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Air Quality Standard Permit for Boilers

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BOILER AIR QUALITY STANDARD PERMIT SUMMARY DOCUMENT

I. EXECUTIVE SUMMARY

The Texas Commission on Environmental Quality (TCEQ or commission) is issuing a new air quality standard permit for boilers. This new standard permit will not replace the current permit by rule for boilers with a heat input of less than or equal to 40 million British thermal units per hour (MMBtu/hr), but will provide another authorization mechanism for boilers with a heat input of greater than 40 MMBtu/hr. This standard permit also authorizes any fugitive components associated with a boiler authorized by this standard permit.

II. EXPLANATION AND BACKGROUND OF AIR QUALITY STANDARD PERMIT

The New Source Review (NSR) Program under Title 30 Texas Administrative Code (30 TAC) Chapter 116, Control of Air Pollution by Permits for New Construction or Modification, requires any person who plans to construct any new facility or to engage in the modification of any existing facility which may emit air contaminants into the air of the state to obtain a permit pursuant to 30 TAC § 116.111, General Application, or satisfy the conditions of a standard permit, a flexible permit, a permit by rule, or the criteria for a de minimis facility or source before any actual work begins on the facility. A standard permit authorizes the construction or modification of new or existing facilities which are similar in terms of operations, processes, and emissions. A standard permit provides an efficient mechanism for qualifying facilities to obtain authorization as an alternative to a case-specific air quality permit.

This standard permit provides a streamlined preconstruction authorization process that may be used for any boiler with a heat input of greater than 40 MMBtu/hr complying with the standard permit requirements and that is not prohibited by some other state or federal permitting statute or regulation.

III. OVERVIEW OF AIR QUALITY STANDARD PERMIT

The commission is issuing an air quality standard permit authorizing boilers with a heat input greater than 40 MMBtu/hr under authority of the Texas Clean Air Act (TCAA), Texas Health and Safety Code (THSC) § 382.05195, Standard Permit, and 30 TAC Chapter 116, Subchapter F, Standard Permits. The commission currently authorizes boilers by rule with a maximum heat input of 40 MMBtu/hr under the conditions of 30 TAC § 106.183, Boilers, Heaters, and Other Combustion Devices, or under 30 TAC Chapter 116 for all boilers regardless of heat input. The proposal of this standard permit is consistent with the desire of the commission to simplify its regulatory structure.

The standard permit is designed to allow for authorization of both temporary and permanent boilers greater than 40 MMBtu/hr. However, it is not intended to provide an authorization mechanism for all possible unit configurations or for unusual operating scenarios. Those facilities which cannot meet the standard permit conditions may apply for a case-by-case review of an air quality permit under 30 TAC § 116.111.

IV. PERMIT CONDITION ANALYSIS AND JUSTIFICATION

The new standard permit for boilers greater than 40 MMBtu/hr creates an authorization mechanism for construction or modification of temporary or permanent boilers. Boilers with a maximum heat input of 40 MMBtu/hr or less are permitted by rule under 30 TAC § 106.183. This standard permit requires boilers to comply with certain administrative requirements including: registration and a fee, executive director approval, and recordkeeping requirements, as well as general requirements, which include maximum emission limitations for nitrogen oxides (NO_x). This standard permit also requires renewal of registration every 10 years.

Applicability

Section (1) of the standard permit outlines the applicability criteria of the standard permit. This standard permit applies to new units installed, or existing units modified, after the effective date of the standard permit. This standard permit also authorizes any fugitive components associated with a boiler authorized by this standard permit. Any boiler that is subject to federal NSR permitting is not eligible for authorization by this standard permit.

Definitions

Section (2) of the standard permit contains definitions of fuel gas, temporary boiler, and annual capacity factor. The definition of fuel gas is intended to limit the type of fuels authorized by the standard permit. In this permit, fuel gas is any gas generated at a petroleum refinery or a petrochemical plant, and any blend of those gases with natural gas. A temporary boiler is limited in operation to 180 days at a site, and is subject to a 12-month waiting period for a second authorization to perform substantially the same purpose at a site. The waiting period is waived if the temporary boiler will be used for a different purpose. This definition of temporary boiler is intended to ensure an owner or operator does not install and operate a temporary boiler indefinitely and thus avoid permitting a permanent boiler subject to lower emission standards. The annual capacity factor is the ratio between the actual heat input during a calendar year and the potential heat input had the boiler been operated for 8,760 hours during a calendar year at the maximum steady state design heat input capacity. Different NO_x emission standards will apply to small boilers with an annual capacity factor of 0.30 or less.

