

The Texas Natural Resource Conservation Commission (commission or TNRCC) adopts new §§117.460, 117.461, 117.463, 117.465, 117.467, and 117.469, concerning Water Heaters, Small Boilers, and Process Heaters. Sections 117.460, 117.465, and 117.467 are adopted with changes to the proposed text as published in the December 31, 1999, issue of the *Texas Register* (24 TexReg 12007). Sections 117.461, 117.463, and 117.469 are adopted without changes and will not be republished.

The commission adopts these revisions to Chapter 117, concerning Control of Air Pollution from Nitrogen Compounds, and to the State Implementation Plan (SIP) in order to reduce nitrogen oxide (NO_x) emissions from new natural gas-fired water heaters, small boilers, and process heaters sold and installed in Texas. Because of regional transport, the commission believes that this rulemaking will reduce ozone in ozone attainment areas, ozone near-nonattainment areas, and in combination with other emission reduction rules, is a necessary and essential component of the one-hour attainment demonstration for ozone nonattainment areas.

The adopted new sections have been placed in Subchapter D, concerning Small Combustion Sources. In separate rulemaking published in this issue of the *Texas Register*, the commission renumbered the existing Subchapter D, concerning Administrative Provisions, as Subchapter E.

The new sections are one element of the Dallas/Fort Worth (DFW) Attainment Demonstration SIP and were developed at the request of the North Texas Clean Air Steering Committee, which represents the DFW ozone nonattainment area. The purpose of these rules is to reduce NO_x emissions from new water heaters, small boilers, and process heaters as part of the control strategy to reduce emissions of

ozone precursors in order for the DFW ozone nonattainment area to be able to demonstrate attainment with the National Ambient Air Quality Standards (NAAQS) for ground-level ozone.

In addition, the revisions are one element of a new combined strategy to meet the NAAQS for ground-level ozone. The purpose of the strategy is to reduce overall background levels of ozone in order to assist in keeping ozone attainment areas and near-nonattainment areas in compliance with the federal ozone standards. The new strategy is also necessary to help the Beaumont/Port Arthur (BPA), DFW, and Houston/Galveston (HGA) ozone nonattainment areas as defined in 30 TAC §101.1, concerning Definitions, move closer to reaching attainment with the ozone NAAQS. The strategy takes into account recent science that shows that regional approaches may provide improved control of air pollution. In particular, staff has conducted photochemical grid modeling which indicates that NO_x controls in east and central Texas will reduce peak one-hour ozone in much of the region. Additional details concerning the need for a regional strategy are as follows.

BACKGROUND AND SUMMARY OF THE FACTUAL BASIS FOR THE ADOPTED RULES

The DFW ozone nonattainment area, an area defined by Collin, Dallas, Denton, and Tarrant Counties, was originally designated “moderate” under the Federal Clean Air Act (FCAA) Amendments of 1990 (42 United States Code (USC)) and thus was required to attain the one-hour NAAQS for ozone by November 15, 1996. As required by the FCAA, the state submitted an attainment demonstration plan in 1994 which projected attainment of the ozone NAAQS by 1996. This plan was based on a volatile organic compound (VOC) reduction strategy. DFW did not attain the ozone NAAQS in 1996. The United States Environmental Protection Agency (EPA) is authorized to redesignate an area to the next

higher classification (“bump up”) if the area fails to attain by the required date. In March 1998, in accordance with 42 USC, §7511(b)(2), the EPA reclassified the DFW area from moderate to serious, based on monitored exceedances of the ozone NAAQS between 1994 and 1996. The reclassification required the state to submit a revised SIP that demonstrates that the ozone NAAQS will be met in DFW by November 15, 1999. Because the DFW area continued to exceed the ozone NAAQS in 1999, the EPA may bump up the area to the severe classification. Regardless, the EPA and 42 USC, §7410 and §7502(a)(2), require the state to submit a revised SIP which demonstrates that the area will attain the ozone NAAQS as expeditiously as practicable. The rules adopted for DFW in this notice are one element of the ozone attainment demonstration SIP for DFW being adopted concurrently in this issue of the *Texas Register*. The commission plans to submit this SIP to the EPA in April, 2000.

In 1996, the commission began to develop new modeling for the DFW area and now is using newer air quality models with improved meteorological and emission inputs. The newer modeling since 1996 shows that reductions of NO_x in the DFW area and regionally will be necessary to attain the ozone NAAQS. The current modeling also shows that achieving the ozone NAAQS in the DFW area will require strenuous effort because the area’s rapid growth has resulted in increasing amounts of emissions due to increased levels of activity in the area. The emissions from increased activity are offsetting the emission reductions being achieved from new emission standards applicable to the on-road and non-road engine source categories which dominate the emissions inventory in the DFW area.

The emission reduction requirements adopted as part of this SIP package are the outcome of a development process which involved the EPA, the commission, local elected officials, citizens,

industrial stakeholders, air quality researchers, and hired consultants. Local officials from the DFW area have formally submitted a resolution to the commission requesting the inclusion of many specific emission reduction strategies, including the one contained in these rules.

