

**OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION**

MEMORANDUM

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THROUGH: PM Phil Martin, P.E., Engineering Manager, Existing Source Permit Section

THROUGH: RK Peer Review

FROM: YS Jian Yue, P.E. and AT Asha Thomas, New Source Permits Section

SUBJECT: General Permit for Air Curtain Incinerators

SECTION I. INTRODUCTION

This General Permit has been developed to authorize construction and/or operation of air curtain incinerator (ACI) facilities with actual emissions less than 100 tons/year (TPY) of a regulated pollutant in an attainment area, less than 10 TPY of any single hazardous air pollutant (HAP), and less than 25 TPY of total HAP.

An ACI means an incineration unit operating by forcefully projecting a curtain of air across an open, integrated combustion chamber (fire box) or open pit or trench (trench burner) in which combustion occurs. ACIs are mostly used to dispose of wood-waste generated from manufacturing and rebuilding wooden pallets, to reduce debris from land clearing in construction industry, or to reduce debris from storms in disaster recovery operations. ACIs can be permanent or portable.

Typically, a site is required to obtain a Title V permit when the site is a major source, however, a minor source ACI that is subject to the following regulations is required to obtain a Title V permit:

For Commercial and Industrial Solid Waste Incineration Units (CISWIs)

1. OAC 252:100-17, Part 9, Commercial and Industrial Solid Waste Incineration Units, or
2. 40 CFR Part 60, Subpart CCCC, Standards of Performance for Commercial and Industrial Solid Waste Incineration Units.

For Other Solid Waste Incineration Units (OSWIs)

1. OAC 252:100-17, Part 11, Other Solid Waste Incineration Units, or
2. 40 CFR Part 60, Subpart EEEE, Standards of Performance for Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006.

Per 252:100-8-6.1(a)(4), the DEQ may issue a general permit if it finds that:

- (A) There are several permittees, permit applicants, or potential permit applicants who:
 - (i) Have the same or substantially similar operations, emissions, activities, or facilities.
 - (ii) Emit the same types of regulated air pollutants.
- (B) The operations, emissions, activities, or facilities are subject to the same or similar:
 - (i) Standards, limitations, and operating requirements.
 - (ii) Monitoring requirements.

Since many ACIs have minor source levels of emissions a general permit would provide for a streamlined permitting approach for both permittees and the Oklahoma Department of Environmental Quality (ODEQ). This permit is designed to cover only ACIs (including the combustion engine used to drive the fan of an ACI) used for the disposal of 100 percent wood waste, 100 percent clean lumber, 100 percent yard waste, or 100 percent mixture of only wood waste, clean lumber, and/or yard waste, and have actual emissions less than 100 tons/year (TPY) of a regulated pollutant in an attainment area, less than 10 TPY of any single hazardous air pollutant (HAP), and less than 25 TPY of total HAP.

SECTION II. DEFINITIONS

1. An air curtain incinerator operates by forcefully projecting a curtain of air across an open, integrated combustion chamber (fire box) or open pit or trench (trench burner) in which combustion occurs.
2. Wood waste means untreated wood and untreated wood products, including tree stumps (whole or chipped), trees, tree limbs (whole or chipped), bark, sawdust, chips, scraps, slabs, millings, and shavings. Wood waste does not include:
 - a. Grass, grass clippings, bushes, shrubs, and clippings from bushes and shrubs from residential, commercial/retail, institutional, or industrial sources as part of maintaining yards or other private or public lands.
 - b. Construction, renovation, or demolition wastes.
 - c. Clean lumber.
 - d. Treated wood and treated wood products, including wood products that have been painted, pigment-stained, or pressure treated by compounds such as chromate copper arsenate, pentachlorophenol, and creosote, or manufactured wood products that contain adhesives or resins (e.g., plywood, particle board, flake board, and oriented strand board).
3. Yard waste means grass, grass clippings, bushes, shrubs, and clippings from bushes and shrubs. Yard waste comes from residential, commercial/retail, institutional, or industrial sources as part of maintaining yards or other private or public lands. Yard waste does not include:
 - a. Construction, renovation, and demolition wastes.
 - b. Clean lumber.
4. Clean lumber means wood or wood products that have been cut or shaped and include wet, air-dried, and kiln-dried wood products. Clean lumber does not include wood products that have been painted, pigment-stained, or pressure-treated by compounds such as chromate copper arsenate, pentachlorophenol, and creosote, or manufactured wood

products that contain adhesives or resins (e.g., plywood, particle board, flake board, and oriented strand board).

SECTION III. PERMIT STRUCTURE

This general permit is designed for ACIs with actual emissions less than 100 tons/year (TPY) of a regulated pollutant in an attainment area, less than 10 TPY of any single hazardous air pollutant (HAP), and less than 25 TPY of total HAP and that are required to have a Title V permit. The single permit can authorize both construction and operation of new and existing sources and modification at existing sources. The general permit is structured so that eligible facilities can obtain an Authorization to Construct and Authorization to Operate under the permit or can obtain an individual construction permit and then an Authorization to Operate under the permit. This should allow applicants the greatest flexibility for obtaining coverage under the permit. No site-specific determinations can be made in issuance of an Authorization to Construct under a general permit. However, once these site-specific determinations have been completed and drafted into an individual construction permit as emissions limitations and/or specific conditions, they can then be incorporated into the Authorization to Operate under a general permit.

All conditions in the permit have been derived directly from applicable requirements given in OAC 252:100 - Air Pollution Control, as promulgated to implement the Oklahoma Clean Air Act. The permit is formatted so that the first section establishes emissions limitations, then specific conditions are given for the emissions unit allowed under the permit. In addition, a section of standard conditions is established to contain those requirements applicable to all sources. Each section contains a list of applicable requirements, which have been copied directly from the rules, followed by "Operational Conditions" and/or "Emissions Limitations," and monitoring and recordkeeping conditions developed to assure compliance with that particular requirement. Operational conditions to assure compliance with those state regulations that implement federal requirements, e.g., NSPS, NESHAP, etc., generally adopt the federal regulations by reference as a specific condition for the permit. Associated monitoring and recordkeeping generally follows the same process.

SECTION IV. EMISSIONS

A. POTENTIAL TO EMIT

The potential to emit (PTE) pollutants at a facility should be calculated using guidance contained in the DEQ "Potential to Emit Fact Sheet", which is available on the DEQ website at www.deq.ok.state.us.

