RESPONSE TO COMMENTS RECEIVED CONCERNING THE DALLAS-FORT WORTH (DFW) ATTAINMENT DEMONSTRATION (AD) STATE IMPLEMENTATION PLAN (SIP) REVISION FOR THE 2008 EIGHT-HOUR OZONE STANDARD

PROPOSED DECEMBER 10, 2014

The commission conducted a public hearing in Arlington on January 15, 2015, at 6:30 p.m., and in Austin on January 22, 2015, at 10:00 a.m. During the comment period, which closed on February 11, 2015, the commission received comments from the Children's Health System of Texas, the DFW Regional Concerned Citizens, Dallas County Medical Society, Downwinders at Risk (Downwinders), State Representative Lon Burnam (Representative Burnam), the Greater Fort Worth Sierra Club, the Health and Wellness Alliance for Children, the League of Women Voters of Dallas, the Lone Star Chapter of the Sierra Club, Mayor John Monaco of the City of Mesquite (City of Mesquite), the North Texas Chapter of American Solar Energy Society, the Regional Transportation Council (RTC), the Texas Medical Association, Public Citizen, the Sierra Club, Solar Turbines Incorporated (Solar), Sustainable Energy and Economic Development (SEED) Coalition, Texas Pipeline Association (TPA), the United States Environmental Protection Agency (EPA), and 56 individuals.

Comments more directly related to the concurrent rulemaking in 30 Texas Administrative Code (TAC) Chapter 117 Nitrogen Oxides (NO_X) Reasonably Available Control Technology (RACT) Rule Revisions (Rule Project No. 2013-049-117-AI) and 30 TAC Chapter 115 Volatile Organic Compounds (VOC) RACT Rule Revisions (Rule Project No. 2013-048-115-AI), which were incorporated by reference into the DFW AD SIP revision, are responded to in the Response to Comments sections of the preambles to those rulemakings.

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GENERAL COMMENTS

General Support

The League of Women Voters of Dallas thanked the employees of the Texas Commission on Environmental Quality (TCEQ) for working hard to protect public health and the environment and submitted an article, *League of Women Voters Launches Clean Air Promise Campaign*. Public Citizen thanked TCEQ staff for doing a thankless job with good intentions. The Sierra Club and Downwinders noted appreciation for the work of TCEQ staff in the development of the proposed DFW AD SIP revision. One individual expressed appreciation for TCEQ staff.

The TCEQ appreciates the support and is committed to working with local entities and interested parties to keep them updated on SIP developments and informed about technical issues related to air quality. The TCEQ has included a copy of the article, *League of Women Voters Launches Clean Air Promise Campaign*, in the record. No changes were made in response to these comments.

Public Participation

An individual commented that the TCEQ does not take the public participation process seriously and will not make any modifications to the DFW AD SIP revision in response to comments received at public hearings. One individual noted concern that no action will result from comments submitted.

The TCEQ encourages public participation in the SIP development process and appreciates the efforts of those who took the time to evaluate the proposed DFW AD SIP revision and provide oral and written comments. The TCEQ takes its duties very seriously and has reviewed and analyzed all testimony related to this DFW AD SIP revision, provided responses to comments, and made changes in the DFW AD SIP revision as appropriate. All public comments received have been included in the DFW AD SIP revision package that will be submitted to the EPA. No changes were made in response to these comments.

Air Quality Concerns

One individual expressed concern about poor air quality in the DFW area and one individual expressed concern regarding numerous days in the DFW area with red-brown haze on the horizon and the skyline fuzzed with smog. An individual stated that the TCEQ should begin to address air pollution problems in Texas. One individual commented that bad air quality limits time outdoors. Eight individuals requested clean air to breathe. One individual commented that they saw the need for a higher standard for clean air. Two individuals stated that air quality improvements have taken too long to achieve and desires to breathe clean air. One individual commented that Dallas has some of the worst air quality in the entire nation.

The Greater Fort Worth Sierra Club and three individuals stated that the TCEQ should help our children instead of the polluting industries. The Lone Star Sierra Club and seven individuals commented that the TCEQ supports industry and not public health. One individual commented that the highest standards should be upheld for clean air and that they would be willing to pay higher taxes and higher costs for clean air. One individual commented that the TCEQ should take the side of the community so that the corporations get the guidance they need to meet the needs of the community. An individual stated that the TCEQ should take action for citizens and not political pressure groups, industry, and lobbyists. One individual noted that businesses are

appropriately designed to make money; and the government is supposed to regulate appropriately, and requested the TCEQ be on the side of the community. One individual commented that the DFW AD SIP revision does not address the needs of the community. Two individuals commented that the state should take care of its citizens.