The NO_x reductions required for the area to attain the ozone NAAQS have been estimated by extensive use of sophisticated air quality grid modeling which, because of its scientific and statutory grounding, is the chief policy tool for designing emission reductions. Title 42 USC, §7511a(c)(2), requires the use of photochemical grid modeling for ozone nonattainment areas designated serious, severe, or extreme.

The modeling has been conducted with input from a technical advisory committee. Hundreds of emission control strategies were considered in developing the modeling. Varying degrees of reductions from point sources and mobile sources were analyzed in at least 50 modeling iterations, to test the effectiveness of different NO_x reductions. The attainment demonstration modeling submitted for public hearing and comment concurrently with these rules shows that, in order for DFW to achieve the ozone NAAQS by 2007, almost all of the practicably achievable NO_x reductions are necessary from each emission source category, including reductions from counties surrounding the DFW nonattainment area. Therefore, each strategy, including the reductions required by this rulemaking, is crucial to meet federal requirements for the DFW nonattainment area.

At the time that the 1990 FCAA Amendments were enacted, the focus of controlling ozone pollution was on local controls. However, over the last ten years an increasing number of air quality professionals have concluded that ozone is a regional problem requiring regional strategies in addition to local control programs. As nonattainment areas across the United States prepared attainment

demonstration SIPs in response to the 1990 FCAA Amendments, several areas found that modeling attainment was made much more difficult, if not impossible, because of high ozone and ozone precursor levels entering from the boundaries of their respective modeling domains, commonly called transport.

The commission has conducted air quality modeling and upper air monitoring with aircraft that found that regional air pollution from sources inside of Texas should be considered when studying air quality in Texas' ozone nonattainment areas. The Texas studies are corroborated by research studies of the Ozone Transport Assessment Group (OTAG), the most comprehensive attempt ever undertaken to understand and quantify the transport of ozone. The results of both the commission and OTAG studies point to the need to take a regional approach, as has been done in this rulemaking, to controlling air pollutants.

During the OTAG studies, the commission's modeling staff ran several sensitivity analyses for Texas using a regional modeling setup based on the Coastal Oxidant Assessment for Southeast Texas (COAST) study. This analysis used the OTAG emission inventory, updated for Texas sources, to assess the impact of potential OTAG reductions on Texas. One modeling scenario, OTAG 5c, consisting of reductions across the domain (60% reduction of point source NO_x, 30% reduction of low-level NO_x, and 30% reduction of VOC), indicated that modeled reductions would reduce peak eight-hour ozone by as much as 20 parts per billion (ppb) throughout most of the eastern half of Texas. Overall, the modeling indicated that a regional reduction strategy would benefit a wide area of the state.

During modeling for the HGA attainment demonstration SIP for the one-hour ozone standard, the commission's modeling staff conducted sensitivity analyses to determine the benefits that regional reductions might have on HGA, when applied simultaneously with local reductions. Unlike the commission's regional modeling exercises discussed in the previous paragraphs, these HGA model runs offer an opportunity to assess separately the benefits of reductions made within and outside a region. Model runs with and without the regional reduction scenarios in HGA were conducted. Modeling runs were completed to evaluate the ozone concentrations in the COAST modeling domain for September 8, 1993 with year 2007 projected emissions and assuming a 70% reduction of NO_x combined with a 15% reduction of VOC in the eight-county HGA area. Even with the large reductions in HGA, much of the upper Texas Coast had ozone concentrations that challenge the one-hour standard as well as exceed the eight-hour standard. Further, Austin, Victoria, and Corpus Christi had modeled eight-hour average concentrations above the eight-hour standard. The application of OTAG 5c reductions outside the HGA eight-county area showed that the reductions are clearly beneficial to HGA, with additional ozone benefits of between five and ten ppb.

Additional modeling has been completed by commission staff assessing the potential benefits of regional NO_x reductions in the attainment counties of east and central Texas. This modeling indicates that NO_x reductions applied in the region will reduce peak one-hour ozone in much of east and central Texas.

The commission's air quality modeling studies conducted for the DFW area show that attaining the one-hour ozone NAAQS will be difficult, and that NO_x reductions from all modeled source categories that impact DFW's air quality will be required. Therefore, reductions of NO_x in the attainment counties of

east and central Texas are a necessary component for the DFW area to attain the one-hour ozone NAAQS. Consequently, these Chapter 117 rules are a necessary component of the DFW and regional NO_x reduction strategy.

Few states have adopted NO_x air quality regulations for natural gas-fired water heaters, small boilers, and process heaters. The leader in this area is California's South Coast Air Quality Management District (SCAQMD), which currently has the most comprehensive regulation in the nation. SCAQMD initially adopted limits for residential-type (i.e., maximum rated capacity no more than 75,000 British thermal units per hour (Btu/hr), designated as a "Type 0 unit" in the commission's rules) natural gas-fired water heaters on December 1, 1978 as Rule 1121. This rule limited NO_x emissions to 40 nanograms per joule (ng/J) of heat output. The scope of SCAQMD Rule 1121 was expanded to include NO_x limits for natural gas-fired commercial water heaters, small boilers, swimming pool heaters, and process heaters with a maximum rated capacity of 75,000 to 2.0 million Btu/hr through the adoption of Rule 1146.2 on January 9, 1998. On December 10, 1999, SCAQMD adopted revisions to Rule 1121 which lower the NO_x emission limit for residential-type water heaters to 20 ng/J of heat output on July 1, 2002, and to 10 ng/J of heat output on January 1, 2005. These revisions also allow manufacturers to pay a mitigation fee instead of meeting the 20 ng/J intermediate limit.