B. REGULATED AIR POLLUTANTS

An ACI site normally consists of an ACI unit and a diesel engine that drives the fan. NO_x, CO, PM, PM₁₀, PM_{2.5}, VOC, and SO₂ are emitted from the ACIs and combustion engines. Emissions estimates can be made using data available from AP-42, *Compilation of Air Pollutant Emission Factors*, or manufacturer's data. The AP-42 factors were based on actual emissions tests at

several facilities. However, in some cases limited data was available to calculate specific factors. Thus, some factors are not rated to be as reliable as others. Incorporation of a reasonable safety factor may be appropriate in developing final estimates.

For ACIs, emissions estimates are based on amount of material burned. Emissions factors are typically given as lb/ton (material burned) as listed in Appendix A. The permit will limit material throughput to insure PM emissions to be in compliance with the allowable hourly emissions in accordance with equations from OAC 252:100-19 Appendix G.

For combustion engines, emissions can be estimated from emissions factors based on stack test data, manufacturer's data, federally enforceable emission limits (e.g., NSPS), or emission factors from AP-42, Chapter 3. Stack test data, federally enforceable emission limits (e.g., NSPS), or manufacturer's data are preferred methods for calculating potential NO_x and CO emissions from engines, unless hourly emissions limitations are placed on an engine.

Combustion equipment also emits SO₂ due to the combustion of any sulfur compounds present in the fuel. OAC 252:100-31, Part 5 limits SO₂ emissions from any new gas-fired fuel-burning equipment to 0.2 lb/MMBTU and SO₂ emissions from any new liquid-fired fuel-burning equipment to 0.8 lb/MMBTU. The permit will limit the use of gas fuels to pipeline quality or commercial natural gas and the use of liquid fuels to gasoline, on-road diesel, or off-road diesel to insure compliance with OAC 252:100-31 requirements as shown in Appendix B. The permit will also limit eligibility of combustion engines to be less than or equal to 240 horsepower.

C. HAZARDOUS AIR POLLUTANTS (HAP)

Wood combustion produces HAPs including acrolein, benzene, formaldehyde, hydrogen chloride, and other pollutants. These HAP emissions are generally estimated using the emission factors in AP-42 (9/03), Chapter 1, Table 1.6-3, or other industry generated data.

Engines emit HAPs including formaldehyde, acrolein, and acetaldehyde, with the most significant being formaldehyde. HAP emissions are generally estimated using manufacturer's data, the emission factors in AP-42 Chapter 3, or other industry generated data.

SECTION V. EMISSIONS LIMITATIONS

Compliance with Facility-Wide Emissions Cap

Emissions limitations specified in the permit are established from applicable requirements given in the permit, from a limitation that the source assumes to avoid an applicable requirement, or from limitations established in previously issued state or federal permits for the facility. Provided, however, that source assumed limitations and/or limitations from previously issued permits are equivalent or more stringent than those established from applicable requirements given in the permit.

Because of the nature of the emissions units at the facility, specific numeric emissions limitations need not be developed for each emissions unit, except where hourly emissions limits on engines are required for compliance methods as discussed below.

Compliance with the facility-wide emissions cap can be determined by compliance with maximum annual burning rate of the ACIs, the size of engines, and fuel types. Details are addressed in the following sections.

In those cases where a numerical limitation is not specifically developed to demonstrate compliance, other methods (e.g., work practices, parametric monitoring, modeling analyses, etc.) are required by the permit to assure compliance. These are specified as “Operational Conditions” in the permit.

Any changes and modifications to an existing facility should follow the requirements of OAC 252:100-8-6.1(d):

- (1) If an owner or operator of a source(s) makes a change to a source covered by a general permit that affects any applicability information supplied in the general permit application, but the source is still eligible for coverage under a general permit, the owner or operator must revise the general permit application and submit it to the DEQ within 60 days.
- (2) After coverage is granted to a source under the general permit, physical changes to the facility which result in the addition of equipment new to the facility, either as a replacement (except like-kind replacements) or net addition, will require a construction permit or a new authorization. Any significant modification to a stationary source included under a general permit shall subject the source to a Tier II review.
- (3) If equipment new to the facility is newly purchased or is relocated from another facility where a permit was issued with enforceable emissions limits on that equipment, then authorization under the general permit shall be modified or amended to include an emissions limit for the newly purchased or relocated equipment. "Grandfathered" emissions sources at the facility will retain only the equipment descriptions as permit conditions. "Grandfathered" means a unit that was in existence prior to the effective date of any applicable regulation that would have created specific quantifiable and enforceable emissions rate limits.
- (4) For a general operating permit, if emissions change for any reason that subjects the facility to PSD permitting requirements, then the facility no longer qualifies for a general operating permit.

Compliance with the Cap for ACIs

Since the annual emissions generated by any ACI are calculated by multiplying the emission factors to the amount of material burned in a year, the most straightforward method to assure compliance with the NO_x, CO, VOC, SO₂, PM, PM₁₀, PM_{2.5}, and HAP emissions cap is to limit the total amount of material burned in a year. Based on available emission factors, the permittee shall be limited to the maximum annual burning rates listed in the following table for different scenarios. Detailed derivation of these burning rates can be found in Appendix A. The permittee will be required to maintain records of annual tonnage burned (12-month rolling total) to demonstrate compliance with the emission cap.

Scenarios	Allowable ACI Annual Throughputs
	TPY
Scenario1: Engine Not Subject to NSPS	33,000
Scenario2: No Combustion Engine or Engine Subject to NSPS	38,300

Compliance with the Cap for Combustion Engines

Since the amount of emissions generated by any engine is proportional to the heat content of the fuel, the size of the engine, the number of hours the engine is operated, and whether it uses a control device (e.g., catalytic converter), then limiting engine size and fuel type is the easiest method to limit both the types of pollutants and their emissions.

Engine size is limited to ≤ 240 horsepower in this permit. Compliance with the NO_x, CO, VOC, PM, and HAP cap for natural gas, gasoline, or diesel fired engines can be determined and documented by the permittee by recording only the number of hours the engine is operated.

Likewise, emissions of SO₂ for engines can be determined and documented by the permittee by recording only the number of hours the engine is operated if the maximum sulfur content of the fuel is pre-established. In order to demonstrate compliance with OAC 252:100-31 Part 5, the permit will have the following fuel limits:

1. Pipeline quality natural gas with total sulfur content of no more than 0.25 gr/100 scf (4 ppm_{dv}).
2. Gasoline with total sulfur content of no more than 30 ppm.
3. On-road diesel or off-road diesel with total sulfur content of no more than 15 ppm.

With the above permit restrictions, the potential to emit for each pollutant is limited to a maximum of less than 30 TPY for a combustion engine. Detailed calculations can be found in Appendix B.