Administrative Requirements

Section (3) of the standard permit outlines the administrative requirements all facilities must meet. Subsection (A) requires registration of the proposed facilities in accordance with the regulatory requirements of 30 TAC § 116.611. The standard permit also specifies that 30 TAC § 116.610(a)(1), Applicability, does not apply to boilers under this standard permit because the emissions are only products of combustion. Subsection (B) requires compliance with 30 TAC § 116.614, Standard Permit Fees. This will require a fee of \$900 for any standard permit registration. Subsection (C) states that facilities cannot be constructed or operated until the applicant obtains written approval of the registration from the executive director. Subsection (D) states that the requirements of Title 40 Code of Federal Regulations (40 CFR) Part 60, Subparts Da, Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978; Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units; or Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units; must be met, if applicable, and Subsection (E) clarifies that this standard permit does not exempt owners or operators from any 30 TAC Chapter 117, Control of Air Pollution from Nitrogen Compounds, requirements that may apply if the facility is located in a nonattainment area.

General Requirements

Section (4) of the standard permit outlines the requirements that all boilers must meet in order to be eligible to use this standard permit. Subsection (A) establishes fuel limitations, and specifies that acceptable fuels are fuel gas or natural gas. For petroleum refineries, the fuel gas requirements of 40 CFR Part 60, Subpart J, Standards of Performance for Petroleum Refineries, must also be met. To ensure good combustion and compliance with the emission standards, limits were placed on the amount of hydrogen in the fuel and the higher heating value of the fuel. In addition, the fuel may not contain alkynes since they contribute to higher NO_x formation via thermal NO_x. Liquid fuel is also allowed for up to 720 hours per year to provide flexibility to the owner or operator during times of unavailability of natural or fuel gas. For boilers with a heat input of 100 MMBtu/hr or greater, the average hourly gaseous fuel consumption of the boiler must be monitored and recorded. Subsection (A) also specifies that this standard permit may not be used to authorize the boiler as a control device. Other mechanisms are available for permitting additional fuel sources.

Subsection (B) establishes emission limits for boilers authorized under this standard permit. The NO_x emission limits are based on the type of boiler in operation and the type of fuel fired. Based on current best available control technology (BACT) guidelines, NO_x emissions from new or existing boilers fired on fuel containing greater than 75 percent natural gas shall not exceed 0.01 pound (lb) per MMBtu. If the fuel contains less than or equal to 75 percent natural gas, then the NO_x emission limit is 0.015 lb/MMBtu. The NO_x emissions from temporary boilers shall not exceed 0.036 lb/MMBtu. Temporary boilers are generally limited in size for transportation purposes, and their operation is limited to 180 days under this standard permit; therefore annual NO_x emissions from the site are not expected to increase significantly as a result of operation of a temporary boiler at the higher hourly emission rate. Likewise, boilers with a maximum heat input of less than 100 MMBtu/hr and an annual capacity factor of 0.30 or less are allowed a NO_x emissions limit of 0.036 lb/MMBtu because their emissions are less than if the boiler had operated continuously at the maximum heat input for the entire year. These NO_x limits represent BACT for boilers.

Subsection (B) also establishes a carbon monoxide (CO) limit of 50 parts per million by volume on a dry basis (ppmvd) corrected to 3 percent oxygen (O₂), an ammonia (NH₃) limit of 10 ppmvd corrected to 3 percent O₂ for boilers using NH₃ or urea-based control technology, and an opacity limit of 5 percent averaged over a six-minute period. The CO, NH₃ and opacity limits also represent BACT for boilers. In addition, the NH₃ limit is based on the requirements in 30 TAC Chapter 117.