The TCEQ strives to protect our state's human and natural resources consistent with sustainable economic development and in accord with federal and state laws. The TCEQ is committed to attaining the 2008 eight-hour ozone standard as expeditiously as practicable. The purpose of this DFW AD SIP revision is to demonstrate attainment of the 2008 eight-hour ozone standard in accordance with the EPA's guidance and Federal Clean Air Act (FCAA) requirements. The DFW area has made considerable improvement in air quality, as evidenced by the information provided in this DFW AD SIP revision. For example, between 2000 and 2014 the eight-hour ozone design value has trended downward 21 ppb, as a result of both state and federal rules. The number of DFW eight-hour ozone exceedance days has also decreased from 36 to three over the same period. Progress toward attainment of the ozone standard has been significant, even in light of the increasing population and vehicle miles traveled in the DFW area, which is largely influenced by mobile emissions. All emissions in the area (on-road mobile, non-road mobile, stationary point sources, and area sources) were reviewed in this DFW AD SIP revision for appropriate emission controls.

The rules associated with this DFW AD SIP revision include achievable and cost-effective emissions standards for sources in and around the DFW ozone nonattainment area. An achievable and cost-effective level of control for a particular source category depends on the current levels of emissions, available control technologies for the source category, and other technical and economic factors that may be specific to a source or to a region. The TCEQ determined the appropriate level of control for sources in the DFW ozone nonattainment area considering all appropriate factors, including information obtained during the public comment period. Discussion regarding the level of control required on specific source categories is provided in the preambles to the rules associated with this DFW AD SIP revision. No changes were made in response to these comments.

An individual commented that the language used to define nonattainment area classifications is misleading and that the term "moderate nonattainment" implies that air quality in the DFW area is not so bad.

The TCEQ's authority regarding the designation and classification of nonattainment areas is limited under the FCAA to providing recommendations to the EPA. In accordance with the FCAA, ozone nonattainment areas are classified by the EPA based on the ambient ozone design value in an area at the time of designations. The classifications range in severity. There are five classifications – marginal, moderate, serious, severe, and extreme. A "moderate" classification is the second level on this scale, and indicates an area that is significantly closer to attaining the ozone standard than areas classified as serious, severe, or extreme. The EPA finalized a rule on May 21, 2012 (77 *Federal Register* [FR] 30160) establishing the air quality classification thresholds for the 2008 eight-hour ozone standard and classified the 10-county DFW area as "moderate nonattainment"

according to that rule, and the DFW area's design value. No changes were made in response to these comments.

An individual commented that earthquakes have caused or could cause water main ruptures, explosions, and residential and business damage. Another individual commented that earthquakes are a result of oil and gas activities, and voiced concern over explosions and tap water catching fire. An individual commented that the TCEQ should put a stop to drilling and hydraulic fracturing (fracking) activities that occur close to the city limits as they cause earthquakes.

Comments related to earthquakes or water contamination, including incidents allegedly linked to fracking, are beyond the scope of this DFW AD SIP revision. No changes were made in response to these comments.

An individual commented that the President's plan to include methane and other associated chemical releases from the gas drilling activities in our densely populated environment must be studied and the chemicals must be measured.

The President's Climate Action Plan proposes actions to reduce methane emissions from the oil and gas sector by 40-45% from 2012 through 2025. The purpose of this DFW AD SIP revision is to demonstrate attainment of the 2008 eight-hour ozone standard. The EPA's definition of VOC, found in 40 Code of Federal Regulations §51.100(s), specifically excludes methane from this class of ozone precursors. Therefore, this comment is outside the scope of this DFW AD SIP revision. No changes were made in response to these comments.

Health Effects

Eleven individuals noted concern for health and air quality and one individual expressed concern regarding a decrease in quality of life due to air quality. One individual commented that smog generates and exacerbates adverse health conditions.

The SEED Coalition commented that the health of our children, our elderly, and those with chronic lung problems should be put first and foremost. Two individuals noted general concern for children's health and air quality. One individual commented that the health and well-being of our future should be protected.

