engine power greater than 1,300 hp:¹²⁴ <ul style="list-style-type: none"> 1.0 g/hp-hr NOx /or 82 ppmvd at 15% O₂ for engines ≥ 100 hp. 2.0 g/hp-hr CO/or 270 ppmvd at 15% O₂ for engines ≥ 100 hp. 0.7 g/hp-hr VOCs or 60 ppmvd at 15% O₂ for engines ≥ 100 hp. 	<p><u>Natural Gas Compressor Station General Permit Number G33-A</u>¹²⁵</p> <ul style="list-style-type: none"> Engines over 100 HP - compliance with NSPS Subpart JJJJ.

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
12.2 12.3	<p><u>“New” Lean-Burn Compressor Engines</u></p> <ul style="list-style-type: none"> Emissions limitations for new, purchased, replacement, reconstructed, or relocated lean-burn engines greater than 100 hp and up to 500 hp: <ul style="list-style-type: none"> 1.0 g/hp-hr NOx. 2.0 g/hp-hr CO. 0.7 g/hp-hr VOCs. Emissions limitations for new, purchased, replacement, reconstructed, or relocated lean-burn engines greater than 500 hp: <ul style="list-style-type: none"> 0.5 g/hp-hr NOx. 47 ppmvd at 15% O₂ or 93% reduction for CO. 0.25 g/hp-hr VOCs. 0.05 g/hp-hr HCHO (formaldehyde). 	<p><u>NSPS Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)</u></p> <ul style="list-style-type: none"> Emissions limitations for engines manufactured on or after 2010/2011 greater than 100 hp engine models (depending on engine size)¹²⁶: <ul style="list-style-type: none"> 1.0 g/hp-hr for NOx. 2.0 g/hp-hr for CO. 0.7 g/hp-hr for VOCs. <p>Compressor engines are also subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE) at 40 CFR. 63, Subpart ZZZZ (i.e., the “RICE MACT”)¹²⁷</p>	<p><u>Exemption Category No. 38 (Compressor Engines at the Wellpad)</u>¹²⁸</p> <ul style="list-style-type: none"> Compressor engines at the wellpad (those installed on or after August 10, 2013) are exempt from permitting requirements under Exemption Category No. 38 provided that: <ul style="list-style-type: none"> NOx emissions from stationary internal combustion engines at the wells, and wellheads are less than 100 lbs/hr, 1000 lbs/day, 2.75 tons per ozone season (May 1 to September 30), and 6.6 tons per year on a 12-month rolling basis. Combined VOC emissions from all the sources at the facility are less than 2.7 tons on a 12-month rolling basis. Additionally, combined HAP emissions at the facility must be less than 1000 lbs of a single HAP or one ton of a combination of HAPs in any consecutive 12-month period. If the VOCs emissions include HAPs, this HAP exemption criteria is met.¹²⁹ <p><u>GP-5 (Compressor Engines at Natural Gas Compression and/or Processing Facilities)</u></p> <ul style="list-style-type: none"> The facility emissions are limited to non-major emission thresholds. (Synthetic Minor).¹³⁰ Natural gas fired lean burn less than 100 hp¹³¹ <ul style="list-style-type: none"> 2.0 g/hp-hr for NOx. 2.0 g/hp-hr for CO Natural gas lean burn greater than 100 hp and less than or equal to 500 hp¹³² <ul style="list-style-type: none"> 1.0 g/hp-hr for NOx. 2.0 g/hp-hr for CO. 0.7 g/hp-hr for non-methane/non-ethane hydrocarbons (except formaldehyde). Natural gas lean burn greater than 500 hp¹³³ <ul style="list-style-type: none"> 0.5 g/hp-hr for NOx. 47 ppmvd at 15% CO or 93% reduction for CO. 0.25 g/hp-hr for non-methane/non-ethane hydrocarbons (except formaldehyde). 0.05 g/hp-hr for formaldehyde. 	<p><u>Ohio Oil and Gas Production Operations, General Permit 12.1</u></p> <ul style="list-style-type: none"> Applicable to facilities that have less than or equal to 1,800 hp total for all natural gas engines and where the flare system is operated at a heat input capacity less than or equal to 10 MMBtu/hr.¹³⁴ Engines must comply with NSPS Subpart JJJJ standards.¹³⁵ Stack Height:¹³⁶ <ul style="list-style-type: none"> Engine ≥ 250 hp: exhaust stack at least 20' above ground level. Engine < 250 hp: exhaust stack at least 12' above ground level. Specific Emission Limitations¹³⁷ <ul style="list-style-type: none"> 20% opacity, 6-min average. Particulate Emissions (PE): <ul style="list-style-type: none"> 0.310 lb/MMBtu for engines ≤ 600 hp. 0.062 lb/MMBtu for engines > 600 hp. Engines exempt from SO₂ emission limitation for any day in which only natural gas is burned pursuant to OAC 3745-18-06(A). Total combined engine power less than or equal to 1,300 hp:¹³⁸ <ul style="list-style-type: none"> 2.0 g/hp-hr NOx for engines over 100 hp. 4.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. Total combined engine power greater than 1,300 hp:¹³⁹ <ul style="list-style-type: none"> 1.45 g/hp-hr NOx for engines over 100 hp. 3.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. 5.75 lbs NOx/hr from all spark ignition engines combined. <p><u>Ohio Oil and Gas Production Operations, General Permit 12.2</u></p> <ul style="list-style-type: none"> Applicable to facilities that have less than or equal to 1,000 hp total for all natural gas engines and where the flare system is operated at a heat input capacity less than or equal to 32 MMBtu/hr.¹⁴⁰ Engines must comply with NSPS Subpart JJJJ standards.¹⁴¹ Stack Height:¹⁴² <ul style="list-style-type: none"> Engine ≥ 250 hp: exhaust stack at least 20' above ground level. Engine < 250 hp: exhaust stack at least 12' above ground level. Specific Emission Limitations¹⁴³ <ul style="list-style-type: none"> 20% opacity, 6-min average. Particulate Emissions (PE): <ul style="list-style-type: none"> 0.310 lb/MMBtu for engines ≤ 600 hp. 0.062 lb/MMBtu for engines > 600 hp. Engines exempt from SO₂ emission limitation for any day in which only natural gas is burned pursuant to OAC 3745-18-06(A). Total combined engine power less than or equal to 500 hp:¹⁴⁴ <ul style="list-style-type: none"> 2.0 g/hp-hr NOx for engines over 100 hp. 4.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. Total combined engine power greater than 500 hp:¹⁴⁵ <ul style="list-style-type: none"> 2.0 g/hp-hr NOx for engines over 100 hp. 2.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. 4.4 lbs NOx/hr from all spark ignition engines combined. 	<p><u>Natural Gas Production Facility Class II General Permit G70-D</u></p> <ul style="list-style-type: none"> Requires compliance with NSPS Subpart JJJJ.¹⁴⁶