SECTION VI. ELIGIBILITY

In order to provide the broadest coverage to applicants under this permit, yet assure compliance with all applicable requirements, eligibility must be restricted to only those facilities whose emissions units are addressed in this permit. The permit has been developed for ACIs that are subject to OAC 252:100-17, Part 9, or Part 11, or 40 CFR Part 60, Subpart CCCC, or EEEE and burns only 100 percent wood waste, 100 percent clean lumber, 100 percent yard waste, or 100 percent mixture of only wood waste, clean lumber, and/or yard waste. In addition, combustion engines subject to NSPS subparts IIII or JJJJ, or NESHAP Subpart ZZZZ are also covered.

Applicable requirements for ACIs and combustion engines have been included in the permit either as a facility-wide requirement or as an emissions-unit specific requirement. Any other emissions unit subject to an applicable requirement not included in this permit makes that facility ineligible for coverage under this permit unless an individual construction permit is obtained and

conditions from that permit are incorporated into an Authorization to Operate under this general permit.

The following facilities are not eligible for coverage under this permit:

1. Facilities for which material facts were misrepresented or omitted from the application and the applicant knew or should have known of such misrepresentation or omission.
2. Facilities with emissions units which are subject to:
 - a. OAC 252:100-7 (Permits for Minor Facilities).
 - b. OAC 252:100-15 (Motor Vehicle Pollution Control Devices).
 - e. OAC 252:100-23 (Cotton Gins).
 - f. OAC 252:100-24 (Grain, Feed, or Seed Operations).
 - g. OAC 252:100-33 (Control of Emissions of Nitrogen Oxides).
 - h. OAC 252:100-35 (Control of Emissions of Carbon Monoxide).
 - i. 40 CFR Part 52 (Prevention of Significant Deterioration (PSD))
 - j. 40 CFR Part 59 (National VOC Standards for Consumer Products).
 - k. 40 CFR Part 64 (Compliance Assurance Monitoring)
 - j. 40 CFR Part 82, Subparts A, B, & C (Stratospheric Ozone Protection).

The following facilities are not eligible to obtain an Authorization to Construct under this permit, but may be eligible for coverage under an Authorization to Operate if they obtain an individual construction permit and all relevant requirements and limitations in that permit are incorporated into the Authorization to Operate:

1. Facilities located in an area that is federally designated as non-attainment.
2. Facilities that request an Alternative Emissions Reduction Authorization under OAC 252:100-11.
3. Facilities that require site-specific determinations of emissions limitations and/or specific conditions.

The DEQ may not issue a permit authorization sought by an applicant that has not paid all money owed to the DEQ or is not in substantial compliance with the Environmental Quality Code, rules of the Board, and/or the terms of any existing DEQ permits and orders. The DEQ may impose specific conditions on the applicant to assure compliance and/or a separate schedule that the DEQ considers necessary to achieve required compliance. Facilities that are not in compliance with all applicable State and Federal air requirements may become eligible for coverage under this permit through submission of a compliance plan meeting the requirements of Part 3 of this Permit.

The DEQ may refuse issuance of an Authorization to an applicant even though the facility meets the above eligibility criteria. In such a case, DEQ will provide to the facility a written explanation providing the reason(s) for the decision.

SECTION VII. APPLICABLE RULES AND REGULATIONS

Applicable rules and regulations are given below for each emission unit authorized in this permit, including facility-wide requirements and ACIs. For brevity, only those applicable requirements that are specific to the particular emissions unit, and not addressed in the Facility-wide requirements, are covered in each section. In addition, the description of the applicable requirement may also be abbreviated to save space. For a more lengthy description, refer to the particular rule.

FACILITY-WIDE REQUIREMENTS**Oklahoma Air Pollution Control Rules****OAC 252:100-1 (General Provisions) [Applicable]**

Subchapter 1 includes definitions but there are no regulatory requirements.

OAC 252:100-2 (Incorporation by Reference) [Applicable]

This subchapter incorporates by reference applicable provisions of Title 40 of the Code of Federal Regulations listed in OAC 252:100, Appendix Q. These requirements are addressed in the “Federal Regulations” section.

OAC 252:100-3 (Air Quality Standards and Increments) [Applicable]

Subchapter 3 enumerates the primary and secondary ambient air quality standards and the significant deterioration increments. At this time, all of Oklahoma is in attainment of these standards.

OAC 252:100-5 (Registration, Emissions Inventory, & Annual Operating Fees) [Applicable]

Subchapter 5 requires sources of air contaminants to register with Air Quality, file emission inventories annually, and pay annual operating fees based upon total annual emissions of regulated pollutants.

This permit assures compliance with this regulation using the following approach:

A standard condition in the permit requires the permittee to file an annual emissions inventory and pay annual fees based on either emission inventories or allowable emissions.

OAC 252:100-8 (Permits for Part 70 Facilities) [Applicable]

Part 1 includes definitions and subjects all permitting to the tiered Uniformed Permitting Act. Permits are required to meet public review requirements consistent with the Tier System given in the Uniform Permitting Act.

Part 3 establishes fees for construction and operating permits, Authorizations issued under General Permits, and applicability determinations.

Part 5 establishes permit categories and requirements for the permittee to comply with all applicable air pollution rules, federal NSPS and NESHAP established in Sections 111 and 112 of the Federal Clean Air Act, and to not exceed ambient air quality standards. A permit modification is also required when making certain modifications to a facility. Permits are also required to meet public review requirements consistent with the Tier System given in the Uniform Permitting Act.

The permit assures compliance with this regulation using the following approach:

The permit is designed to allow facilities with ACIs to fulfill the requirement to obtain an Authorization to Construct and an Authorization to Operate before starting construction and operation of an eligible facility, or for modifications to existing eligible facilities. A Notice of Intent (NOI) to Construct is required prior to commencing construction or installation of any new facility. Coverage under the general permit is effective upon receipt of the NOI to Construct by the AQD. The earliest of (1) a legible dated U.S. Postal Service postmark (private metered postmarks are not acceptable); (2) a dated receipt from a commercial carrier or the U.S. Postal Service; or (3) a DEQ date stamped application, is acceptable documentation of receipt of the NOI. After construction is complete, a NOI to Operate must be submitted within 180 days of start-up.