One individual noted that a research study should be considered regarding the growing number of children with asthma in the DFW area. The Health and Wellness Alliance with the Children's Health System of Texas commented that consistently high ozone levels impact the well-being of all children and endanger the lives of children with asthma. Two individuals expressed concern regarding children developing asthma due to bad air in the DFW area.

The Dallas County Medical Society commented that ozone days between 90 – 100 ppb provide a serious threat to pediatric asthma patients, elderly emphysema patients, and middle-aged patients with coronary heart disease. The commenter also noted concern regarding three coal power plants that need to reduce air pollution emissions to current EPA standards to protect patients in North Texas with asthma and chronic lung disease and to prevent premature death.

One individual questioned the effects of outside workers' daily exposure to toxins in the air and noted that migraine headaches are worse during severe pollution days. The League of Women Voters of Dallas expressed concern that the human health impact regarding the cumulative mix of chemicals in the air has not been fully investigated.

One individual commented that ozone damages our lungs. One individual commented that chronic obstructive pulmonary disease (COPD) and asthma are caused by poisoned air and VOC. Six individuals expressed general concern for asthma and air quality. The League of Women Voters of Dallas commented that ozone can cause health problems such as throat irritation, reduced lung function, inflammation in airways, and cardiac problems and that ozone pollution deaths in the DFW area rank second in the country behind the northeast.

The Health and Wellness Alliance for Children of Children's Medical Center commented that consistently high ozone levels across the North Texas region are impacting the well-being of all children and endangering the lives of children burdened by asthma. Annual economic costs to Dallas County, including costs to families in medical care facilities across the community, are estimated to be a staggering $60 million. Mortality rates are 12 deaths per 100,000 for asthma among children in Dallas County.

An individual commented that as a teacher, she has seen asthma in children increase in her school in Fort Worth to two to three students per class. She is concerned that the medical expenses associated with asthma are increasing and many can't afford their prescription medicine. She stated the greed of a few is fed at the expense of innocents and asked the TCEQ not to allow this to continue.

The Sierra Club and Downwinders commented on the prevalence of asthma in Texas, in particular in the DFW region, and how this disease disproportionately affects minorities and low-income families. They commented that ozone is a significant driver of unhealthy air in Texas, and that ozone exposure significantly impacts health, particularly respiratory health. They expressed concern both about acute and long-term exposures to ozone, particularly how those exposures impact respiratory and cardiovascular morbidity, premature mortality, perinatal and reproductive diseases, as well as suggested impacts on the central nervous system. They commented that physiological impacts that are seen in healthy individuals are relatively low concentrations of ozone, but that certain sensitive and at-risk groups may have an increased susceptibility to ozone-induced health impacts. In addition, they stated that acute and chronic ozone exposure can have respiratory impacts including respiratory symptoms, lung function defects, inflammation, and lung injury. They commented that epidemiology studies show that ozone is associated with respiratory hospital admissions and emergency department visits and increases respiratory mortality. They commented that ozone exposure is linked to both new-onset asthma and asthma exacerbations and that, increasingly, ozone has been associated with cardiovascular effects as well as respiratory effects. They also commented that both acute and chronic exposure to ozone has been linked to premature mortality. In particular, they noted that daily changes in ambient ozone concentrations are linked to premature mortality, even at very low pollution levels. They also commented that there are health impacts related to ozone exposure on newborns and the developing fetus.

The TCEQ appreciates the comments related to health effects of ozone and is committed to working with area stakeholders to attain the 2008 eight-hour ozone standard, which is a health-based standard. The primary National Ambient Air

Quality Standards (NAAQS) are those that the EPA determines are necessary to protect public health, including sensitive members of the population such as children, the elderly, and those with pre-existing conditions. Breathing relatively high levels of ground-level ozone may cause acute respiratory problems like cough and respiratory irritation and may aggravate the symptoms of asthma. Health effects from ozone can generally resolve quickly once an individual is no longer exposed to high levels. The TCEQ agrees with the League of Women Voters of Dallas that there are not many studies determining the health effects of ozone in combination with other pollutants. This lack of data prevents the TCEQ from making assessments on the health effects of ozone-pollutant mixtures.

Between 2000 and 2014, the eight-hour ozone design value in the DFW area has trended downward by 21 ppb. This decrease in ozone design value has coincided with significant reductions in ozone precursor emissions. Analyzing the anthropogenic emissions inventory (EI) from 2005 to 2011 for the 10-county DFW 2008 eight-hour ozone nonattainment area indicates that NO_X emissions have decreased by approximately 29,000 tons (16%) and VOC emissions have decreased by approximately 80,000 tons (34%).