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
12.4 12.5	<p><u>“New” Rich-Burn Compressor Engines</u></p> <p>Emissions limitations for new, purchased, replacement, reconstructed, or relocated rich-burn engines greater than 100 hp and up to 500 hp:</p> <ul style="list-style-type: none"> 0.25 g/hp-hr NOx. 0.30 g/hp-hr CO. 0.20 g/hp-hr VOCs. <p>Emissions limitations for new, purchased, replacement, reconstructed, or relocated rich-burn engines greater than 500 hp:</p> <ul style="list-style-type: none"> 0.20 g/hp-hr NOx. 0.30 g/hp-hr CO. 0.20 g/hp-hr VOCs. 2.7 ppmvd at 15% O₂ or 75% reduction for HCHO (formaldehyde). 	<p>NSPS Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)</p> <ul style="list-style-type: none"> Emissions limitations for engines manufactured on or after 2010/2011 greater than 100 hp engine models (depending on engine size):¹⁴⁷ <ul style="list-style-type: none"> 1.0 g/hp-hr for NOx. 2.0 g/hp-hr for CO. 0.7 g/hp-hr for VOCs. <p>Compressor engines are also subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE) at 40 CFR 63, Subpart ZZZZ (i.e., the “RICE MACT”)¹⁴⁸</p>	<p><u>Exemption Category No. 38 (Compressor Engines at the Wellpad)</u>¹⁴⁹</p> <ul style="list-style-type: none"> Compressor engines at the wellpad (those installed on or after August 10, 2013) exempt from permitting where: <ul style="list-style-type: none"> NOx emissions from stationary internal combustion engines at the wells, and wellheads are less than 100 lbs/hr, 1000 lbs/day, 2.75 tons per ozone season (May 1 to September 30), and 6.6 tons per year on a 12-month rolling basis. Combined VOC emissions from all the sources at the facility are less than 2.7 tons on a 12-month rolling basis. Additionally, combined HAP emissions at the facility must be less than 1000 lbs of a single HAP or one ton of a combination of HAPs in any consecutive 12-month period. If the VOCs emissions include HAPs, this HAP exemption criteria is met.¹⁵⁰ <p><u>Coverage under GP-5 (Compressor Engines at Natural Gas Compression and/or Processing Facilities)</u></p> <ul style="list-style-type: none"> The facility emissions are limited to non-major emission thresholds. (Synthetic Minor).¹⁵¹ Natural gas fired rich burn less than 100 hp:¹⁵² <ul style="list-style-type: none"> 2.0 g/hp-hr NOx. 2.0 g/hp-hr CO. Natural gas rich burn greater than 100 hp and less than or equal to 500 hp:¹⁵³ <ul style="list-style-type: none"> 0.25 g/hp-hr NOx. 0.30 g/hp-hr CO. 0.2 g/hp-hr for non-methane/non-ethane hydrocarbons (except formaldehyde). Natural gas rich burn greater than 500 hp:¹⁵⁴ <ul style="list-style-type: none"> 0.20 g/hp-hr NOx. 0.30 g/hp-hr CO. 0.20 g/hp-hr for non-methane/non-ethane hydrocarbons (except formaldehyde). 2.7 ppmvd at 15% O₂ or 76% reduction for formaldehyde. 	<p><u>Ohio Oil and Gas Production Operations, General Permit 12.1</u></p> <ul style="list-style-type: none"> Applicable to facilities that have less than or equal to 1,800 hp total for all natural gas engines and where the flare system is operated at a heat input capacity less than or equal to 10 MMBtu/hr.¹⁵⁵ Engines must comply with NSPS Subpart JJJJ standards.¹⁵⁶ Stack Height:¹⁵⁷ <ul style="list-style-type: none"> Engine ≥ 250 hp: exhaust stack at least 20' above ground level. Engine < 250 hp: exhaust stack at least 12' above ground level. Specific Emission Limitations¹⁵⁸ <ul style="list-style-type: none"> 20% opacity, 6-min average. Particulate Emissions (PE): <ul style="list-style-type: none"> 0.310 lb/MMBtu for engines ≤ 600 hp. 0.062 lb/MMBtu for engines > 600 hp. Engines exempt from SO₂ emission limitation for any day in which only natural gas is burned pursuant to OAC 3745-18-06(A). Total combined engine power less than or equal to 1,300 hp:¹⁵⁹ <ul style="list-style-type: none"> 2.0 g/hp-hr NOx for engines over 100 hp. 4.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. Total combined engine power greater than 1,300 hp:¹⁶⁰ <ul style="list-style-type: none"> 1.45 g/hp-hr NOx for engines over 100 hp. 3.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. 5.75 lbs NOx/hr from all spark ignition engines combined. <p><u>Ohio Oil and Gas Production Operations, General Permit 12.2</u></p> <p>Applicable to facilities that have less than or equal to 1,000 hp total for all natural gas engines and where the flare system is operated at a heat input capacity less than or equal to 32 MMBtu/hr.¹⁶¹</p> <ul style="list-style-type: none"> Engines must comply with NSPS Subpart JJJJ standards.¹⁶² Stack Height:¹⁶³ <ul style="list-style-type: none"> Engine ≥ 250 hp: exhaust stack at least 20' above ground level. Engine < 250 hp: exhaust stack at least 12' above ground level. Specific Emission Limitations¹⁶⁴ <ul style="list-style-type: none"> 20% opacity, 6-min average. Particulate Emissions (PE): <ul style="list-style-type: none"> 0.310 lb/MMBtu for engines ≥ 600 hp. 0.062 lb/MMBtu for engines > 600 hp. Engines exempt from SO₂ emission limitation for any day in which only natural gas is burned pursuant to OAC 3745-18-06(A). Total combined engine power less than or equal to 500 hp:¹⁶⁵ <ul style="list-style-type: none"> 2.0 g/hp-hr NOx for engines over 100 hp. 4.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. Total combined engine power greater than 500 hp:¹⁶⁶ <ul style="list-style-type: none"> 2.0 g/hp-hr NOx for engines over 100 hp. 2.0 g/hp-hr CO for engines over 100 hp. 1.0 g/hp-hr VOC for engines over 100 hp. 4.4 lbs NOx/hr from all spark ignition engines combined. 	<p><u>Natural Gas Production Facility Class II General Permit G70-D</u></p> <ul style="list-style-type: none"> Requires compliance with NSPS Subpart JJJJ.¹⁶⁷