The general permit has gone through Tier II review; therefore, only Tier I review will be provided for any Authorizations issued hereunder. In lieu of an Authorization to Construct, an applicant may obtain an individual construction permit, and then apply for an Authorization to Operate under this permit. Permit conditions have been included in the permit that provide that conditions from an individual construction permit can be incorporated into the Authorization to Operate as long as the conditions are equivalent to or more stringent than the corresponding conditions in the General Permit. Operational conditions have been included in the permit to require a source to construct and operate all emission units and associated control equipment within a practical range of operating conditions so as to achieve, on a continuous basis, a level of emissions that complies with applicable requirements. Operating and compliance requirements, as well as monitoring and recordkeeping requirements for control devices are specifically addressed in the permit. An initial compliance inspection of the facility may be conducted by the AQD prior to issuance of the Authorization to Operate. Conditions have also been included in the permit to require a compliance demonstration prior to issuance of an Authorization to Operate and continuing compliance demonstrations to assure that the source continues to meet applicable requirements. Compliance with the facility-wide emissions cap shall be demonstrated by annual tons burned in the ACIs less than those listed in the table on page 6 for different cases. Emissions limitations are required for those sources that have the potential to violate an applicable requirement. These limitations are established as part of the facility-wide emissions cap, not to equal or exceed 100 TPY of a regulated pollutant, 10 TPY of any single HAP, or 25 TPY of all HAP. Specific conditions are also included in the permit to address any ambient air quality standards or NSPS and NESHAP requirements. After construction is complete, a NOI to Operate must be submitted within 180 days of start-up and a new Authorization to Operate will be issued.

Any physical changes to the facility which result in the addition of equipment new to the facility, either as a replacement (except like-kind replacements) or net addition, will require a construction permit or a new authorization. Any significant modification to a stationary source included under the general permit shall subject the source to a Tier II review.

Many ACIs are temporary sources, moved around, and operated at different locations. A single authorization may authorize emissions from similar operations by the same source owner or operator at multiple temporary locations provided that requirements of 252:100-8-6.2 are met.

OAC 252:100-9 (Excess Emissions Malfunction Reporting) [Applicable]

Subchapter 9 requires an owner or operator of a regulated facility to report all excess emissions from an air pollution source caused by malfunction, shutdown, start-up, or regularly scheduled maintenance that is in violation of the applicable air pollution control rule. However, no specific emission limitation, standard, or criteria is specified in this subchapter.

The permit assures compliance with this regulation using the following approach:

Conditions are included in the standard conditions of this permit which require prompt reporting to AQD should excess emissions occur.

OAC 252:100-13 (Open Burning) [Applicable]

Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in this subchapter. The open burning of refuse and combustible materials is prohibited unless conducted in strict accordance with the conditions and requirements contained in OAC 252:100-13-8 and 9. Under no circumstances shall the open burning of tires be allowed. OAC 252:100-13-9 establishes the following conditions and requirements when conducting open burning of refuse and other combustible material:

- (1) No public nuisance is or will be created;
- (2) The burning is controlled so that a visibility hazard is not created on any roadway, rail track or air field as a result of the air contaminants being emitted;
- (3) The burning is conducted so that the contaminants do not adversely affect the ambient air quality of a city or town; and
- (4) The initial burning shall begin only between three hours after sunrise and three hours before sunset and additional fuel shall not be intentionally added to the fire at times outside these limits.

OAC 252:100-13-8. Use of air curtain incinerators

Except for hazardous material, any combustible material or refuse that is allowed to be burned under this Chapter may be burned in an air curtain incinerator that is properly designed and operated for the control of smoke and particulate matter. The owner or operator of an air curtain incinerator shall not accept any material owned by other persons and shall not transport any material to the property where the air curtain incinerator is located in order to burn the material, except the following:

- (1) The owner or operator of the air curtain incinerator may accept and/or transport:
 - (A) 100 percent wood waste,
 - (B) 100 percent clean lumber, or
 - (C) 100 percent mixture of wood waste and clean lumber.
- (2) In addition to the requirements in this subchapter, the owner or operator of the air curtain incinerator must comply with the requirements of OAC 252:100-17 and 40 CFR Part 60.

Persons who conduct open burning in accordance with the provisions of this subchapter are not exempt or excused from the consequences, damages, or injuries that may result from such

conduct, nor are they exempt or excused from complying with all applicable laws, ordinances, rules, and orders. The permit incorporates all applicable requirements of this subchapter.

The permit assures compliance with this regulation using the following approach:

The permit restricts materials burned and sets opacity limits in the specific conditions of this permit.

OAC 252:100-29 (Control of Fugitive Dust)

[Applicable]

This subchapter prohibits the handling, transportation, or storage of any substance or material in a way that may enable fugitive dust to become wind-borne, and result in air pollution, without taking reasonable precautions or measures to minimize atmospheric pollution. Subchapter 29 further prohibits discharge of visible fugitive dust beyond the property line on which the emissions originated in such a manner as to damage or interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or to interfere with the maintenance of air quality standards. A list of reasonable precautions is specified in this subchapter.

The permit assures compliance with this regulation using the following approach:

The permit requires that the facility respond to any fugitive dust complaint within 48 hours. The facility shall take any necessary action to resolve the complaint, or they may refer the complaint to DEQ for response and investigation.

OAC 252:100-43 (Testing, Monitoring, and Recordkeeping)

[Applicable]

This subchapter provides general requirements for testing, monitoring and recordkeeping and applies to any testing, monitoring or recordkeeping activity conducted at any stationary source. To determine compliance with emissions limitations or standards, the Air Quality Director may require the owner or operator of any source in the state of Oklahoma to install, maintain and operate monitoring equipment or to conduct tests, including stack tests, of the air contaminant source. All required testing must be conducted by methods approved by the Air Quality Director and under the direction of qualified personnel. A notice-of-intent to test and a testing protocol shall be submitted to Air Quality at least 30 days prior to any EPA Reference Method stack tests. Emissions and other data required to demonstrate compliance with any federal or state emission limit or standard, or any requirement set forth in a valid permit shall be recorded, maintained, and submitted as required by this subchapter, an applicable rule, or permit requirement. Data from any required testing or monitoring not conducted in accordance with the provisions of this subchapter shall be considered invalid. Nothing shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed.

The permit assures compliance with this regulation using the following approach:

A standard condition is included which states that all required tests shall be made and the results calculated in accordance with test procedures described or referenced in the permit and approved by Air Quality. Permit specific conditions establish minimum monitoring requirements for control devices associated with emission units addressed in this permit. In addition, testing must be performed as specified in 40 CFR Parts 51, 60, 61, 63, and 75, as applicable, unless otherwise specified in an Authorization under this permit.

Federal Regulations

Certain state regulations require compliance with federally promulgated regulations. These are given in this section as “Federal Regulations.” New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP), established under Sections 111 and 112 of the Federal Clean Air Act, respectively, are incorporated by reference in the State’s rules at OAC 252:100-4-5 and 252:100-41-15, respectively. In addition, OAC 252:100-45 provides that any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of the State Implementation Plan (SIP).