Several health-related concerns have been broached by commenters, and responses to these concerns are listed below.

Asthma:

Despite decreasing levels of both precursors and ozone, diagnosis of asthma continues to increase. As a result, it is not clear that there is a definite link between ozone levels and asthma development.

Although the causes of asthma are not fully understood, there are many factors that influence the development and exacerbation of asthma. According to the World Health Organization, one of the strongest risk factors for developing asthma is genetic predisposition. In addition, indoor allergens (dust mites, pet dander, and presence of pests such as rodents or cockroaches) together with outdoor allergens (pollen and mold), tobacco smoke, or other triggers such as cold air, extreme emotions (anger or fear), and physical exercise can all provoke symptoms in those with asthma. The Centers for Disease Control and Prevention estimates that asthma prevalence has increased over recent years. The reason for this increase is unknown, but some scientists have suggested changes in exposure to microorganisms (hygiene hypothesis) or the rise in sedentary lifestyle (affecting lung health) and obesity, which results in inflammation, may be to blame.

Recent, large, multi-city studies, which have included Dallas, have shown that current ambient concentrations of ozone do not increase asthma symptoms (O'Connor, 2008, Schildcrout, 2006). In addition, a recent study has shown that the most important factors affecting asthma are not urban (more polluted) areas, but rather ethnicity and poverty (Keet, 2015).

Ozone-induced mortality:

The TCEQ does not support the assertion that ambient concentrations of ozone are causing death because the scientific data does not support it.

Tests on human subjects have shown that when people are exposed to ozone at ambient concentrations (i.e. 40 ppb – 120 ppb) for up to eight hours while exercising vigorously, a range of mild respiratory effects occur. It is not consistent with toxicological principles that a concentration of ozone that only causes a mild, reversible effect, or no effect at all, also causes death. The doses of ozone that kill animals is orders of magnitude higher than ambient ozone (the National Institute for Occupational Safety and Health (NIOSH) Immediately Dangerous to Life or Health value for ozone is 5000 ppb; NIOSH 2005), and so, again, does not support assertions that there is a mechanism for ambient ozone to contribute to mortality. The epidemiology studies that are the basis for the conclusions about ozone affecting mortality have a crucial error; these studies do not consider the actual exposure of the people in the study. Rather, these studies assume that people are exposed to the level of ozone at the ambient monitor (sometimes to the highest ambient monitor in the entire metropolitan area), which could be up to 10-times higher than their actual exposure (Lee 2004), and may not even correlate with the person's exposure (Sarnat, 2001, Sarnat, 2005).

Respiratory effects of ozone:

Studies done in the last several years have shown that people who are exposed to ozone at 60, 72, or 80 ppb, while vigorously exercising for 6.6 hours, experience mild, reversible respiratory effects that are not clinically significant by the EPA's standards (Adams, 2006, Kim, 2011, Schelegle, 2009). Exposure to 88 ppb caused clinically significant effects by the EPA's standards, but the DFW area's eight-hour ozone design value (the 4th highest level averaged over three years) was 81 ppb in 2014, which is below the 88 ppb level required to cause clinically significant effects. Children and asthmatics have been shown to have the same respiratory effects after ozone exposure as healthy adults (McDonnell, 1985, Koenig, 1987, Holz, 1999, Stenfors, 2002). Clinical studies have not shown increased lung function responses to ozone of people with COPD compared to healthy individuals (Gong 1997). There is little consistent data from epidemiology studies showing lung function effects of ozone on individuals with COPD (Peacock 2011, Lagorio 2006).

Long-term exposure to ozone:

The EPA concludes that there is a likely causal relationship between ozone and long-term respiratory mortality, based on a single epidemiology study (Jerrett, 2009). The relationship between long-term ozone exposure and mortality has been investigated in at least 12 epidemiology studies. When considering other potential causes of mortality, such as other air pollutants, only one of those studies (Jerrett, 2009) showed a statistically significant (but very small) effect of ozone on respiratory mortality. Interestingly, the effect only occurred at temperatures above 82°F. Paradoxically, the increased mortality was not observed in United States (U.S.) regions with the highest ozone concentrations (southern California) nor in areas with the highest number of respiratory deaths (the Northeastern U.S. and the industrial Midwest). Other studies that looked at the same dataset as Jerret, 2009 did not find an association between long-term ozone exposure and cardiopulmonary mortality (Pope, 2002, Jerret, 2005).