Extensive supporting work, including negotiations with industry, a review of available technology, and a development of a detailed impact assessment, was undertaken in the development of SCAQMD's regulations. Their research solicited cost, sales data, performance of existing products, and other relevant information from manufacturers. The commission staff's resource limitations prevented

conducting the type of exhaustive development work that SCAQMD performed. To take advantage of SCAQMD's development work and have standards consistent with California, the NO_x limits in the commission's rules are consistent with the SCAQMD NO_x limits, with the exception of not including the SCAQMD intermediate limit for Type 0 units between 2002 and 2005.

The commission's adopted rules implement the California standards throughout the State of Texas. Making the rules applicable statewide serves two purposes. First, it alleviates some of the manufacturing and distribution problems which arise with a patchwork application. Second, it helps to ensure that essentially all of the new units installed in the nonattainment and near nonattainment areas will emit less NO_x. Since the rules are enforced primarily at the wholesale and retail levels instead of the user level, patchwork rules might allow users to purchase units outside the area of applicability and perform the installation themselves. Under this rulemaking, low-emitting units will be the only units available in all areas of the state.

SECTION BY SECTION DISCUSSION

The rules are based upon California's Bay Area Air Quality Management District (BAAQMD) Regulation 9, Rule 6 and SCAQMD's Rule 1121 and Rule 1146.2 and apply to new natural gas-fired water heaters, small boilers, and process heaters sold and installed in Texas. The rules do not mandate use of a specific burner technology to meet the emission limits, but instead allow the manufacturers to determine the technology which is most cost-effective for each of its affected products. The rules also do not require retrofitting of existing natural gas-fired water heaters, small boilers, and process heaters.

The new §117.460, concerning Definitions, establishes definitions for terms used in the new division.

These definitions are heat output, Type 0 unit, Type 1 unit, Type 2 unit, and water heater.

The new §117.461, concerning Applicability, specifies that the new division applies to manufacturers, distributors, retailers, and installers of natural gas-fired water heaters, boilers, and process heaters with a maximum rated capacity of 2.0 million British thermal units per hour (MMBtu/hr) or less.

The new §117.463, concerning Exemptions, provides exemptions from the requirements of the new division. Specifically, units using a fuel other than natural gas, units used in recreational vehicles, and Type 0 units used exclusively to heat swimming pools and hot tubs are exempt from the requirements.

The new §117.465, concerning Emission Specification, sets NO_x emission limits which vary depending on the unit's maximum rated capacity (maximum design heat input) and date of manufacture. In order to comply, a unit must meet NO_x emission rates based upon either heat output or concentration for Type 1 and 2 units, or heat input or concentration for Type 2 units. In order to provide uniformity for the manufacturers and to eliminate duplicative enforcement efforts between the states, these standards are identical to those adopted in California except that the commission has not included the SCAQMD intermediate limit for Type 0 units between 2002 and 2005. The mitigation fee allowed by the SCAQMD rule makes the intermediate limit impractical for adoption in these rules.

The new §117.467, concerning Certification Requirements, establishes a testing and certification procedure for manufacturers. In order to prevent duplicative certification tests, a manufacturer may

submit an approved BAAQMD or SCAQMD certification. The TNRCC will issue its own certification only for those units which have not obtained certification in California.

The new §117.469, concerning Notification and Labeling Requirements, requires each manufacturer to submit a statement certifying that its units subject to the requirements of §117.465 of this title (relating to Emission Specifications) meet those emission limits. The required statement would include the manufacturer's brand name, model number, and the input rating as it appears on the water heater rating plate. In addition, the manufacturer is required to label the shipping carton and rating plate of each unit with the model number and date of manufacture.

FINAL REGULATORY IMPACT ANALYSIS

The commission has reviewed the rulemaking in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and has determined that the rulemaking does not meet the definition of a “major environmental rule” as defined in that statute. “Major environmental rule” means a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The amendments to Chapter 117 will require emission reductions from natural gas-fired water heaters, boilers, and process heaters throughout Texas. The rules are intended to protect the environment but do not have material adverse effects on a sector of the economy.

Manufacturers and retailers of units covered by this rule would not normally be considered a sector of the economy. Also, while the rules may have an adverse impact on manufacturers, retailers, and

consumers, the impact is small and would not be classified as “material.” Further, Texas Government Code, §2001.0225 only applies to a major environmental rule, the result of which is to: 1) exceed a standard set by federal law, unless the rule is specifically required by state law; 2) exceed an express requirement of state law, unless the rule is specifically required by federal law; 3) exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program; or 4) adopt a rule solely under the general powers of the agency instead of under a specific state law.