Credible Evidence, 40 CFR Part 51

[Applicable]

This regulation clarifies that “any credible evidence,” including data gathered from means other than the use of a specified “reference test method,” can be used in a government or citizen enforcement case to prove an alleged emission limitation violation. Likewise, a facility can rely on any similar data to document compliance.

The permit assures compliance with this regulation using the following approach:

Conditions are included in the Standard Conditions of the permit to address the credible evidence requirements.

New Source Performance Standards (NSPS), 40 CFR Part 60

[Applicable]

NSPS means a standard of emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which, taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements, the Administrator of EPA determines has been adequately demonstrated. NSPS apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication of the standard applicable to that facility. Certain notification, recordkeeping, emissions limitations, performance tests, and monitoring requirements are specified in these regulations.

The permit assures compliance with this regulation using the following approach:

Conditions are included in this section of the permit to address the general notification, recordkeeping, emissions limitations, performance test, and monitoring requirements under this regulation. Conditions specific to a particular NSPS are included in the separate sections for each emissions unit that may be determined to be an affected unit. Eligibility for this permit is restricted to those facilities whose emissions units are not subject to any NSPS subpart other than those listed, unless incorporated by reference into the Authorization.

The following table lists the non-applicable Oklahoma Air Quality Rules on a facility-wide basis. If a particular rule applies to a specific emission unit then that unit is listed. Therefore, no permit conditions are included in the facility-wide section of the permit to address that activity. They are addressed specific to each emission unit(s).

Facility-wide Summary
Non-applicable Oklahoma Air Quality Rules

OAC 252:100-7	Permits for Minor Sources	ineligible, source too small
OAC 252:100-11	Alternative Emissions Reduction	ineligible*
OAC 252:100-15	Mobile Sources	not a covered source
OAC 252:100-23	Cotton Gins	not a covered source
OAC 252:100-24	Grain Elevators	not a covered source
OAC 252:100-33	Nitrogen Oxides	not a covered source
OAC 252:100-35	Carbon Monoxide	not a covered source
OAC 252:100-37, Part 5	Control of VOC	not a covered source

*Ineligible for Authorization to Construct. May be eligible if addressed in an individual permit and carried over into Authorization to Operate.

Non-applicable Federal Regulations

40 CFR Part 52	Prevention of Significant Deterioration	Ineligible
40 CFR Part 59	Consumer/Commercial Products	not a covered source
40 CFR Part 61	NESHAP	Ineligible for Authorization to Construct
40 CFR Part 64	Compliance Assurance Monitoring	Ineligible
40 CFR Part 68	Chemical Accident Prevention	not a covered source
40 CFR Part 82	Stratospheric Ozone Protection	not a covered source

UNIT – SPECIFIC REQUIREMENTS

1. Air Curtain Incinerator Requirements

Oklahoma Air Pollution Control Rules

OAC 252:100-17 (Incinerators)

[Applicable]

Part 9 Commercial and Industrial Solid Waste Incineration Units. This part applies to each individual Commercial and Industrial Solid Waste Incineration (CISWI) unit that meets the following criteria:

- (1) Any CISWI unit for which construction commenced on or before June 4, 2010, or for which modification or reconstruction commenced after June 4, 2010 but no later than August 7, 2013.
- (2) Incineration units that meet the definition of a CISWI unit as defined in 40 CFR Section 60.2875.
- (3) Incineration units that do not qualify as exempt under OAC 252:100-17-63.

If the owner or operator of a CISWI unit makes changes that meet the definition of modification or reconstruction on or after June 1, 2001, the CISWI unit is no longer subject to this part and becomes subject to 40 CFR Part 60, Subpart CCCC, that has been incorporated by reference at 252:100-2-3. If the owner or operator of a CISWI unit makes physical or operational changes to an existing CISWI unit primarily to comply with this Part, such changes do not qualify as a modification or reconstruction. The owner or operator of a CISWI unit subject to this Part shall

comply with applicable portions of 40 CFR Part 60, Subpart DDDD (Sections 60.2575 through 60.2875) incorporated by reference in 252:100-2-3.

- (1) CISWI units in the incinerator subcategory that commenced construction on or before November 30, 1999 shall achieve final compliance by December 1, 2005.
- (2) CISWI units that commenced construction after November 30, 1999, but on or before June 4, 2010, and CISWI units in the small remote incinerator, energy recovery unit, and waste-burning kiln subcategories that commenced construction before June 4, 2010 shall achieve final compliance as expeditiously as practicable after approval of the state plan but not later than the earlier of the two dates specified in paragraphs (d)(2)(A) and (B) of this subsection.
 - (a) February 7, 2018.
 - (b) Three years after the effective date of State plan approval.
 - (c) For compliance schedules approved under 40 CFR Section 60.2575 or 60.2815, the CISWI unit shall submit a final control plan not more than 1 year following the effective date of State plan approval, and shall achieve final compliance as expeditiously as practicable, but not later than February 7, 2018 or three years after the effective date of State plan approval, whichever is earlier. Within the appropriate context, these dates shall be considered the "date(s) to be specified in state plan" wherever that phrase appears in the model rule and associated tables.

OAC 252:100-17-74 states that air curtain incinerators are only required to meet the requirements §§ 60.2805 through 60.2870 if they only burn the following materials:

- (1) 100 percent wood waste;
- (2) 100 percent clean lumber;
- (3) 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

Part 11 Other Solid Waste Incineration Units. This part applies to each individual existing other solid waste incineration (OSWI) unit or air curtain incinerator for which construction was commenced on or before December 9, 2004. The definitions in 40 CFR 60.2977 and applicability to air curtain incinerators in 40 CFR 60.2888 were incorporated by reference, as they existed on December 16, 2005. If the owner or operator of an OSWI unit makes changes that meet the definition of modification or reconstruction on or after June 16, 2006, the OSWI unit is no longer subject to this part and becomes subject to standards in 40 CFR 60, Subpart EEEE, that has been adopted by reference at OAC 252:100-2. If the owner or operator of an OSWI unit makes physical or operational changes to an existing OSWI unit primarily to comply with this part, such changes do not qualify as a modification or reconstruction. OAC 252:100-17-105 states that

- (1) Parts 60.2970, 60.2971 except for 60.2971(a), 60.2972, 60.2973 except for 60.2973(a), and 60.2974 of Title 40 of CFR are hereby incorporated by reference as they exist on December 16, 2005.
- (2) Within 180 days after the final compliance date, the two limitations specified in paragraphs OAC 252:100-17-105(b)(1) and (2) must be met.
 - (a) The opacity limitation is 10 percent (6 minute Method 9 block average), except as described in paragraph (b)(2) of this section.