The evidence for other long-term effects of ambient concentrations of ozone is even weaker than the respiratory mortality data. A recent study of children in the Los Angeles (LA) area,which has much higher levels of ozone than the DFW area (the 2014 eight-hour ozone design value was 102 ppb in LA and 81 ppb in DFW) has shown that ozone has no effect on lung development (Gauderman, 2015).

Cardiovascular effects of ozone:

Several recent studies have integrated all of the evidence for both short-term and long-term ozone exposure effects on cardiovascular disease and mortality. For both short-term and long-term exposure, the study authors found that the evidence was "below equipoise." This means that the evidence is not good enough to conclude that either short-term or long-term exposure to ambient concentrations of ozone causes cardiovascular health effects (Goodman, 2014, Prueitt, 2014).

Other health effects:

Many different health effects have been investigated after ozone exposure. However, only those with consistent, robust data are considered in the TCEQ and the EPA's health risk assessments. Those that do not have robust datasets, and therefore are not included in the risk assessment, include: perinatal, reproductive, and central nervous system impacts.

No changes were made in response to these comments. References for all studies are provided at the end of the document.

The League of Women Voters of Dallas and one individual commented that particulate matter (PM) causes adverse health effects and haze and that the TCEQ has an obligation to reduce PM pollution in the DFW area. The League of Women Voters of Dallas submitted a 2011 article regarding the Clean Air Promise Campaign to inform and engage Americans on the issue of clean air, asking them to protect the health of children and families by supporting clean air policies that public health experts have recommended.

This DFW AD SIP revision is intended to demonstrate attainment of the 2008 eight-hour ozone NAAQS. Comments related to PM pollution are outside the scope of this DFW AD SIP revision; however, the EPA issued final area designations on December 18, 2014 for the 2012 primary annual fine particulate matter ($PM_{2.5}$) NAAQS, designating all areas of Texas, including the DFW area, as unclassifiable/attainment. Further, the DFW area is designated attainment for all PM NAAQS. No changes were made in response to these comments.

Oil & Gas Health Effects

One individual commented that the TCEQ should do more to protect human health and the environment from oil and gas activities and not allow itself to be influenced by politics. The Greater Fort Worth Sierra Club expressed concern regarding the long-term health effects of ozone and emissions from natural gas sites in the DFW area.

An individual commented that poor air quality and fracking causes sore throats; bloody noses; burning eyes; and breathing problems, especially in children with asthma. One individual commented that drilling and fracking close to city limits cause people to get cancer. One

individual commented that fracking causes cancer, teen depression, rashes, nosebleeds, and asthma. Another individual commented that drilling and fracking in residential areas causes allergies, pneumonia, migraines, nausea, cancer, asthma, and nosebleeds in children.

An individual expressed concern about gas emissions and their effect on our youth's lungs and reproductive organs each time they breathe the Arlington air when they are directly downwind while at Six Flags, Ranger Stadium, or AT&T Stadium. An individual commented that public quantitative health research needs to be done in North Texas on chemical releases from the gas drilling activities since the citizens are suffering health risks associated from this activity.

The TCEQ has conducted extensive air monitoring for chemicals associated with oil and gas operations in the DFW area, and staff has not monitored any off-site, short-term concentrations that would be expected to cause adverse health effects after short-term exposure. Additionally, staff has not monitored any concentrations at stationary monitors that would be expected to cause adverse health effects after long-term (i.e., lifetime) exposure. In some instances, staff has measured short-term concentrations of some chemicals that would be expected to cause odors, consistent with citizen odor complaints and staff investigator reports. No changes were made in response to these comments.

To help address concerns about potential health risks (including cancer) from long-term exposure to emissions from oil and gas operations, The stationary VOC monitoring network in the DFW nonattainment area has increased from eight VOC monitors in 2009 to 25 monitors in December 2014, mostly at the direction of Senate Bill 527 of the 82nd Legislative Session. The bill directed the TCEQ to work with a non-profit organization to expand and maintain air quality monitors in North Texas. These monitors were specifically sited to evaluate long-term ambient air quality in populated areas impacted by oil and gas activity.