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
13	<p><u>Storage Vessels</u></p> <ul style="list-style-type: none"> By October 15, 2013 – all existing and new individual storage vessels at the wellpad with VOC emissions equal to or greater than 6 tpy must install controls to achieve at least a 95% reduction in VOC emissions. 	<p><u>NSPS Subparts OOOO & OOOOa</u></p> <p>Storage vessels that have potential VOC emissions equal to or greater than 6 tons per year (tpy) must achieve at least a 95% reduction in VOC emissions within 60-days of startup.¹⁶⁸</p> <ul style="list-style-type: none"> Existing storage vessels that have not been constructed, modified, or reconstructed after August 23, 2011 are not subject to this requirement.¹⁶⁹ 6 tpy determination: <ul style="list-style-type: none"> 6 tpy VOC determination may take into account enforceable limits in an operating permit or other requirement established under a Federal, State, local or tribal authority.¹⁷⁰ Emissions from a storage vessel that are recovered and routed to a process through a vapor recovery unit (VRU) can be excluded from the 6 tpy VOC determination provided certain requirements are met.¹⁷¹ Exception: <ul style="list-style-type: none"> Maintain uncontrolled actual VOC emissions at less than 4 tpy (must be able to show less than 4 tpy for 12 months prior to using the uncontrolled actual VOC emission rate for compliance purposes).¹⁷² Control device must be reinstalled: (1) if a well feeding the storage vessel undergoes fracturing or refracturing; or (2) the monthly emissions from the uncontrolled storage vessel increase to 4 tpy or greater.¹⁷³ Control Requirements: <ul style="list-style-type: none"> Control devices used to reduce emissions from storage vessels must be equipped with a cover (which meets the requirements of 40 C.F.R. § 60.5411(b)), must be connected through a closed vent system (which meets the requirements of 40 C.F.R. § 60.5411(c)), and emissions must be routed to either a control device (carbon adsorption or combustion control device), which meets specifications of 40 C.F.R. § 60.5412(c)-(d) or a process.¹⁷⁴ If a floating roof is used to reduce emissions, it must meet the requirements of 40 C.F.R. § 60.112b(a)(1) or (2) and relevant requirements in 40 C.F.R. part 60 subpart Kb.¹⁷⁵ 	<p><u>Exemption Category No. 38¹⁷⁶</u></p> <ul style="list-style-type: none"> Storage vessels/storage tanks are exempt from permit requirements if they are equipped with VOC emission controls achieving emission reduction of 95% or greater. Storage vessels/tanks can qualify for the exemption if combined VOC emissions from all the sources at the facility are less than 2.7 tons on a 12-month rolling basis. Combined HAP emissions at the facility must be less than 1000 lbs of a single HAP or one ton of a combination of HAPs in any consecutive 12-month period in order to qualify for the exemption. If the VOCs emissions include HAPs, this HAP exemption criteria is met.¹⁷⁷ No de minimis emission threshold per tank as allowed in NSPS Subpart OOOO (<i>i.e.</i>, must reduce storage tank/storage vessel VOC emissions by 95% if combined VOC emissions from storage vessels/storage tanks are above 2.7 tpy in order to qualify for exemption). 	<p><u>Oil and Gas Well-Site Production Operations, General Permit 12.1 and 12.2^{178,179}</u></p> <ul style="list-style-type: none"> Requires compliance with NSPS Subpart OOOO where applicable. Total VOC emissions (including breathing losses, working losses, and flashing losses) from all storage vessels combined at the site may not exceed 4.28 tons per month averaged over a 12-month rolling period. Designed minimum control efficiency of 95% for an enclosed flare/combustor (where used for compliance with NSPS Subpart OOOO requirements, where applicable). Flare/combustion device may not operate at more than 10 MMBtu/hr (for General Permit 12.1) or 32 MMBtu/hr heat input (for General Permit 12.2), except: <ul style="list-style-type: none"> when a malfunction occurs (<i>e.g.</i>, when excess gas must be safely disposed of by venting it to the flare/combustion device); or for repair pressure blow-downs; or when another well is being drilled or fractured and the gas must be safely disposed of by venting it to the flare/combustion device. If required to install controls per the Subpart OOOO storage vessel requirements, an enclosed combustion device must be operated with no visible emissions except for periods not to exceed a total of 1 minute in any 15 minute period, conducting Method 22 once every calendar month. Emission Limits for flare/combustion device in GP 12.1: <ul style="list-style-type: none"> CO: 1.35 tons/month (12-month rolling period). NOx: 0.25 tons/month (12-month rolling period). SO₂: 0.15 tons/month (12-month rolling period). Emission Limits for flare/combustion device in GP 12.2: <ul style="list-style-type: none"> CO: 4.32 tons/month (12-month rolling period). NOx: 0.79 tons/month (12-month rolling period). SO₂: 0.48 tons/month (12-month rolling period). 	<p><u>Natural Gas Production Facility Class II General Permit G70-D</u></p> <ul style="list-style-type: none"> Compliance with NSPS Subpart OOOO and OOOOa requirements.¹⁸⁰

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
14.1	<p><u>Rod Packing at Reciprocating Compressors</u></p> <ul style="list-style-type: none"> Change rod packing at all reciprocating compressors (both existing and new), including those at the wellhead, either every 26,000 hours of operation or after 36 months. 	<p><u>NSPS Subparts OOOO & OOOOa</u></p> <ul style="list-style-type: none"> Reciprocating compressors (installed after August 23, 2011):¹⁸¹ <ul style="list-style-type: none"> change rod packing either every 26,000 hours of operation or every 36 months; or use a rod packing emissions collection system that operates under negative pressure and route the rod packing emissions to a process through a closed vent system that meets the requirements of 40 CFR § 5411(a). <p>Reciprocating compressors located at a well site or an adjacent well site and servicing more than one well site are excluded from this requirement.¹⁸²</p>	<p>No additional state-specific requirements other than the requirements in NSPS Subparts OOOO & OOOOa.</p>	<p>No additional state-specific requirements other than the requirements in NSPS Subparts OOOO & OOOOa.</p>	<p>No additional state-specific requirements other than the requirements in NSPS Subparts OOOO & OOOOa.</p>
14.2	<p><u>Pneumatic Controllers</u></p> <ul style="list-style-type: none"> By October 15, 2013, pneumatic controllers (both existing and new) must be either: <ul style="list-style-type: none"> Low bleed, with a natural gas bleed rate limit of 6.0 scfh or less; or Zero bleed when electricity (3-phase electrical power) is on-site. 	<p><u>NSPS Subparts OOOO & OOOOa</u></p> <ul style="list-style-type: none"> Pneumatic controllers (constructed, installed, modified or reconstructed on or after October 15, 2013) located between the wellhead and a natural gas processing plant: bleed rate of 6.0 scfh or less.¹⁸³ Exception to 6.0 scfh bleed rate – where use of a greater bleed rate is required based on functional needs, including response time, safety and positive actuation.¹⁸⁴ 	<p><u>GP-5 - Natural Gas Compression and/or Processing Facilities</u></p> <ul style="list-style-type: none"> Lists pneumatic controllers as a covered device, however, it contains no additional state-specific requirements for such controllers other than the requirements for natural gas compressor stations in NSPS Subpart OOOO.¹⁸⁵ 	<p>Ohio Oil and Gas Production Operations, General Permit 12.1 and 12.2, specifically require compliance with Subpart OOOO requirements for pneumatic controllers.¹⁸⁶</p>	<p><u>Natural Gas Production Facility Class II General Permit G70-D</u></p> <ul style="list-style-type: none"> Requires compliance with NSPS Subpart OOOO and OOOOa requirements for pneumatic controllers.¹⁸⁷
14.3	<p><u>Centrifugal Compressors</u></p> <ul style="list-style-type: none"> New centrifugal compressors may not contain wet oil seals. Replace worn out wet seals on existing centrifugal compressors with dry seals. 	<p><u>NSPS Subparts OOOO & OOOOa</u></p> <ul style="list-style-type: none"> For centrifugal compressors installed after August 23, 2011 - must reduce VOC emissions from each centrifugal compressor wet seal fluid degassing system by 95% or greater.¹⁸⁸ <ul style="list-style-type: none"> If a control device is used to reduce emissions, must equip the wet seal fluid degassing system with a cover that meets the applicable requirements in NSPS Subpart OOOO/OOOOa, that is connected through a closed vent system that meets the applicable requirements in NSPS Subpart OOOO/OOOOa and routed to a control device that meets the applicable conditions in NSPS Subpart OOOO/OOOOa. As an alternative to routing the closed vent system to a control device, may route the closed vent system to a process. Not applicable to centrifugal compressors located at a well site or at an adjacent well site and servicing more than one well site.¹⁸⁹ 	<p><u>GP-5 - Natural Gas Compression and/or Processing Facilities</u></p> <ul style="list-style-type: none"> Compliance with NSPS Subpart OOOO requirements for centrifugal compressors.¹⁹⁰ 	<p>No state-specific requirements in addition to NSPS Subparts OOOO & OOOOa requirements.</p>	<p>No state-specific requirements in addition to NSPS Subparts OOOO & OOOOa requirements.</p>