- (b) The opacity limitation is 35 percent (6-minute average) during the startup period that is within the first 30 minutes of operation.
- (3) Except during malfunctions, the requirements of OAC 252:100-17-105(b) apply at all times, and each malfunction must not exceed 3 hours.

Per OAC 252:100-17-103 and § 60.2966, the owner or operator of an OSWI, must apply for and operate pursuant to a Part 70 operating permit.

The permit assures compliance with this regulation using the following approach:

Eligibility for an Authorization to Construct or Operate under the permit is restricted to ACIs used for the disposal of 100 percent wood waste, 100 percent clean lumber, 100 percent yard waste, or 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

Specific conditions are included in the permit to require periodic opacity tests using Method 9 of 40 CFR Part 60, Appendix A to determine compliance with the opacity limitations.

This general permit is a means to satisfy the Title V permit requirements for ACIs in CISWI and OSWI categories.

OAC 252:100-25 (Visible Emissions and Particulates) [Applicable]

No discharge of greater than 20% opacity is allowed except for short-term occurrences that consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity.

The permit assures compliance with this regulation using the following approach:

ACI units are either subject to NSPS Subparts CCCC and EEEE or OAC 252:100-17. Units subject to opacity limits of NSPS Subparts CCCC and EEEE are exempt from this subchapter. ACIs subject to Subchapter 17 will comply with the requirements of this subchapter when complying with more restrictive opacity limits of Subchapter 17.

OAC 252:100-37 (Volatile Organic Compounds) [Applicable]

Part 7 requires fuel-burning and refuse-burning equipment to be operated to minimize emissions of VOC.

The permit assures compliance with this regulation using the following approach:

Temperature and available air must be sufficient to provide essentially complete combustion. Specific conditions are included in the permit that require that the permittee properly operate and maintain ACIs in a manner that will minimize emissions. Operational and maintenance records are required to be kept to document compliance with this requirement.

Federal Regulations

New Source Performance Standards (NSPS), 40 CFR Part 60 [Applicable]

Subpart CCCC. Standards of Performance for Commercial and Industrial Solid Waste Incineration Units. This subpart took effect on August 7, 2013 and affects new CISWI units that

commenced construction after June 4, 2010 or commenced reconstruction or modification after August 7, 2013.

Per §60.2242, each CISWI unit and air curtain incinerator subject to standards under this subpart must operate pursuant to a permit issued under Section 129(e) and Title V of the Clean Air Act.

Per §60.2245, Air curtain incinerators that burn only the materials listed below are only required to meet the requirements under “Air Curtain Incinerators” (§§60.2245 through 60.2260).

- (1) 100 percent wood waste.
- (2) 100 percent clean lumber.
- (3) 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

The permit assures compliance with this regulation using the following approach:

Eligibility for an Authorization to Construct or Operate under the permit is restricted to ACIs used for the disposal of 100 percent wood waste, 100 percent clean lumber, 100 percent yard waste, or 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

Specific operational conditions in the permit adopt these requirements by reference. The permit will require compliance with all applicable requirements of this subpart.

Subpart EEEE. Standards of Performance for Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006.

Per §60.2966, each OSWI unit subject to this subpart is required to obtain a Title V operating permit unless you meet the relevant requirements for an exemption specified in §60.2887.

Per §60.2970, Air curtain incinerators that burn only the materials listed in paragraphs (b)(1) through (4) of this section are required to meet only the requirements in §§60.2970 through 60.2974 and are exempt from all other requirements of this subpart.

- (1) 100 percent wood waste.
- (2) 100 percent clean lumber.
- (3) 100 percent yard waste.
- (4) 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

The permit assures compliance with this regulation using the following approach:

Eligibility for an Authorization to Construct or Operate under the permit is restricted to ACIs used for the disposal of 100 percent wood waste, 100 percent clean lumber, 100 percent yard waste, or 100 percent mixture of only wood waste and/or clean lumber.

Specific operational conditions in the permit adopt these requirements by reference. The permit will require compliance with all applicable requirements of this subpart.

2. Internal Combustion Engine Requirements

Oklahoma Air Pollution Control Rules

OAC 252:100-19 (PM Emissions from Fuel-burning Equipment)

[Applicable]

Subchapter 19 requires that the maximum allowable emissions of particulate matter from engines and other combustion equipment not exceed the following amount:

$$\begin{array}{lll}
 Y = 0.6 & \text{Pounds per MMBtu} & \text{for Heat Input} < 10 \text{ MMBtu/hr} \\
 \text{Log}(Y) = & -0.259\text{Log}(X) + 0.037 & \text{for } 10 < \text{Heat Input} < 10,000 \text{ MMBtu/hr} \\
 Y = 0.1 & \text{Pounds per MMBtu} & \text{for Heat Input} > 10,000 \text{ MMBtu/hr} \\
 & \text{Where } Y = \text{Pounds per MMBtu} & \\
 & X = \text{MMBtu/hr} &
 \end{array}$$

The permit assures compliance with this regulation using the following approach:

Eligibility for an Authorization to Construct under the permit is restricted to those facilities using pipeline grade natural gas with no greater than 4 ppmv total sulfur content, gasoline, or on-road or off-road diesel fuel. AP-42, Tables 3.2-1,2, and 3 (7/00), list PM₁₀ emissions from gas-fired internal combustion engines as 0.038 lb/MMBtu for 2-cycle engines and 0.0095 lb/MMBtu for 4-cycle engines, which are in compliance for all heat input ranges. AP-42, Table 3.3-1 (10/96), lists gasoline fuel PM₁₀ emissions as 0.10 lb/MMBtu, which is also in compliance for all heat input ranges. AP-42, Table 3.3-1 (10/96), lists diesel fuel PM₁₀ emissions as 0.31 lb/MMBtu, which is in compliance for sources with heat rates less than about 100 MMBtu/hr. Thus, all engines eligible for this permit are in compliance with this subchapter.

OAC 252:100-25 (Visible Emissions and Particulates)

[Applicable]

No discharge of greater than 20% opacity is allowed except for short-term occurrences that consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity.

The permit assures compliance with this regulation using the following approach:

Liquid fueled engines have the potential for visible emissions. However, liquid fueled engines restricted to the fuels allowed in this permit have very little potential to violate these opacity requirements. Thus, periodic monitoring of opacity is not required for the engines. Ongoing operation and maintenance activities for the engines require by NSPS or NESHAP should provide sufficient opportunities to allow owner/operators to identify and take corrective action to address any opacity exceedance. These activities along with DEQ complaint and compliance activities should be sufficient to assure compliance with the opacity requirements.