This rulemaking does not meet any of these four applicability requirements. Specifically, the emission limitations and control requirements within this rulemaking were developed in order to meet the NAAQS for ozone set by the EPA under FCAA, §109, and therefore meet a federal requirement. States are primarily responsible for ensuring attainment and maintenance of the NAAQS once EPA has established them. Under FCAA, §110 and related provisions, states must submit, for approval by EPA, SIPs that provide for the attainment and maintenance of NAAQS through control programs directed to sources of the pollutants involved. The commission has performed photochemical grid modeling which predicts that the controls required by these rules will result in reductions in ozone formation in one or more nonattainment areas in Texas. This rulemaking is not an express requirement of state law, but was developed specifically in order to meet the air quality standards established under federal law as NAAQS. Specifically, this rulemaking is intended to help bring ozone nonattainment areas into compliance, and to help keep attainment and near-nonattainment areas from going into nonattainment. The rulemaking does not exceed a standard set by federal law, exceed an express requirement of state law (unless specifically required by federal law), or exceed a requirement of a

delegation agreement. The rulemaking was not developed solely under the general powers of the agency, but was specifically developed to meet the air quality standards established under federal law as the NAAQS and authorized under Texas Clean Air Act (TCAA), §§382.011, 382.012, and 382.017. No comments were received during the comment period regarding the draft regulatory impact analysis.

TAKINGS IMPACT ASSESSMENT

The commission has completed a takings impact assessment for this rulemaking. The following is a summary of that assessment. The rules limit NO_x emissions from new natural gas-fired water heaters, small boilers, and process heaters sold and installed in Texas.

The rules are one element of the DFW Attainment SIP as well as part of a new strategy to meet the NAAQS for ground-level ozone. The strategy is necessary to reduce overall background levels of ozone in order to assist in keeping ozone attainment areas and near-nonattainment areas in compliance with federal ozone standards. The strategy and the modeling supporting it are discussed in other sections of this preamble. Promulgation and enforcement of the rules will not burden private real property because the rules do not require the permanent installation of new equipment. Although the rules do not directly prevent a nuisance or prevent an immediate threat to life or property, they do prevent a real and substantial threat to public health and safety and fulfill a federal mandate under the 1990 Amendments to the FCAA, §110. Specifically, the emission limitations and control requirements within this rulemaking were developed in order to meet the NAAQS for ozone set by the EPA under the FCAA, §109. States are primarily responsible for ensuring attainment and maintenance of NAAQS once the EPA has established them. Under the FCAA, §110 and related provisions, states must submit,

for approval by the EPA, SIPs that provide for the attainment and maintenance of NAAQS through control programs directed to sources of the pollutants involved. Therefore, the purpose of this rulemaking is to meet the air quality standards established under federal law as NAAQS.

Consequently, the following exemption applies to these rules: an action reasonably taken to fulfill an obligation mandated by federal law.

COASTAL MANAGEMENT PROGRAM CONSISTENCY REVIEW

The commission has determined that this rulemaking relates to an action or actions subject to the Texas Coastal Management Program (CMP) in accordance with the Coastal Coordination Act of 1991, as amended (Texas Natural Resources Code, §§33.201 et seq.), and the commission's rules in 30 TAC Chapter 281, Subchapter B, concerning Consistency with Texas Coastal Management Program. As required by 31 TAC §505.11(b)(2) and 30 TAC §281.45(a)(3), relating to actions and rules subject to the CMP, commission rules governing air pollutant emissions must be consistent with the applicable goals and policies of the CMP. The commission has reviewed this action for consistency with the CMP goals and policies in accordance with the regulations of the Coastal Coordination Council. For this rulemaking, the commission has determined that the rules are consistent with the applicable CMP goal expressed in 31 TAC §501.12(1) of protecting and preserving the quality and values of coastal natural resource areas, and the policy in 31 TAC §501.14(q), which requires that the commission protect air quality in coastal areas. This rulemaking is intended to reduce overall emissions of NO_x from new natural gas-fired water heaters, small boilers, and process heaters sold and installed in Texas. This action is consistent with the CMP because it does not authorize any new emissions and will reduce

existing emissions of NO_x. No comments were received during the comment period regarding the consistency of the rulemaking with the CMP goals and policies.

HEARINGS AND COMMENTERS

Public hearings on this proposal were held on January 24, 2000 in El Paso; January 25, 2000 in Austin; January 26, 2000 in Longview and Irving; January 27, 2000 in Dallas and Lewisville; January 28, 2000 in Fort Worth; January 31, 2000 in Beaumont and Houston; and February 9, 2000 in Denton. The comment period was originally scheduled to close on February 1, 2000, but was extended until 5:00 p.m. on February 14, 2000. (See the January 21, 2000 issue of the *Texas Register* (25 TexReg 461)).

Twenty-four commenters submitted oral testimony on this proposal. One hundred ninety-two commenters submitted written testimony on the proposal. Sierra Club - Dallas Regional Group; Greater Fort Worth Sierra Club; Downwinders At Risk; Sustainable Economic and Environmental Development (SEED); Texas Campaign for the Environment; Texas Clean Water Action; and Texas Public Citizen submitted joint comments and will be referred to as Sierra Club. Two individuals opposed the proposed revisions. Citizens for a Safe Environment (CSE); City of Cleburne (Cleburne); Environmental Defense (ED); League of Women Voters of Dallas (LWVD); League of Women Voters of Texas (LWVTX); North Texas Clean Air Steering Committee (NTCASC); Sierra Club; Sierra Club - Lone Star Chapter (SCLSC); and 195 individuals supported the proposed revisions. The American Lung Association of Texas (ALAT); EPA; Gas Appliance Manufacturers Association (GAMA); Home Builders Association of Greater Dallas (HBA); State Representative Tommy Merritt (Representative Merritt); PVI Industries, Inc. (PVI); Process Safety and Reliability Group (PSRG); A.O. Smith Water

Products Company (A.O. Smith); and an individual generally supported the proposed revisions but suggested changes or clarifications. PVI and A.O. Smith supported the comments submitted by GAMA. Sierra Club's comments included the *Citizen's Implementation Plan for Cleaner Air in DFW* (January 2000). ALAT; CSE; LWVD; SCLSC; and 184 individuals expressed support for this plan.