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
14.4	<p><u>Directed Inspection and Maintenance Program</u></p> <ul style="list-style-type: none"> By March 20, 2014 or date of Operator’s initial application for certification (whichever is later) – Operators to implement a directed inspection and maintenance program (DI&M) for equipment leaks from all existing and new valves, pump seals, flanges, compressor seals, pressure relief valves, open-ended lines, tanks and other process and operation components that result in fugitive emissions. Monitored by a weekly visual, auditory, and olfactory check. Yearly mechanical or instrument check to detect leaks. Repair detected significant leaks in a timely manner. 	<p><u>NSPS Subparts OOOO & OOOOa</u></p> <p>Inspections for closed vent systems and covers at centrifugal compressor, reciprocating compressor, and pneumatic pump facilities:¹⁹¹</p> <ul style="list-style-type: none"> Conduct annual visual inspections for defects that could result in air emissions. Method 21 test to ensure no detectable emissions: No detectable emissions where organic concentration value is less than 500 ppm. Repairs: <ul style="list-style-type: none"> If a leak or defect is detected, the leak must be repaired as soon as practicable. A first attempt at repair must be made within 5 days and repair must be completed within 15 days. Delay permissible if repair requires shutdown or if emissions during repair would be greater than delay of repair until shutdown. <p>Closed vent systems and cover for storage vessel facilities:</p> <ul style="list-style-type: none"> Monthly olfactory, visual and auditory inspections for defects that could result in air emissions.¹⁹² If a leak or defect is detected, the leak must be repaired as soon as practicable. A first attempt at repair must be made within 5 days and repair must be completed within 30 days. <p>Exceptions to inspection requirements:¹⁹³</p> <ul style="list-style-type: none"> Unsafe to inspect components because inspecting personnel would be exposed to an imminent or potential danger. Must have a written plan in place that requires inspection as frequently as possible during safe-to-inspect times. Difficult to inspect components that cannot be inspected without elevating the inspecting personnel more than 2 meters above a support surface. Must have a written plan in place requiring inspection at least every 5 years. <p>Well site fugitive emissions components (e.g., valves, connectors, pressure relief devices, etc. that have potential emit methane or VOCs):¹⁹⁴</p> <ul style="list-style-type: none"> Develop and implement fugitive emissions monitoring plan whereby fugitive emissions surveys of all fugitive emissions components at the well site are conducted within 60 days of startup (or by 6/3/17, whichever is later) and semiannually thereafter using either OGI or Method 21. Relaxed requirements are provided for difficult-to-monitor components and an exception is provided for unsafe-to-monitor components. Fugitive emissions defined as any visible emission observed using OGI or an instrument reading of 500 ppm or greater using Method 21. When fugitive emissions are detected, repair or replace as soon as practicable, but no later than 30 days. Must resurvey within 30 days after the repair/replacement. Exceptions provided for repairs/replacements requiring blowdown/shutdown/shut-in/safety. 	<p><u>Exemption Category No. 38¹⁹⁵</u></p> <ul style="list-style-type: none"> Perform a leak detection and repair (LDAR) program inspection within 60 days after the well is put into production and an annual inspection thereafter. Use of optical gas imaging camera (such as FLIR), gas leak detector, or other leak detection monitoring devices approved by PADEP. Conduct on valves, flanges, connectors, storage vessels/storage tanks, and compressor seals in natural gas or hydrocarbon liquids service. If leak is discovered – repair within 15 days unless facility shutdown is required or ordering replacement parts are necessary for the repair. Upon receipt of a written request documenting justification – PADEP may grant extension for leak detection deadlines or repairs. For storage vessels, leak detection and repair is to be performed in accordance with NSPS Subpart OOOO. A leak is considered repaired if one of the following can be demonstrated: <ul style="list-style-type: none"> No detectable emissions consistent with EPA Method 21 specified in 40 CFR Part 60, Appendix A. A concentration of 2.5% methane or less using a gas leak detector and a VOC concentration of 500 ppm or less. No visible leak image when using an optical gas imaging camera. No bubbling at leak interface using a soap solution bubble test specified in EPA Method 21. Any other method approved in writing by PADEP. 	<p><u>Ohio Oil and Gas Production Operations, General Permit 12.1 and 12.1¹⁹⁶</u></p> <p>Leak detection and repair program for ancillary equipment covered by permits, including each pump, compressor, pressure relief device, connector, valve, flange, vent, cover, any bypass in the closed vent system, and each storage vessel.</p> <p>Leak detection/repair program requirements:</p> <ul style="list-style-type: none"> Use of FLIR camera or an analyzer meeting U.S. EPA Method 21 of 40 CFR Part 60, Appendix A. Initial monitoring must be completed within 90 days of startup and quarterly thereafter for a period of four consecutive quarters (1 year). If following initial four consecutive quarters $\leq 2\%$ of ancillary equipment have leaked during most recent quarterly monitoring event, then monitoring frequency can be reduced to semi-annual. If following two consecutive semi-annual periods $< 2\%$ of ancillary equipment have leaked during most recent semi-annual monitoring event, then monitoring frequency can be reduced to annual. If $\geq 2\%$ of the ancillary equipment have leaked during any one of the semi-annual or annual monitoring events, then monitoring frequency must be returned to quarterly. First repair attempt within 5 calendar days of determining a leak. Repair must be made within 30 calendar days after leak detected. References Subpart OOOO requirements (40 CFR 60.5416(c)(5)) for permissible delay of repair (delay permissible if repair requires shutdown or if emissions during repair would be greater than delay of repair until shutdown). Incorporates certain Subpart OOOO leak detection and repair requirements for cover and closed vent systems for "new" storage vessels with potential to emit VOC emissions equal to or greater than 6 tpy at 40 CFR 60.5416(c)(4) and 40 CFR 60.5416(c)(5), including 5-day initial repair attempt, 30 day repair timeframe and permissible delay of repair. <p>Determination of Leak - Component leaking where instrument reading is equal to or greater than:</p> <ul style="list-style-type: none"> pressure relief device in gas/vapor service: 10,000 ppm. pressure relief device in light liquid service: 10,000 ppm. pumps in light liquid service: 10,000 ppm. compressor: 500 ppm. sampling connection system (must be equipped with a closed-purge, closed-loop, or closed-vent system) . open ended valves or lines (must be equipped with a cap, blind flange, plug, or a second valve). valves in gas/vapor and light liquid service: 10,000 ppm. closed vent system: 500 ppm. connectors: 10,000 ppm. all other ancillary and associated equipment in VOC service: 10,000 ppm. <p>Emission Limitation for Fugitive Equipment Leaks: 10.56 tpy for VOCs.</p>	<p><u>G70-D</u></p> <ul style="list-style-type: none"> Compliance with NSPS Subpart OOOO and OOOOa requirements.¹⁹⁷

AIR STANDARDS

NO.	CRSD PERFORMANCE STANDARD	FEDERAL	PENNSYLVANIA	OHIO	WEST VIRGINIA
14.5	<p><u>Well-bore freeze-up emissions</u></p> <ul style="list-style-type: none"> Eliminate VOC emissions associated with the prevention of well-bore freeze-up (only de minimis emissions are permitted). 	None.	If facility-wide VOC emissions exceed 2.7 tpy, Exemption Category No. 38 is not applicable and Plan Approval (case-by-case best available technology (BAT)) may be required. ¹⁹⁸	None.	None.
14.6	<p><u>Blowdown emissions</u></p> <ul style="list-style-type: none"> Existing and new compressors are required to be pressurized when they are off-line for operational reasons in order to reduce blowdown emissions. 	None.	If facility-wide VOC emissions exceed 2.7 tpy, Exemption Category No. 38 is not applicable and Plan Approval (case-by-case best available technology (BAT)) may be required. ¹⁹⁹	None.	None.
15.1 15.2	<p><u>Truck Emission Requirements</u></p> <ul style="list-style-type: none"> By March 20, 2014 - 80% of all trucks used to transport fresh water or well flowback water must meet U.S. EPA's Final Emission Standards for 2007 and Later Model Year Highway Heavy-Duty Vehicles and Engines for particulate matter (PM) emissions. By September 24, 2015 - 95% of all trucks used to transport fresh water or well flowback water must meet U.S. EPA's Final Emission Standards for 2007 and Later Model Year Highway Heavy-Duty Vehicles and Engines for particulate matter (PM) emissions. 	U.S. EPA regulates engine emissions from highway heavy-duty vehicles based on the vehicle's model year. ²⁰⁰	None. ²⁰¹	None. ²⁰²	None. ²⁰³
15.3 15.4	<p><u>Truck Idling and Fuel Requirements</u></p> <ul style="list-style-type: none"> All on-road vehicles and equipment - limit unnecessary idling to 5 minutes, or abide by applicable local or state laws if they are more stringent. All on-road and non-road vehicles and equipment - use Ultra-Low Sulfur Diesel fuel (15 ppm of sulfur) at all times. 	<ul style="list-style-type: none"> Starting in 2006, highway diesel fuel required to meet ultra-low sulfur (15 ppm of sulfur) requirement.²⁰⁴ Starting in 2010, diesel produced for use in non-road engines required to meet ultra-low sulfur (15 ppm of sulfur) requirement.²⁰⁵ 	Motor vehicles with gross weight of 10,001 lbs or more – 5 minute idling limit in any continuous 60-minute period. ²⁰⁶	No state-wide regulation.	15-minute idling limit for diesel-powered motor vehicles with a gross vehicle weight of 10,001 lbs or more. ²⁰⁷