Subsection (C) establishes that installation of controls such as burner replacement, flue gas recirculation, or selective catalytic reduction (SCR) to meet the emission requirements in subsection (B) are authorized by this standard permit.

Subsection (D) establishes maintenance, startup, and shutdown limitations. During maintenance, startup, and shutdown, the NO_x emission limit is 0.10 lb/MMBtu, the CO limit is 500 ppmvd, and the opacity limit is specified in 30 TAC Chapter 111, Control of Air Pollution from Visible Emissions and Particulate Matter. In addition, the duration is limited to four hours for a warm start up event, eight hours for a cold startup event, and one hour for a shutdown event. These emission limits and durations are based on representations in past permits and input from industry representatives. Emissions from upset events are not authorized by this standard permit.

Subsection (E) establishes the equation for determining the minimum stack height for the boiler as a function of the maximum heat input. This equation is based on the results of the air dispersion modeling analysis and protectiveness review.

Initial Compliance Testing

Section (5) of the standard permit specifies the initial testing requirements to establish the actual pattern and quantities of air contaminants being emitted into the atmosphere from the boiler. Within 90 days after installation or modification of the boiler, stack testing at maximum heat input must be completed for NO_x, CO, and O₂. If the boiler is controlled by a SCR system, emissions of NH₃ must also be tested. Temporary boilers that have been tested at another site located in Texas and have an acceptable sampling report are exempt from the initial compliance testing requirements.

Continuous Demonstration of Compliance

Section (6) establishes the continuous demonstration of compliance requirements for a boiler authorized under this standard permit. Based on 40 CFR Part 60, Subparts Da and Db requirements, a boiler with a maximum potential heat input of 100 MMBtu/hr or greater or a boiler with a SCR system must install and operate a NO_x continuous emission monitor system (CEMS). Based on 30 TAC Chapter 117 requirements and current permitting practices, a boiler with a maximum potential heat input of 250 MMBtu/hr or greater is also required to have a CO CEMS. The performance and testing requirements for the CEMS are detailed in Section (6), and are identical to the CEMS requirements in 30 TAC Chapter 117.

Boilers without CEMS for NO_x are required to perform the testing procedure specified in section (5) every three years after the completion of the initial boiler testing.

Section (6) also establishes the NH₃ monitoring procedures required for boilers which inject NH₃ or urea into the exhaust stream for NO_x control. These monitoring procedures are based on the requirements in 30 TAC Chapter 117.

Recordkeeping

Section (7) establishes the recordkeeping requirements to demonstrate compliance with this standard permit. For all boilers, startup and shutdown records, maintenance records, and emissions records shall be maintained. For units using NH₃ or urea, records of the NH₃ monitoring are required. For temporary boilers, records demonstrating that the boiler complies with the applicable conditions of the standard permit are required. The CEMS records must be maintained for boilers with a CEMS.

Reporting for Boilers with CEMS

Section (8) establishes the reporting requirements for boilers with CEMS. The owner or operator of the boiler must report excess emissions, malfunctions, and CEMS downtime. The reporting requirements of this section are based on the requirements in 30 TAC Chapter 117.

V. PROTECTIVENESS REVIEW

Modeling was performed for a boiler and the associated NH₃ fugitives using the SCREEN3 air dispersion model. The modeling results indicated that the 30 TAC Chapter 112, Control of Air Pollution from Sulfur Compounds, standard for sulfur dioxide (SO₂) was the most restrictive standard for the protectiveness review when compared to results for the other SO₂ averaging times and for the modeling results for CO, nitrogen dioxide, particulate matter, particulate matter with a diameter of less than 10 microns, particulate matter with a diameter of less than 2.5 microns, and NH₃. The contaminant concentration is a function of the boiler size and the stack height. Since this standard permit applies to any size boiler, the modeling results were used to correlate the size of the boiler to the minimum stack height required to meet the 30 TAC Chapter 112 property line standard for SO₂. This correlation is the basis for the minimum stack height equation in subsection (4)(E) of the standard permit. Meeting the required minimum stack height ensures that the National Ambient Air Quality Standards and the 30 TAC Chapter 112 property line standards are protective for all contaminants.