ANALYSIS OF TESTIMONY

Two individuals opposed the proposed rules.

As described elsewhere in this preamble, the commission believes that this rulemaking is necessary to help meet the air quality standards established under federal law as NAAQS. The commission has made no change in response to the comment.

PSRG commented that the cost of an installed water heater is about \$238, while the Public Benefit section of the rule proposal preamble indicated that the estimated cost of a 40 to 50 gallon water heater is about \$140 to \$350, with an average price of approximately \$230. PSRG also stated that either Harris County or the City of Houston now require a double insulated vent pipe, resulting in additional cost.

PSRG included a copy of a receipt indicating a price of \$139.99 for a water heater with a six-year warranty, plus \$9.00 for basic installation, plus an additional cost of \$90 to install the unit in an attic. The installation costs (including standard labor costs, additional charges for attic service, and costs for meeting revised building codes) are unaffected by the NO_x emissions of the unit being

installed. The cost information provided by PSRG indicates that the water heater cost estimates in the rule proposal preamble are reasonable.

HBA questioned how the requirements for water heaters would affect home construction.

The rules will require new natural gas-fired water heaters sold and installed in Texas to meet the specified emission limits. During home construction, if the home builder chooses to install a natural gas-fired water heater, then the home builder (or subcontractor) will simply install a compliant unit.

GAMA suggested that definitions of "boiler" and "process heater" be added to §117.460.

These terms are already defined in §117.10. The commission has made no changes in response to the comment.

GAMA suggested that the definition of "heat output" in §117.460 be revised to reference the SCAQMD Protocol: *Nitrogen Oxides Emissions Compliance Testing for Natural Gas-Fired Water Heaters and Small Boilers* (January 1998) rather than 10 CFR 430, Subpart E, Appendix E. GAMA stated that the use of recovery efficiency in the definition of heat output only applies to residential water heaters.

The commission has made the suggested change and believes that this will simplify the rule by ensuring that a consistent testing procedure is used.

GAMA suggested that a definition of "protocol" which references the SCAQMD Protocol: *Nitrogen Oxides Emissions Compliance Testing for Natural Gas-Fired Water Heaters and Small Boilers* (January 1998) be added to §117.460.

Instead of adding a definition, the commission has added references to this document to the definition of heat output and to §117.467.

Representative Merritt commented on §117.461 and supported the proposed nonapplicability to existing units.

The commission agrees that it is appropriate for the rule to be applicable to manufacturers, distributors, retailers, and installers, but without a requirement to retrofit or replace existing Type 0, 1, and 2 units. However, the commission staff expects to evaluate the possibility of retrofit requirements for equipment with a maximum rated capacity greater than 2.0 MMBtu/hr.

An individual commented on §117.463(3), which exempts Type 0 units used exclusively to heat swimming pools and hot tubs, and suggested that this exemption be deleted.

The percentage of Type 0 units used for swimming pools and hot tubs of total Type 0 units sold is relatively insignificant. The commission believes that it is appropriate to exempt Type 0 units used exclusively to heat swimming pools and hot tubs at this time due to their relatively low

representation in the market, but may in the future revisit this issue if additional emission reductions are needed.

One individual supported the proposed NO_x emission limits for small boilers in §117.465. Five individuals supported all standards in §117.465, while A.O. Smith, GAMA, and PVI recommended that the proposed standards be relaxed. GAMA stated that manufacturers make water heater models specifically for the California market that are not marketed nationally and that it is a misconception that models that are made for California are also sold nationwide. GAMA stated that manufacturers can provide different NO_x models for Texas and are willing to do so. GAMA stated that the NO_x limits in the recently revised Rule 1121 are not acceptable to water heater manufacturers and suggested that the mitigation fee option of Rule 1121 for manufacturers who sell Type 0 units with NO_x emissions greater than 20 ng/J after the July 1, 2002 compliance date indicates a lack of solid substantiation that the SCAQMD has for the 20 ng/J limit.

It is the commission's understanding that SCAQMD provided the mitigation fee option so that manufacturers could choose to make a single change to their product line rather than meeting the 10ng/J limits in two steps. This would undoubtedly reduce some costs by eliminating the intermediate step of a 20 ng/J limit and allowing manufacturers to focus on meeting the 10 ng/J standard, especially considering the other regulatory requirements that water heater manufacturers are being faced with over the next three years and the lead-time needed to obtain safety and design certifications. Because the Texas legislature has not given the commission the authority to establish a mitigation fee option similar to SCAQMD's, and because the major

manufacturers are already producing Type 0 units which meet a 40 ng/J standard in California, the commission is revising the July 1, 2002 standard of §117.465(1) from 20 ng/J to 40 ng/J (or 55 ppmv at 3.0% oxygen). This will provide emission reductions per Type 0 unit of approximately 53% from GAMA's estimated average of 85 ng/J for Type 0 units currently sold in Texas.