ENDNOTES

- ¹ [See 40 C.F.R. § 435.32.](#)
- ² [See 40 C.F.R. §§ 435.33-435.34.](#)
- ³ [80 Fed. Reg. 18557, 18575 n. 15 \(April 7, 2015\).](#)
- ⁴ [58 Pa. C.S. § 3217.](#)
- ⁵ [25 Pa. Code § 95.10\(b\).](#)
- ⁶ [25 Pa. Code § 95.10\(b\).](#)
- ⁷ [July 26, 2011 Letter from PADEP to EPA Regarding PADEP's Call to Gas Drillers to Cease Delivering Wastewater from Shale Gas Extraction to 15 Facilities That Accept It.](#)
- ⁸ [Ohio Rev. Code § 1509.22\(A\).](#)
- ⁹ [Ohio Rev. Code § 1509.22\(B\)\(2\)\(a\).](#)
- ¹⁰ [Ohio Rev. Code § 1509.227.](#)
- ¹¹ [Ohio Rev. Code § 1509.22\(C\)\(1\).](#)
- ¹² [Ohio's Regulations: A Guide for Operators Drilling in the Marcellus and Utica Shales, Ohio EPA, March 2012, at p. 7.](#)
- ¹³ [W. Va. Code § 22-6-7; James A. Martin, WVDEP Chief, Completion Returns from the Marcellus Shale formation \(July 30, 2013\).](#)
- ¹⁴ [25 Pa. Code § 287.53.](#)
- ¹⁵ [Ohio Rev. Code § 1509.22\(B\)\(2\)\(a\); Ohio Admin. Code § 1501:9-1-02.](#)
- ¹⁶ [WVDEP Guidance, Large Volume Water Fracture Treatments \(Jan. 8, 2010\); W. Va. Code R. § 22-6A-\(a\)7.](#)
- ¹⁷ [W. Va. Code § 22-6A-7; W. Va. Code R. § 35-8-5.6.](#)
- ¹⁸ Pennsylvania has promulgated new requirements for unconventional wells in Title 25, Chapter 78a of the Pennsylvania Code. These new requirements were published as final rule in the Pennsylvania Bulletin on October 8, 2016 (46 Pa.B. 6431).
- ¹⁹ [25 Pa. Code §§ 78a.56.](#)
- ²⁰ [25 Pa. Code § 78a.57.](#)
- ²¹ [25 Pa. Code § 78a.57\(a\).](#)
- ²² [Ohio Rev. Code § 1509.22.](#)
- ²³ [W. Va. Code R. § 35-8-12.4 .](#)
- ²⁴ [25 Pa. Code §§ 78a.56.](#)
- ²⁵ [25 Pa. Code § 78a.57.](#)
- ²⁶ [25 Pa. Code § 78a.57\(a\).](#)
- ²⁷ [Ohio Rev. Code § 1509.22.](#)
- ²⁸ [W. Va. Code R. § 35-8-12.4; W.Va. Code R. § 35-8-16.](#)
- ²⁹ [32 P.S. § 693.1 et seq.; 25 Pa. Code Chapter 105; see also Pennsylvania Design and Construction Standards for Centralized Impoundments.](#)
- ³⁰ [25 Pa. Code § 78a.59c; 25 Pa. Code § 78a.59c\(b\).](#) Note: The Pennsylvania Commonwealth Court preliminary enjoined enforcement of 25 Pa. Code § 78.59c in its entirety on November 8, 2016. *See Marcellus Shale Coalition v. DEP*, No. 573 M.D. 2016 (Nov. 8, 2016).
- ³¹ [Ohio Rev. C § 1509.22\(C\)\(6\).](#)
- ³² [W. Va. Code R. § 35-8-17.](#)
- ³³ [West Virginia Design and Construction Standards for Centralized Pits.](#)
- ³⁴ [25 Pa. Code § 78a.52a.](#)
- ³⁵ [Ohio Admin. Code § 1501:9-2-02\(C\).](#)
- ³⁶ [Ohio Admin. Code § 1501:9-2-02\(C\).](#)
- ³⁷ [W. Va. Code R. § 35-8-6.2.j.](#)
- ³⁸ [W. Va. Code R. § 35-8-6.2.j.](#)
- ³⁹ [W. Va. Code R. § 35-8-6.2.k.](#)
- ⁴⁰ [58 Pa. C.S. § 3218; 25 Pa. Code 78a.52.](#)
- ⁴¹ [25 Pa. Code § 78a.15\(b.1\).](#)
- ⁴² [Ohio Rev. C § 1509.06\(A\)\(8\)\(c\).](#)
- ⁴³ [W. Va. Code § 22-6A-18; W. Va. Code R. § 35-8-15.](#)
- ⁴⁴ [58 Pa. C.S. § 3253; see also 25 Pa. Code § 78a.89; 25 Pa. Code § 78a.51; 25 Pa. Code § 91.33.](#)
- ⁴⁵ [25 Pa. Code § 78a.51.](#)
- ⁴⁶ [Ohio Rev. C. § 1509.04.](#)
- ⁴⁷ [Ohio Rev. C. § 1509.22\(F\).](#)
- ⁴⁸ [W. Va. Code § 22-6A-19.](#)