OAC 252:100-31 (Sulfur Compounds)

[Applicable]

Part 5 limits SO₂ emissions from any new gas-fired fuel-burning equipment to 0.2 lb/MMBtu heat input for a three-hour average. Part 5 also limits SO₂ emissions from any new liquid-fired fuel-burning equipment to 0.8 lb/MMBtu heat input for a three-hour average.

The permit assures compliance with this regulation using the following approach:

Eligibility for an Authorization to Construct under the permit is restricted to those facilities using liquid petroleum gas, natural gas with no greater than 0.25 grains/100 scf (4 ppm) total sulfur content, gasoline, or on-road or off-road diesel fuel. Appendix B documents compliance with Subchapter 31 for any engine eligible for the permit and combusting these restricted fuels.

OAC 252:100-37 (Control of VOCs)**[Applicable]**

This subpart, as applied to engines, provides that all fuel-burning equipment shall be operated so as to minimize emissions of hydrocarbons or other organic materials. The equipment should be operated such that it is not overloaded, that it is properly cleaned and maintained, and that temperature and available air are sufficient to provide essentially complete combustion.

The permit assures compliance with this regulation using the following approach:

Specific conditions are included in the permit that require that the permittee properly operate and maintain engines and associated control systems in a manner that will minimize emissions. Operational and maintenance records are required to be kept to document compliance with this requirement.

Federal Regulations**New Source Performance Standards (NSPS), 40 CFR Part 60****[Applicable]**

The following NSPS Subparts are applicable to combustion equipment constructed and operated under this permit:

Subpart IIII, Standards of Performance for Compression Ignition Internal Combustion Engines. This subpart contains phased-in emissions standards for CI ICE, performance testing, and recordkeeping requirements for owners and operators.

The permit assures compliance with this regulation using the following approach:

Specific operational conditions in the permit adopt these requirements by reference. The permit will require compliance with all applicable requirements of this subpart.

Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI-ICE). This subpart contains phased-in emissions standards for SI-ICE, performance testing, and recordkeeping requirements for owners and operators.

The permit assures compliance with this regulation using the following approach:

Specific operational conditions in the permit adopt these requirements by reference. The permit will require compliance with all applicable requirements of this subpart.

National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 63**[Applicable]**

The following NESHAP Subpart is applicable to combustion equipment constructed and operated under this permit:

Subpart ZZZZ, Reciprocating Internal Combustion Engines (RICE). This subpart affects any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions. Owners and operators of new or reconstructed RICE must meet the requirements of Subpart ZZZZ by complying with either 40 CFR Part 60 Subpart IIII (for CI engines) or 40 CFR Part 60 Subpart JJJJ (for SI engines). No further requirements apply for these engines.

A summary of the requirements for existing engines < than 500-hp are shown below.

Engine Category	Requirements From Table 2d to Subpart ZZZZ of Part 63
Existing Non-Emergency, Non-Black Start, 4SLB ≤ 500-hp Existing Non-Emergency, Non-Black Start, 4SRB ≤ 500-hp	Change oil and filter, inspect spark plugs, and inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first.
Existing Non-Emergency, Non-Black Start, 2SLB	Change oil and filter, inspect spark plugs, and inspect all hoses and belts every 4,320 hours of operation or annually, whichever comes first.

The permit assures compliance with this regulation using the following approach:

Specific operational conditions in the permit adopt these requirements by reference. The permit will require compliance with all applicable requirements of this subpart.

TIER CLASSIFICATION AND PUBLIC REVIEW

Processing of a new General Permit has been classified as **Tier II** based on OAC 252:4-7-13(c). A request for an Authorization under this General Permit will typically be classified as Tier I, unless a compliance schedule required by OAC 252:100-8-5(d)(8)(C)(iii) is included, in which case it will be classified as Tier II.

DEQ published the "Notice of Tier II Draft Permit" in the *Daily Oklahoman* on May 2, 2015 and the *Tulsa World* on May 3, 2015. The notice stated that the draft permit was available for public review at the AQD office in Oklahoma City and Tulsa, and on the Air Quality section of the DEQ web page at www.deq.state.ok.us. Notice of the DRAFT of this general permit was provided to the surrounding states of Arkansas, Colorado, Kansas, Missouri, New Mexico and Texas. No comments were received from the public or the surrounding states. The draft permit was also sent to EPA Region VI for a 45-day review. No comments were received from the EPA.

SUMMARY

Applicants must demonstrate eligibility for coverage under this General Permit and that they are able to comply with applicable air quality rules and regulations. Ambient air quality standards are not threatened at any of the sites eligible for coverage under this General Permit. Issuance of the permit is recommended.

APPENDIX A

Emission Factors and Maximum ACI Throughput Determination

ACIs

The following table lists emission factors for ACIs from various sources.

Sources	PM	PM ₁₀	PM _{2.5}	NO _x	CO	VOC	SO ₂
	lb/ton	lb/ton	lb/ton	lb/ton	lb/ton	lb/ton	lb/ton
AP-42 (10/96), Table 2.1-12	13.0			4.0	No Data	No Data	0.1
USDA (11/2005)			1.1		2.6		
Fountainhead Engineering (12/2000)	0.12				1.0		
Arizona DEQ GOP for ACIs	13.0*			4.0	2.22		0.1
Air Burners LLC (Letter to EPA dated 2/2/2005)	2.5	2.0		4.0	1.4	0.1	0.1

*Used AP-42 PM emission factor.

The following table lists emission factors this permit accepts as default.

PM	PM ₁₀	PM _{2.5}	NO _x	CO	VOC	SO ₂
lb/ton	lb/ton	lb/ton	lb/ton	lb/ton	lb/ton	lb/ton
13.0	2.0	1.1	4.0	2.22	0.1	0.1

Combustion Engine

For engines not subject to NSPS Subparts IIII or JJJJ, AP-42 (7/00) emissions are used.