GAMA and PSRG commented on §117.465(2), concerning the proposed 10 ng/J standard for Type 0 units (water heaters) manufactured on or after January 1, 2005. PSRG stated that this date seems unreasonably far in the future and that the emission reductions will not be very much as a result. PSRG questioned what the cost per ton of NO_x reduced is for water heaters. GAMA stated that SCAQMD's review of available technology was based on discussions with manufacturers of low-NO_x burners who offered low-NO_x burners or stated that they had burner designs with low-NO_x characteristics. GAMA stated that only one low-NO_x burner technology has been applied to Type 0 units and is still several years away from finalization. GAMA stated that the burner manufacturers saw the SCAQMD rulemaking as a business opportunity and are unable to estimate what the implementation of their burners will do to the prices consumers will have to pay for water heaters. A.O. Smith stated that the proposed rule will "significantly impact the price." GAMA stated that the estimates of cost increases for Type 0 units given in the SCAQMD background information are "the unqualified estimates of burner manufacturers" and that these estimates are not appropriate for Texas because they are for the cost of going from 40 ng/J models to 10 and 20 ng/J models.

The January 1, 2005 compliance date was selected for consistency with the compliance date for SCAQMD's Rule 1121. The cost effectiveness is estimated to be \$4,400 per ton of NO_x reduced to

meet the 10 ng/J standard. SCAQMD extensively researched the burner manufacturers and developers to order to identify possible low-NO_x technologies for Type 0 units and determined that potential burner designs for meeting the 10 ng/J NO_x limit are in a variety of developmental stages, including building prototypes for tank-type water heaters, laboratory tests, and actual field tests in residences. Several burner technologies have been commercialized in residential combustion applications, but SCAQMD was not aware of any burners that can achieve the 10 ng/J emission level that have been installed in commercially available gas-fired Type 0 tank-type units. Potential burner designs to meet the 10 ng/J limit have not yet been tested for compliance with the new American National Standard Institute (ANSI) flammable vapor ignition resistance standards (ANSI Standard Z21.10.1) that become effective in 2001. Consequently, the burner performance may be different than initially designed in order to resist flammable vapor ignition. Although the potential 10 ng/J burners have not yet been tested, the commission expects that the primary low-NO_x technology will also address the flammable vapor ignition issue. The commission believes that the January 1, 2005 compliance date provides burner and water heater manufacturers sufficient time for the development, testing, and commercialization of several burner technologies to meet the 10 ng/J NO_x emission level. The SCAQMD and commission rules specifying a 10 ng/J for Type 0 units is a technology-forcing rule that the commission expects will spur the commercialization of low-NO_x burner technologies for gas-fired Type 0 tank-type units.

In 1991, one manufacturer developed a ported ceramic fiber burner for gas-fired Type 0 tank-type units that meets 10 ng/J limit. The burner is a flat plate matrix of ceramic fibers consolidated with inorganic binders. Laboratory tests have shown that the burner emitted less

than 10 ppmv NO_x, air free, dry (about 6.0 ng/J at 80% recovery efficiency, air free, dry) over 1,600 hours of operation. An added feature is that the combustion chamber is sealed, which provides increased resistance to flammable vapors.

According to SCAQMD, this burner was field tested in about 180 Type 0 units and demonstrated to be technically feasible. The field tests were conducted using a major water heater manufacturer's units equipped with these ported ceramic fiber burners. The units were installed and operated in residences for nine months to a year, ending in December 1995. While the consumer's response was generally positive, installers raised issues of cost, ease of serviceability, availability of standard parts and controls, and burner life. The manufacturer of the burners used in the field tests has made improvements to its burner design to address these issues. In 1998, this manufacturer streamlined the burner processing steps to reduce the manufacturing costs and modified the water heater design to achieve a low-cost removable burner to improve the serviceability.

SCAQMD determined that several other companies manufacture commercially-available low-NO_x atmospheric ceramic and metal fiber burners or materials for these burners for other applications such as wall-hung water heaters, gas fireplaces, commercial cooking fryers, water heater boosters, and commercial pulp, paper, or ceramic tile furnaces, and demand (instantaneous) water heaters. Demand water heating systems are tankless designs where unheated supply water travels through a pipe into a heating unit where the heating element heats the water on an as-needed basis. These burners are presently used in European countries where demand water heaters are common.

Although these burners have not been used in tank-type water heaters, transferring this technology to tank-type residential water heaters is technically feasible.

Based on a review of the available information, the commission believes that the burner technology to meet the 10 ng/J limit is sufficiently developed that it can be introduced into new Type 0 units by the end of 2004. However, as part of the Attainment SIP mid-course review (anticipated to be completed by December 2003) there will be an opportunity for the commission to evaluate the implementation status of the new low-NO_x burners at that time. The commission has made no change in response to the comments.