ENDNOTES

- ⁴⁹ [W. Va. Code § 22-6A-18\(e\)](#).
- ⁵⁰ [58 Pa. C.S. § 3217](#); [25 Pa. Code § 78a.71](#); [25 Pa. Code § 78a.81](#); [25 Pa. Code § 78a.83](#); [25 Pa. Code § 78a.83a](#); [25 Pa. Code § 78a.83b](#); [25 Pa. Code § 78a.83c](#); [25 Pa. Code § 78a.84](#); [25 Pa. Code § 78a.85](#).
- ⁵¹ [Ohio Rev. Code § 1509.17](#); [Ohio Admin. Code § 1501:9-1-08](#).
- ⁵² [W. Va. Code § 22-6A-24](#); [W. Va. Code R. § 35-8-5.7, 9.2](#).
- ⁵³ [Federal regulation requires that operators who inject diesel fuels during hydraulic fracturing obtain an Underground Injection Control \(UIC\) permit prior to injection. This requirement must be met in Pennsylvania, Ohio and West Virginia.](#)
- ⁵⁴ [58 Pa. C.S. § 3222](#); [58 Pa. C.S. § 3222.1\(b\)\(2\)](#).
- ⁵⁵ [58 Pa. C.S. § 3222.1\(c\)](#).
- ⁵⁶ [58 Pa. C.S. § 3222.1\(d\)](#).
- ⁵⁷ [58 Pa. C.S. § 3222.1\(b\)\(11\)](#).
- ⁵⁸ [58 Pa. C.S. § 3222.1\(d\)\(2\)](#).
- ⁵⁹ [Ohio Rev. Code § 1509.10\(A\)\(9\)-\(10\)](#).
- ⁶⁰ [Ohio Rev. Code § 1509.10\(A\)\(9\)\(a\), \(A\)\(10\)\(a\), \(K\)\(2\)](#).
- ⁶¹ [Ohio Rev. Code § 1509.10\(I\)](#).
- ⁶² [Ohio Rev. Code § 1509.10\(H\)](#).
- ⁶³ [Ohio Rev. Code § 1509.10\(2\)](#).
- ⁶⁴ [W. Va. Code § 22-6A-7](#); [W. Va. Code § 22-6A-7\(e\)\(5\)](#); [W. Va. Code R. § 35-8-10](#).
- ⁶⁵ [W. Va. Code § 22-6A-7](#); [W. Va. Code § 22-6A-7\(e\)\(5\)](#); [W. Va. Code R. § 35-8-10](#).
- ⁶⁶ [25 Pa. Code § 287.53](#).
- ⁶⁷ [25 Pa. Code § 78a.88](#).
- ⁶⁸ [Ohio Admin. Code § 1501:9-1-08\(N\)](#); [Ohio Admin. Code § 1501:9-1-08\(D\)\(3\)](#).
- ⁶⁹ [W. Va. Code R. § 35-8-9.2](#); [West Virginia DEP, Office of Oil and Gas, Casing and Cementing Standards and Best Management Practices \(December 10, 2012\)](#).
- ⁷⁰ [58 Pa. C.S. § 3218.2](#); [25 Pa. Code § 78a.53](#); [25 Pa. Code § 78.55](#); [25 Pa. Code § 78a.55](#); [25 Pa. Code § 91.34](#).
- ⁷¹ [Ohio Admin. Code § 1501:9-1-07](#).
- ⁷² [Ohio Admin. Code § 1501:9-2-02](#).
- ⁷³ [W. Va. Code R. § 35-8-5.4, 5.5](#).
- ⁷⁴ [West Virginia General Water Pollution Control Permit, Stormwater Runoff from Oil and Gas Field Construction \(June 13, 2013\)](#); [W. Va. Code § 22-6A-7\(g\)\(5\)](#); [W. Va. Code R. § 35-8-9, 18](#).
- ⁷⁵ [35 Pa. C.S. § 7321](#); [25 Pa. Code § 78a.55](#).
- ⁷⁶ [25 Pa. Code § 78a.55](#).
- ⁷⁷ [Ohio Admin. Code § 1501:9-9-05](#).
- ⁷⁸ [W. Va. Code § 22-6A-7](#); [W. Va. Code R. § 35-8-5.7](#).
- ⁷⁹ [25 Pa. Code § 78a.66\(b\)](#).
- ⁸⁰ [Ohio Admin. Code § 1501:9-8-02](#).
- ⁸¹ [W. Va. Code R. § 35-8-18.9](#).
- ⁸² Compliance with Federal air regulations is required in all states regardless of whether or not a permit is required to be obtained. Additionally, the Federal New Source Performance Standards, 40 CFR Part 60, are self-implementing in Pennsylvania and West Virginia. See [25 Pa. Code § 122.3](#); [W. Va. Code R. § 45-16-4](#).
- ⁸³ Pursuant to the Pennsylvania Air Pollution Control Act (APCA), 35 P.S. §4001 *et seq.* and 25 Pa. Code § 127.14 (relating to exemptions), the Pennsylvania Department of Environmental Protection (PADEP) may determine sources or classes of sources to be exempt from the plan approval and permitting requirements of 25 Pa. Code Chapter 127 (relating to construction, modification, reactivation and operation of sources). If a source does not meet the qualifying criteria for one of PADEP's Air Quality Permit Exemptions, it is subject to plan approval and permitting requirements (unless a request for determination on a case-by-case basis for an exemption is sought and granted by PADEP). See [Pennsylvania's Air Quality Permit Exemptions](#).
- ⁸⁴ Unless subject to an exemption or a permit-by-rule, a facility that contains an "air contaminant source" is required to obtain either an individual permit-to-install/permit-to-operate or may be eligible for a general permit-to-install/permit-to-operate if one exists. See [Ohio Rev. Code § 3704.03\(F\)-\(G\)](#); [Ohio Rev. Code § 3704.011](#); [Ohio Admin. Code § 3745-15-05](#); [Ohio Admin. Code § 3745-31-01](#); [Ohio Admin. Code § 3745-31-02](#); [Ohio Admin. Code § 3745-31-03](#).
- ⁸⁵ In West Virginia, a facility that meets the definition of a "stationary source" must obtain either an individual air permit or may be eligible for a general permit if one exists. See [W. Va. Code R. § 45-13-2.24](#); [W. Va. Code R. § 45-13-5](#).
- ⁸⁶ U.S. EPA has amended NSPS Subpart OOOO (relating to facilities constructed, modified or reconstructed after August 23, 2011) and promulgated a new a NSPS Subpart OOOOa (relating to facilities constructed, modified or reconstructed after September 18, 2015). 35844. These updates include current VOC requirements already provided in NSPS Subpart OOOO and new provisions for GHGs (in the form of methane provided for in Subpart NSPS OOOOa) and VOCs.
- ⁸⁷ [40 C.F.R. § 60.5375 \(a\)\(1\)-\(4\)](#).
- ⁸⁸ [40 C.F.R. § 60.5375a\(f\)](#).
- ⁸⁹ [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#).
- ⁹⁰ [PADEP Frequently Asked Questions, General Permit 5 \(GP-5\) and Exemption Category No. 38, December 11, 2015, Question/Answer No. 54, at p. 14](#).
- ⁹¹ [Ohio Admin. Code § 1501:9-9-05\(B\)](#).
- ⁹² [WVDEP Class II General Permit G70-D, Section 5.0](#).