Pollutants	Gas Fuel		Diesel Fuel	
	Subject to JJJJ ^a	Not Subject to JJJJ ^b	Subject to IIII ^c	Not Subject to IIII ^d
	lb/hp-hr	lb/hp-hr	lb/hp-hr	lb/hp-hr
NO _x	0.0044	0.029	0.0152	0.031
CO	0.0088	0.026	0.0187	6.68E-03
VOC	0.0022	0.0002	0.0022	2.47E-03
SO _x		4.1E-06		2.05E-03
PM ₁₀ /PM _{2.5}		0.0003	0.00165	2.20E-03
Formaldehyde	5.52E-02 lb/MMBTU ^e		1.18E-03 lb/MMBTU ^f	

^a Table 1 to Subpart JJJJ of Part 60 (converted from g/hp-hr)

^b AP-42 (7/00), NO_x: Table 3.2-2 factor x 7000 BTU/hp-hr; CO and VOC: Table 3.2-3 factors x 7000 BTU/hp-hr

^c Table 1 to Subpart IIII of Part 60 (converted from g/hp-hr)

^d AP-42 (10/96), Table 3.3-1

^e AP-42 (10/96), Table 3.2-1

^f AP-42 (10/96), Table 3.3-2

Potential Emissions from a 240-hp Engine

Pollutants	Gas Fuel		Diesel Fuel	
	JJJJ Engine	Non JJJJ Engine	III Engine	Non III Engine
	TPY	TPY	TPY	TPY
NOx	4.63	30.48	15.77	32.59
CO	9.25	27.33	19.65	7.02
VOC	2.32	2.10	2.32	2.60
SOx		0.004		2.15
PM ₁₀ /PM _{2.5}		0.32	1.73	2.31
Formaldehyde	0.03		<0.01	

Based on emission factors and emissions listed above, PM emission is the restricting emission. Since PM is not a regulated pollutant under Title V and the significance level is 250 TPY for PSD, maximum allowable annual burning rate is back calculated from 249 TPY PM to be 38,300 TPY. After PM, NOx is the overall restricting emission for the total combination of the engine and ACI. The following table lists maximum ACI annual burning rate derived from four different combinations of the engine and ACI back calculated from a combined emission of 99 TPY.

Cases	Engine Emissions	ACI Emissions	ACI Throughputs
	NOx (TPY)	NOx (TPY)	TPY
Case 1: No Combustion Engine	0	99	49,500
Case 2: Engine Not Subject to NSPS	33	66	33,000
Case 3: Engine Subject to JJJJ	5	95	47,500
Case 4: Engine Subject to III	16	83	41,500

Apparently, the burning rate of 38,300 TPY restricted by PM emissions would satisfy Cases 1, 3, and 4, but not case 2. Therefore, final allowable annual burning rates are accepted as listed in the following table.

Scenarios	Allowable ACI Annual Throughputs
	TPY
Scenario1: Engine Not Subject to NSPS	33,000
Scenario 2: No Combustion Engine or Engine Subject to NSPS	38,300

The following table lists ACI HAP emissions at the maximum throughput of 38,300 TPY.

HAPs	Emission Factors		Emissions
	lb/MMBTU	lb/ton	TPY
Acrolein	4.0E-03	0.072	1.38
Benzene	4.2E-03	0.076	1.46
Formaldehyde	4.4E-03	0.079	1.51

Hydrogen Chloride	1.9E-02	0.342	6.55
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APPENDIX B

**Justification to Document Compliance w/OAC 252:100-31
Fuel-burning equipment**

SECTION I. PART 5. NEW EQUIPMENT STANDARDS

OAC 252:100-31-25. Fuel-burning equipment

a. Emission limits.

(1) **Gas-fired-fuel-burning equipment.** Sulfur oxide emissions (measured as sulfur dioxide) from any new gas-fired fuel-burning equipment shall not exceed 0.2 lb/MMBtu heat input (86 ng/J).

(2) **Liquid-fired fuel-burning equipment.** Sulfur oxide emissions (measured as sulfur dioxide) from new liquid-fired fuel-burning equipment shall not exceed 0.8 lb/MMBtu heat input (340 ng/J).

b. Compliance Demonstration

The amount of SO₂ produced by burning natural gas is dependent upon the conversion of sulfur compounds in the gas, measured as total reduced sulfur (TRS) to SO₂. Sulfur levels in pipeline quality natural gas are not expected to exceed 0.25 grains/100 scf (4 ppmv). Assuming 100% conversion of sulfur to SO₂ and a higher heating value of the fuel of 1050 Btu/scf, the amount of SO₂ generated can be calculated as:

$$\frac{0.25 \text{ grain } S}{100 \text{ scf}} \times \frac{1 \text{ pound}}{7000 \text{ grains}} \times \frac{1 \text{ mole}}{32 \text{ lb } S} \times \frac{64 \text{ lb } SO_2}{1 \text{ mole}} = 7.14 \times 10^{-7} \times \frac{\text{lb } SO_2}{\text{scf}}$$

$$7.14 \times 10^{-7} \times \frac{\text{lb } SO_2}{\text{scf}} \times \frac{1 \text{ scf}}{1050 \text{ BTU}} \times \frac{10^6 \text{ BTU}}{\text{MMBTU}} = 0.000625 \frac{\text{lb } SO_2}{\text{MMBTU}}$$

This is much less than the standard. Thus, restricting fuel to pipeline quality natural gas assures compliance with the new equipment standard of 0.2 lb/MMBtu heat input.

The following table shows the sulfur contents of various fuel oils expected to be used at these facilities.

Fuel Type	Maximum Sulfur Concentration (ppmw)	Density lb/gallon	Heating Value (MMBTU/gallon)
Gasoline	30 ^a	6.07	0.130
On-Road Diesel	15 ^b	7.05	0.137
Off-Road Diesel	15 ^b		

^a Per 40 CFR Part 80, Subpart H.

^b Per 40 CFR Part 80, Subpart I.

Assuming 100% conversion of sulfur to SO₂, the amount of SO₂ generated from gasoline can be calculated as:

$$\frac{30 \text{ lb S}}{10^6 \text{ lb}} \times \frac{1 \text{ mole}}{32 \text{ lb S}} \times \frac{64 \text{ lb SO}_2}{1 \text{ mole}} = \frac{60 \text{ lb SO}_2}{10^6 \text{ lb}}$$

$$\frac{60 \text{ lb SO}_2}{10^6 \text{ lb}} \times \frac{6.17 \text{ lb}}{\text{gallon}} \times \frac{1 \text{ gallon}}{0.13 \text{ MMBTU}} = 0.0028 \frac{\text{lb SO}_2}{\text{MMBTU}}$$

Similarly, the amount of SO₂ generated from diesel can be calculated as:

$$\frac{15 \text{ lb S}}{10^6 \text{ lb}} \times \frac{1 \text{ mole}}{32 \text{ lb S}} \times \frac{64 \text{ lb SO}_2}{1 \text{ mole}} = \frac{30 \text{ lb SO}_2}{10^6 \text{ lb}}$$

$$\frac{30 \text{ lb SO}_2}{10^6 \text{ lb}} \times \frac{7.05 \text{ lb}}{\text{gallon}} \times \frac{1 \text{ gallon}}{0.137 \text{ MMBTU}} = 0.0015 \frac{\text{lb SO}_2}{\text{MMBTU}}$$

Thus, limiting the use of liquid fuels to gasoline, on-road diesel, or off-road diesel assures compliance with the new equipment standard for liquid fuels of 0.8 lb/MMBtu heat input.