GAMA and PVI commented on §117.465(3) and (4), concerning the proposed standard for Type 1 and 2 units manufactured on or after July 1, 2002. GAMA stated that manufacturers make small boiler models specifically for the California market that are not marketed nationally, and that there are boiler manufacturers that market their products nationally but not in the Southern California market. GAMA stated that because of unique circumstances in SCAQMD, Rule 1146.2 will force some national manufacturers to either drop entire product lines that they currently offer in SCAQMD or leave that market entirely. PVI stated that Rule 1146.2 greatly reduced the number of models it can offer in SCAQMD and that they can no longer manufacture a nearly unlimited number of "engineer to order" products. GAMA stated that SCAQMD's recent rulemaking was based on the assumption that low-NO_x burner technology for units with a heat input of 2.0 MMBtu/hr or greater could be transferred to smaller units. GAMA also stated that the high end of SCAQMD's range of cost estimates for Type 1 units was too high and that the low end increased cost estimate was too low. PVI asserted that some

manufacturer's models complying with the SCAQMD limits utilize unproven technology that may be less reliable and more costly to purchase and maintain. GAMA commented that SCAQMD "deflected the industry's comments by including a requirement that an implementation study be done to research some of the issues raised," which GAMA characterized as "rulemaking in reverse." GAMA estimated the baseline for Type 1 equipment in Texas to be about 125 ng/J and suggested that the limit for Type 1 units be changed from 40 ng/J to 70 ng/J and that the proposed requirements for Type 2 units be deleted. GAMA and PVI suggested that larger boilers (those with heat inputs greater than 2.0 MMBtu/hr) should be regulated before Type 2 units, with PVI suggesting a NO_x limit of 30 ppm for these units. GAMA also stated that federal energy efficiency standards will result in lower NO_x emissions simply due to reduced gas usage, independent of any NO_x limits.

In general, Type 1 units are simply larger versions of the Type 0 residential water heaters and are likewise used to heat potable water. In these units, water is contained in an annular tank which is heated as the hot gases flow vertically upward through the annulus. In contrast, Type 2 units are typically constructed so that water circulates through a series of tubes which are placed generally perpendicular to the flow of hot gases, with the hot gases heating the water in the tubes and in many cases creating steam. GAMA is correct that SCAQMD's research revealed that in some cases low-NO_x burner technology for units with a heat input of 2.0 MMBtu/hr or greater could be transferred to Type 2 units, and that in some cases low-NO_x burner technology for units of no more than 75,000 Btu/hr could be transferred to Type 1 units. Several manufacturers have working demonstrated units in the field and have devoted much time, energy, and funding to the development and commercialization of these low-NO_x units. Because there are models which meet

the proposed standards already being manufactured for the California market, there is no question that the technology to comply with the limits is currently available. Regarding costs, SCAQMD noted that an exact cost estimate was difficult to create because some low-NO_x units cost less than an atmospheric unit from a different manufacturer, undoubtedly due in part to varying features and controls. It is reasonable to expect that with wider application of low-NO_x technology, the cost will be reduced. The commission agrees that manufacturers may have to drop certain models if they can not (or choose not to) equip them to meet the new requirements. While federal energy efficiency standards may result in reduced fuel usage, in the absence of a specific NO_x limit there is no guarantee than a new model unit will emit less NO_x. SCAQMD's estimate of fuel savings was based on data from the California Energy Commission. While fuel savings for new high efficiency condensing units may be negligible, fuel savings from low-NO_x units may result from lower excess air and more radiant heat transfer. Regarding units with a maximum rated capacity greater than 2.0 MMBtu/hr, the commission may in future rulemaking evaluate the possibility of retrofit requirements for these units but can not do so at this time since the scope of the current rulemaking was limited to units with a maximum rated capacity of no more than 2.0 MMBtu/hr. The commission has made no change in response to the comments.

The EPA commented on the §117.465(4), concerning the proposed standard for Type 2 units manufactured on or after July 1, 2002. The EPA suggested that §117.465(4)(B) be clarified by including the phrase "heat input" and the appropriate carbon monoxide (CO) limits from SCAQMD Rule 1146.2, section (c)(1).

The commission has added the phrase "heat input" to §117.465(4)(B) to clarify its emission limit.

However, due to potential Administrative Procedure Act constraints, the commission can not add CO limits at this time.

GAMA commented on §117.467(a), concerning certification requirements. GAMA stated that as proposed, paragraphs (2) and (3) are applicable only to residential water heaters. In conjunction with their comments on the definition of heat output and their suggested definition of the SCAQMD protocol, GAMA suggested that paragraphs (2) and (3) be deleted and that paragraph (1) be revised to refer to the SCAQMD protocol.

The commission agrees and has revised §117.467 accordingly.

GAMA commented on the labeling requirements of §117.469. GAMA suggested that the date of manufacture be included on the rating plate but not on the shipping carton.

GAMA did not explain why the date of manufacture should not be included on the shipping carton. The proposed requirement to include the model number and date of manufacture on both the shipping carton and the rating plate is necessary to facilitate enforcement and is consistent with the SCAQMD and BAAQMD requirements. The commission has made no change in response to the comments.