ENDNOTES

- ⁹³ Unless subject to an exemption or a permit-by-rule, a facility that contains an “air contaminant source” is required to obtain either an individual permit-to-install/permit-to-operate or may be eligible for a general permit-to-install/permit-to-operate if one exists. See [Ohio Rev. Code § 3704.03\(F\)-\(G\)](#); [Ohio Rev. Code § 3704.011](#); [Ohio Admin. Code § 3745-15-05](#); [Ohio Admin. Code § 3745-31-01](#); [Ohio Admin. Code § 3745-31-02](#); [Ohio Admin. Code § 3745-31-03](#).
- ⁹⁴ In West Virginia, a facility that meets the definition of a “stationary source” must obtain either an individual air permit or may be eligible for a general permit if one exists. See [W. Va. Code R. § 45-13-2.24](#); [W. Va. Code R. § 45-13-5](#).
- ⁹⁵ [40 C.F.R. § 60.5375\(a\)\(3\)](#); [40 C.F.R. § 60.5375a](#).
- ⁹⁶ [Pennsylvania’s Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#).
- ⁹⁷ [25 Pa. Code § 123.41](#).
- ⁹⁸ [Ohio Admin. Code § 1501:9-9-05\(B\)](#).
- ⁹⁹ [W. Va. Code R. § 45-6-6.1a](#).
- ¹⁰⁰ [W. Va. Code R. § 45-6-4.1, 4.3](#); see also [WVDEP Class II General Permit G70-D, Section 5.1.3](#).
- ¹⁰¹ Unless subject to an exemption or a permit-by-rule, a facility that contains an “air contaminant source” is required to obtain either an individual permit-to-install/permit-to-operate or may be eligible for a general permit-to-install/permit-to-operate if one exists. See [Ohio Rev. Code § 3704.03\(F\)-\(G\)](#); [Ohio Rev. Code § 3704.011](#); [Ohio Admin. Code § 3745-15-05](#); [Ohio Admin. Code § 3745-31-01](#); [Ohio Admin. Code § 3745-31-02](#); [Ohio Admin. Code § 3745-31-03](#).
- ¹⁰² In West Virginia, a facility that meets the definition of a “stationary source” must obtain either an individual air permit or may be eligible for a general permit if one exists. See [W. Va. Code R. § 45-13-2.24](#); [W. Va. Code R. § 45-13-5](#).
- ¹⁰³ [40 C.F.R. Part 89](#); [40 C.F.R. Part 1039](#).
- ¹⁰⁴ [40 C.F.R. Part 80](#).
- ¹⁰⁵ [Pennsylvania’s Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#). Additionally, states are generally precluded from establishing emissions limitations for portable non-road engines. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹⁰⁶ [Ohio Admin. Code § 3745-31-03-\(A\)\(1\)\(qq\)](#). Additionally, states are generally precluded from establishing emissions limitations for portable non-road engines. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹⁰⁷ [W. Va. Code R. § 45-13-1](#). Additionally, states are generally precluded from establishing emissions limitations for portable non-road engines. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹⁰⁸ [40 C.F.R. Part 89](#); [40 C.F.R. Part 1039](#).
- ¹⁰⁹ [40 C.F.R. Part 80](#).
- ¹¹⁰ [Pennsylvania’s Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#). Additionally, states are generally precluded from establishing emissions limitations for portable non-road engines. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹¹¹ [Ohio Admin. Code § 3745-31-03-\(A\)\(1\)\(pp\)](#). Additionally, states are generally precluded from establishing emissions limitations for portable non-road engines. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹¹² [W. Va. Code R. § 45-13-1](#). Additionally, states are generally precluded from establishing emissions limitations for portable non-road engines. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹¹³ [40 C.F.R. Part 86](#).
- ¹¹⁴ [40 C.F.R. Part 80](#).
- ¹¹⁵ States (except California) are precluded from establishing any emissions limitations other than those required in 40 C.F.R. Part 86. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹¹⁶ States (except California) are precluded from establishing any emissions limitations other than those required in 40 C.F.R. Part 86. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#).
- ¹¹⁷ States (except California) are precluded from establishing any emissions limitations other than those required in 40 C.F.R. Part 86. See [Clean Air Act Section 209, 42 U.S.C. § 7543](#). Additionally, motor vehicles are exempted from permitting requirements. See [W. Va. Code R. § 45-13-1](#).
- ¹¹⁸ [40 C.F.R. § 60.4230](#).
- ¹¹⁹ [40 C.F.R. Part 60, Subpart JJJJ, Table 1](#).
- ¹²⁰ [40 C.F.R. Part 63, Subpart ZZZZ](#).
- ¹²¹ [Ohio GP-12, at pp. 12-14](#).
- ¹²² [Ohio GP-12, at pp. 12-14, 17-18](#).
- ¹²³ The total combined total engine horsepower must also be no more than 1,800 hp for the site in order to qualify for Ohio’s GP-12. See [Ohio GP-12, at pp. 12](#). Additionally, where the total combined engine power exceeds 1,300 hp the engines must have a manufacturing date of no earlier than January 1, 2011 for engines less than 500 HP or no earlier than July 1, 2010 for engines 500 hp or greater. *Id.*
- ¹²⁴ The total combined total engine horsepower must also be no more than 1,800 hp for the site in order to qualify for Ohio’s GP-12. See [Ohio GP-12, at pp. 12](#). Additionally, where the total combined engine power exceeds 1,300 hp the engines must have a manufacturing date of no earlier than January 1, 2011 for engines less than 500 HP or no earlier than July 1, 2010 for engines 500 hp or greater. *Id.*
- ¹²⁵ [WVDEP General Permit G33-A, Section 6.0](#).
- ¹²⁶ [40 C.F.R. Part 60, Subpart JJJJ, Table 1](#).
- ¹²⁷ [40 C.F.R. Part 63, Subpart ZZZZ](#).
- ¹²⁸ [Pennsylvania’s Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#).
- ¹²⁹ This VOC and HAP exemption emission threshold does not include emissions from sources that are approved by PADEP in plan approvals or general plan approvals/general operating permits at the facility, nor do they include emissions from sources meeting the criteria specified in Subparagraphs i (components in LDAR), ii (storage vessels/tanks with 95% VOC reduction controls) and iv (allowed flaring activities) in Exemption Category No. 38. See [Pennsylvania’s Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#). Additionally, a release from any equipment or component designed by the manufacturer to protect the equipment, controller, or personnel or to prevent ground water contamination, gas migration, or an emergency situation is not required to be included for the VOC emissions threshold of 2.7 tpy, but these VOC emissions must be included in the annual source report submitted to DEP. See [PADEP Frequently Asked Questions, General Permit 5 \(GP-5\) and Exemption Category No. 38, December 11, 2015, Question/Answer No. 55, at p. 14](#).
- ¹³⁰ A synthetic minor permit restricts the facility’s actual emissions to less than any of the major facility thresholds on a 12-month rolling basis. Individual sources at the facility cannot exceed any source specific emission limitation included in the GP-5.
- ¹³¹ [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section B](#).
- ¹³² [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section B](#).
- ¹³³ [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section B](#).
- ¹³⁴ [Ohio General Permit 12.1 Qualifying Criteria](#).
- ¹³⁵ [Ohio General Permit 12.1, at pp. 14-15](#).
- ¹³⁶ [Ohio General Permit 12.1, at pp. 23](#).

ENDNOTES

¹³⁷ [Ohio General Permit 12.1, at pp. 14-16.](#)

¹³⁸ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹³⁹ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹⁴⁰ [Ohio General Permit 12.2 Qualifying Criteria.](#)

¹⁴¹ [Ohio General Permit 12.2, at pp. 14-15.](#)

¹⁴² [Ohio General Permit 12.2, at pp. 22-23.](#)

¹⁴³ [Ohio General Permit 12.2, at pp. 14-16.](#)

¹⁴⁴ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹⁴⁵ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹⁴⁶ [WVDEP Class II General Permit G70-D, Section 13.1.](#)

¹⁴⁷ [40 C.F.R. Part 60, Subpart JJJJ, Table 1.](#)

¹⁴⁸ [40 C.F.R. Part 63, Subpart ZZZZ.](#)

¹⁴⁹ [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 8-11.](#)

¹⁵⁰ This VOC and HAP exemption emission threshold does not include emissions from sources that are approved by PADEP in plan approvals or general plan approvals/general operating permits at the facility, nor do they include emissions from sources meeting the criteria specified in Subparagraphs i (components in LDAR), ii (storage vessels/tanks with 95% VOC reduction controls) and iv (allowed flaring activities) in Exemption Category No. 38. See [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#). Additionally, a release from any equipment or component designed by the manufacturer to protect the equipment, controller, or personnel or to prevent ground water contamination, gas migration, or an emergency situation is not required to be included for the VOC emissions threshold of 2.7 tpy. See [PADEP Frequently Asked Questions, General Permit 5 \(GP-5\) and Exemption Category No. 38, December 11, 2015, Question/Answer No. 55, at p. 14](#).

¹⁵¹ A synthetic minor permit restricts the facility's actual emissions to less than any of the major facility thresholds on a 12-month rolling basis. Individual sources at the facility cannot exceed any source specific emission limitation included in the GP-5.