Volatile organic compound (VOC) emissions from the combustion of natural gas typically do not undergo a modeling and health effects review; however, since the standard permit allows the use of fuel gas as fuel, the potential VOC constituents of fuel gas were considered in the protectiveness review. Additionally, fugitive emissions of fuel gas from components involved in fueling the boiler such as valves, flanges/connectors, relief valves, and sampling ports were considered in the protectiveness review.

Effect screening levels (ESL) are guideline concentrations derived by the commission's Toxicology Section and used to evaluate ambient air concentrations of constituents. The ESLs are based on data concerning health effects, the potential for odors to be a nuisance, effects on vegetation, and corrosive effects. They are not ambient air standards. If predicted or measured airborne levels of a constituent do not exceed the screening level, adverse health or welfare effects are not expected.

The maximum one-hr and annual VOC concentrations were compared to the ESLs of potential fuel gas constituents. This comparison conservatively assumed the VOC emissions were 100 percent of each potential constituent. No short-term or long-term ESLs were exceeded in this review.

The NH₃ emissions from the boiler stack were not considered in the protectiveness review. The NH₃ emissions from the piping fugitives would result in a higher concentration than NH₃ emissions from the stack, and the fugitive and stack emissions would not accumulate at the same points; therefore, only the worst-case fugitive emissions were considered in the protectiveness review.

VI. PUBLIC NOTICE AND COMMENT PERIOD

In accordance with 30 TAC § 116.603, Public Participation in Issuance of Standard Permits, the TCEQ published notice of the standard permit in the *Texas Register* and newspapers of the largest general circulation in the following metropolitan areas: Amarillo; Austin; Corpus Christi; Dallas; El Paso; Houston; Lower Rio Grande Valley; Lubbock; Permian Basin; San Antonio; and Tyler. The date for these publications was April 14, 2006. The public comment period was from the date of publication until 5:00 p.m. on May 19, 2006.

VII. PUBLIC MEETING

A public meeting on the proposal was offered on the following date at the stated time and location: May 16, 2006, 10:00 a.m. at the Texas Commission on Environmental Quality, 12100 Park 35 Circle, Austin, Texas. There were no attendees at the meeting and it was cancelled.

VIII. ANALYSIS OF COMMENTS

Written comments were received from the Houston Regional Group of the Sierra Club (HSC). No oral comments were received.

The HSC expressed concern that a standard permit was not an appropriate authorization mechanism for boilers since a case-by case review of permit applications would ensure application of BACT, lowest achievable emission rate (LAER), and appropriate source monitoring technology.

The commission is not changing the permit in response to this comment. THSC § 382.0518(b) requires the application of current BACT to any standard permit. This standard permit requires BACT as described in the Permit Condition Analysis and Justification section.

The LAER is a requirement of federal nonattainment permits. New facilities or modifications that trigger any type of federal NSR permit (including a nonattainment permit) requirement cannot be authorized under this standard permit.

This standard permit requires sampling of emissions, within 90 days of installation or modification of the source, to ensure initial compliance with all emission requirements. Additionally, continued demonstration of compliance with emission requirements is required under sections 6 and 7 of this standard permit.

The HSC requested the addition of a permit condition that prohibits use of the standard permit to authorize any facility or modification that is subject to federal NSR permitting.

The commission agrees to make this addition to the standard permit.

The HSC also requested that the phrase, "local air pollution control agencies having jurisdiction," be added to paragraphs (5)(B)(i), (5)(B)(vi), and (8)(B).

The commission agrees to make this addition to the standard permit.

IX. STATUTORY AUTHORITY

This standard permit is issued under THSC, § 382.011, General Powers and Duties, which authorizes the commission to control the quality of the state's air; THSC § 382.023, Orders, which authorizes the commission to issue orders necessary to carry out the policy and purposes of the TCAA; THSC § 382.051, Permitting Authority of Commission; Rules, which authorizes the commission to issue permits, including standard permits for similar facilities; THSC § 382.0513, Permit Conditions, which authorizes the commission to establish and enforce permit conditions consistent with Subchapter C of the TCAA; and THSC § 382.05195, Standard Permit, which authorizes the commission to issue standard permits according to the procedures set out in that section.