STATUTORY AUTHORITY

The new sections are adopted under the Texas Health and Safety Code, TCAA, §382.011, concerning General Powers and Duties, which provides the commission with the authority to establish the level of quality to be maintained in the state's air and the authority to control the quality of the state's air; §382.017, concerning Rules, which provides the commission with the authority to adopt rules consistent with the policy and purposes of the TCAA; and §382.012, concerning State Air Control Plan, which requires the commission to develop plans for protection of the state's air, such as the SIP.

SUBCHAPTER D: SMALL COMBUSTION SOURCES

DIVISION 1: WATER HEATERS, SMALL BOILERS, AND PROCESS HEATERS

§§117.460, 117.461, 117.463, 117.465, 117.467, 117.469

§117.460. Definitions.

Unless specifically defined in the TCAA or in the rules of the commission, the terms used by the commission have the meanings commonly used in the field of air pollution control. In addition to the terms which are defined by the TCAA, the following terms, when used in this division, shall have the following meanings, unless the context clearly indicates otherwise. Additional definitions for terms used in this division are found in §101.1 of this title (relating to Definitions), §3.2 of this title (relating to Definitions), and §117.10 of this title (relating to Definitions).

(1) **Heat output** - The product H_o obtained when a Type 0, 1, or 2 unit is tested according to Section 9.3 of the South Coast Air Quality Management District Protocol: *Nitrogen Oxides Emissions Compliance Testing for Natural Gas-Fired Water Heaters and Small Boilers* (January 1998).

(2) **Type 0 unit** - Any water heater, boiler, or process heater with a maximum rated capacity of no more than 75,000 British thermal units per hour (Btu/hr).

(3) **Type 1 unit** - Any water heater, boiler, or process heater with a maximum rated capacity greater than 75,000 Btu/hr, but no more than 400,000 Btu/hr.

(4) **Type 2 unit** - Any water heater, boiler, or process heater with a maximum rated capacity greater than 400,000 Btu/hr, but no more than 2.0 million Btu per hour (MMBtu/hr).

(5) **Water heater** - A closed vessel in which water is heated by combustion of gaseous fuel and is withdrawn for use external to the vessel at pressures not exceeding 160 pounds per square inch gauge (psig), including the apparatus by which the heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210 degrees Fahrenheit.

§117.461. Applicability.

This division (relating to Water Heaters, Small Boilers, and Process Heaters) applies to manufacturers, distributors, retailers, and installers of natural gas-fired water heaters, boilers, and process heaters with a maximum rated capacity of 2.0 million British thermal units per hour (MMBtu/hr) or less.

§117.463. Exemptions.

This division (relating to Water Heaters, Small Boilers, and Process Heaters) does not apply to:

- (1) units using a fuel other than natural gas;
- (2) units used in recreational vehicles; and
- (3) Type 0 units used exclusively to heat swimming pools and hot tubs.

§117.465. Emission Specifications.

Natural gas-fired Type 0, 1, and 2 units sold, distributed, installed, or offered for sale within the State of Texas shall meet the following limits for nitrogen oxides (NO_x , calculated as nitrogen dioxide (NO_2)).

(1) Type 0 units manufactured on or after July 1, 2002, but no later than December 31, 2004, shall not exceed:

- (A) 40 nanograms per joule (ng/J) of heat output; or
- (B) 55 parts per million by volume (ppmv) at 3.0% oxygen (O_2), dry.

(2) Type 0 units manufactured on or after January 1, 2005 shall not exceed:

- (A) 10 ng/J of heat output; or

(B) 15 ppmv at 3.0% O₂, dry.

(3) Type 1 units manufactured on or after July 1, 2002 shall not exceed:

(A) 40 ng/J of heat output; or

(B) 55 ppmv at 3.0% O₂, dry.

(4) Type 2 units manufactured on or after July 1, 2002 shall not exceed:

(A) 30 ppmv at 3.0% O₂, dry; or

(B) 0.037 pound per million British thermal units per hour (MMBtu/hr) of heat input.

§117.467. Certification Requirements.

(a) The manufacturer shall demonstrate that each model of Type 0, 1, and 2 unit subject to the requirements of §117.465 of this title (relating to Emission Specifications) has been tested in accordance with Test Method 7 (40 Code of Federal Regulations 60, Appendix A (effective June 11, 1986)), including 7A-E, and the South Coast Air Management District (SCAQMD) Protocol: *Nitrogen Oxides Emissions Compliance Testing for Natural Gas-Fired Water Heaters and Small Boilers* (January 1998).

(b) The manufacturer may submit to the executive director an approved Bay Area Air Quality Management District or SCAQMD certification in lieu of conducting duplicative certification tests.

§117.469. Notification and Labeling Requirements.

(a) Each manufacturer shall submit to the executive director a statement certifying that Type 0, 1, and 2 units subject to the requirements of §117.465 of this title (relating to Emission Specifications) are in compliance with §117.465 of this title. The statement shall be signed, dated, and attest to the accuracy of all information. The statement shall include the manufacturer's brand name, model number, and the input rating as it appears on the rating plate. The manufacturer shall inform their wholesaler and/or retailer of the certification requirement of this subsection.

(b) The manufacturer shall display the model number and date of manufacture of each Type 0, 1, and 2 unit complying with §117.465 of this title on the shipping carton and rating plate of each Type 0, 1, and 2 unit.