¹⁵² [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section B.](#)

¹⁵³ [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section B.](#)

¹⁵⁴ [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section B.](#)

¹⁵⁵ [Ohio General Permit 12.1 Qualifying Criteria.](#)

¹⁵⁶ [Ohio General Permit 12.1, at pp. 14-15.](#)

¹⁵⁷ [Ohio General Permit 12.1, at pp. 23.](#)

¹⁵⁸ [Ohio General Permit 12.1, at pp. 14-16.](#)

¹⁵⁹ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹⁶⁰ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹⁶¹ [Ohio General Permit 12.2 Qualifying Criteria.](#)

¹⁶² [Ohio General Permit 12.2, at pp. 14-15.](#)

¹⁶³ [Ohio General Permit 12.2, at pp. 22-23.](#)

¹⁶⁴ [Ohio General Permit 12.2, at pp. 14-16.](#)

¹⁶⁵ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹⁶⁶ Each engine is required to meet the applicable emission standards under 40 CFR Part 60, Subpart JJJJ, based on the manufacture date and size of engine, or where required, to meet the Subpart JJJJ Table 1 standards or the limits identified in this permit by retrofitting pre-NSPS engines with a control device.

¹⁶⁷ [WVDEP Class II General Permit G70-D, Section 13.1.](#)

¹⁶⁸ [40 C.F.R. § 60.5395; 40 C.F.R. § 60.5395a.](#)

¹⁶⁹ [40 C.F.R. § 60.5365\(e\).](#)

¹⁷⁰ [40 C.F.R. § 60.5365\(e\); 40 C.F.R. § 60.5365a\(e\).](#)

¹⁷¹ [40 C.F.R. § 60.5365\(e\); 40 C.F.R. § 60.5365a\(e\).](#)

¹⁷² [40 C.F.R. § 60.5395\(d\)\(2\); 40 C.F.R. § 60.5395a\(a\)\(3\).](#)

¹⁷³ [40 C.F.R. § 60.5395\(d\)\(2\); 40 C.F.R. § 60.5395a\(a\)\(3\).](#)

¹⁷⁴ [40 C.F.R. § 60.5395\(e\)\(1\); 40 C.F.R. § 60.5395a\(b\)\(1\).](#)

¹⁷⁵ [40 C.F.R. § 60.5395\(e\)\(2\); 40 C.F.R. § 60.5395a\(b\)\(2\).](#)

¹⁷⁶ [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 8-11.](#)

¹⁷⁷ This VOC and HAP exemption emission threshold does not include emissions from sources that are approved by PADEP in plan approvals or general plan approvals/general operating permits at the facility, nor do they include emissions from sources meeting the criteria specified in Subparagraphs i (components in LDAR), ii (storage vessels/tanks with 95% VOC reduction controls) and iv (allowed flaring activities) in Exemption Category No. 38. See [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 8-11](#). Additionally, a release from any equipment or component designed by the manufacturer to protect the equipment, controller, or personnel or to prevent ground water contamination, gas migration, or an emergency situation is not required to be included for the VOC emissions threshold of 2.7 tpy, but these VOC emissions must be included in the annual source report submitted to DEP. See [PADEP Frequently Asked Questions, General Permit 5 \(GP-5\) and Exemption Category No. 38, December 11, 2015, Question/Answer No. 55, at p. 14](#).

ENDNOTES

- ¹⁷⁸ [Ohio General Permit 12.1, at pp. 34-35, 37; Ohio General Permit 12.2, at pp. 34-35, 37.](#)
- ¹⁷⁹ Per both GP 12.1 and GP 12.2, these requirements apply to an emission unit where a facility chooses to use a flare/combustion device to control VOCs emitted from the entire facility (including, but not limited to, flash vessel/storage tanks, truck loading for water and/or petroleum liquids, and the dehydrator). If a separate flare is used to control dehydrator emissions, then the flare requirements found in the dehydrator emissions unit terms in the General Permit 12.1 or 12.2 govern the dehydrator flare. See [Ohio General Permit 12.1, at pp. 34; Ohio General Permit 12.2, at pp. 34.](#)
- ¹⁸⁰ [WVDEP Class II General Permit G70-D, Section 7.0.](#)
- ¹⁸¹ [40 C.F.R. § 60.5385\(a\); 40 C.F.R. § 60.5385a\(a\).](#)
- ¹⁸² [40 C.F.R. § 60.5365\(c\); 40 C.F.R. § 60.5365a\(c\).](#)
- ¹⁸³ [40 C.F.R. § 60.5390\(c\)\(1\); 40 C.F.R. § 60.5390a\(c\)\(1\).](#)
- ¹⁸⁴ [40 C.F.R. § 60.5390\(a\); 40 C.F.R. § 60.5390a\(a\).](#)
- ¹⁸⁵ [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section A.3.](#)
- ¹⁸⁶ [Ohio General Permit 12.1, at pp. 42-43; Ohio General Permit 12.2, at pp. 42-43.](#)
- ¹⁸⁷ [WVDEP Class II General Permit G70-D, Section 10.0.](#)
- ¹⁸⁸ [40 C.F.R. § 60.5380\(a\); 40 C.F.R. § 60.5380a\(a\).](#)
- ¹⁸⁹ [40 C.F.R. § 60.5365\(b\); 40 C.F.R. § 60.5365a\(b\).](#)
- ¹⁹⁰ [Pennsylvania GP-5 - Natural Gas Compression and/or Processing Facilities, Section D.](#)
- ¹⁹¹ [40 C.F.R. § 60.5416\(a\)-\(b\); 40 C.F.R. § 60.5416a\(a\)-\(b\).](#)
- ¹⁹² [40 C.F.R. § 60.5416\(c\); 40 C.F.R. § 60.5416a\(c\).](#)
- ¹⁹³ [40 C.F.R. § 60.5416\(b\)\(10\)-\(11\); 40 C.F.R. § 60.5416\(c\)\(6\)-\(7\); 40 C.F.R. § 60.5416a\(b\)\(10\)-\(11\); 40 C.F.R. § 60.5416a\(c\)\(6\)-\(7\).](#)
- ¹⁹⁴ [40 C.F.R. § 60.5397a.](#)
- ¹⁹⁵ [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 8-11.](#)
- ¹⁹⁶ [Ohio General Permit 12.1, at pp. 42-45; Ohio General Permit 12.2, at pp. 42-45.](#)
- ¹⁹⁷ [WVDEP Class II General Permit G70-D, Section 11.0, 12.0, and 13.0.](#)
- ¹⁹⁸ [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 1, 8-11.](#)
- ¹⁹⁹ [Pennsylvania's Air Quality Permit Exemptions, Category No. 38, at pp. 1, 8-11.](#)
- ²⁰⁰ [40 C.F.R. Part 86.](#)
- ²⁰¹ States (except California) are precluded from establishing any emissions limitations other than those required in 40 C.F.R. Part 86. See [Clean Air Act Section 209, 42 U.S.C. § 7543.](#)
- ²⁰² States (except California) are precluded from establishing any emissions limitations other than those required in 40 C.F.R. Part 86. See [Clean Air Act Section 209, 42 U.S.C. § 7543.](#)
- ²⁰³ States (except California) are precluded from establishing any emissions limitations other than those required in 40 C.F.R. Part 86. See [Clean Air Act Section 209, 42 U.S.C. § 7543.](#)
- ²⁰⁴ [40 C.F.R. Part 80.](#)
- ²⁰⁵ [40 C.F.R. Part 80.](#)
- ²⁰⁶ [35 P.S. § 4603\(a\).](#)
- ²⁰⁷ [W. Va. Code § 17C-13A-2.](#)