The TCEQ uses long-term air monitoring comparison values (AMCV) to help determine the potential for chronic adverse health effects to occur from long-term exposure to monitored concentrations of chemicals in air. Long-term AMCVs are protective of cancer and non-cancer health effects as well as adverse effects on vegetation. Based on long-term air monitoring data collected to date in the Barnett Shale area, the TCEQ would not expect an increased risk of cancer to result from long-term exposure to the monitored concentrations.

Air monitoring data and associated toxicological evaluations addressing oil and gas-related air quality issues in the DFW area are publicly available on the TCEQ's Barnett Shale Web page (https://www.tceq.texas.gov/airquality/barnettshale). Toxicological evaluations of Region 4 ambient air network monitoring data are publicly available on the TCEQ's Toxicology Division Web page (http://www.tceq.texas.gov/toxicology/regmemo/AirMain.html). No changes were made in response to these comments.

Economic Effects

DFW Regional Concerned Citizens commented that this DFW AD SIP revision does not move the area toward meeting the newer more strict attainment standards, and thus impacts our economic growth, our citizens' health, and the public infrastructure funding. The Sierra Club

and Downwinders commented that the inability of the DFW area to achieve clean air impacts the local and regional economy. The commenters added that evidence is strong that ozone reduces yields for economically important local crops.

Lone Star Chapter of Sierra Club commented that industry avoids expanding to areas designated nonattainment and that this DFW AD SIP revision supports industry and not the public health. Two individuals commented that many people will leave Texas due to poor air quality. One individual commented that businesses and families will not invest in an area with poor air quality.

The Sierra Club and Downwinders commented that increased economic activity will adversely impact ozone levels.

The TCEQ strives to protect the state's human and natural resources consistent with sustainable economic development. The DFW area has made considerable improvement in air quality while steadily increasing in population and gross metropolitan product.

For example, between 2000 and 2014, the eight-hour ozone design value has trended downward 21 ppb. The number of days in the DFW area where the daily eight-hour ozone peak exceeded 84 ppb has also decreased from 36 to 3 over the same period. According to data from *U.S. Metro Economies Reports* prepared for the United States Conference of Mayors,[1,2] from 2000 to 2013 (the most recent year for which data were available), the DFW metropolitan area's economy has grown from $223 billion to $440 billion and the population has grown approximately 31%. No changes were made in response to these comments.

Inadequacies of the SIP

The DFW Regional Concerned Citizens commented that the proposed DFW AD SIP revision is inadequate, does not meet the criteria of the FCAA, and does not constitute sufficient progress toward bringing the DFW area into compliance with the new proposed standard currently being considered by the EPA. Representative Lon Burnam commented that this plan is inadequate and illegal and the TCEQ is not doing its job to clean the air. The Lone Star Chapter of the Sierra Club commented that the DFW AD SIP revision is inadequate and contained no changes. The Sierra Club and Downwinders urged the TCEQ to take the necessary steps to bring the area into attainment as expeditiously as practicable. 56 individuals commented that the plan is inadequate.

Public Citizen commented that this area has never complied with nor met the goals of the SIP. Downwinders and 52 individuals noted that previous ozone deadlines have not been met and recommended that the EPA reject the plan and take other actions as necessary. Public Citizen also commented that the TCEQ is not doing its job to reduce air pollution to a safe level. The Sierra Club, Downwinders, and one individual commented that given the State's history of

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1 IHS Global Insight (USA), Inc. (2010). *U.S. Metro Economies: GMP and Employment 2013-2015*. Prepared for The United States Conference of Mayors and The Council on Metro Economies and the New American City.

2 DRI-WEFA, Inc. (2001). *U.S. Metro Economies: The Engines of America's Growth*. Prepared for The United States Conference of Mayors.

attainment failure and the propensity for failure with this DFW AD SIP revision, the final numbers do not reflect any margin of error.

The Greater Fort Worth Sierra Club, the SEED Coalition, and two individuals commented that the 75 ppb ozone standard will not protect public health. The Health and Wellness Alliance commented that the current 75 ppb goal by 2018 is insufficient due to current scientific evidence in support of a lower standard. The SEED Coalition asserted that the standard should be 60 ppb and the Greater Fort Worth Sierra Club and one individual noted that this plan should aim to achieve at least 65 ppb to better protect human health. The Health and Wellness Alliance, Downwinders, and 52 individuals commented that this plan should aim at achieving ozone levels closer to 70 ppb in anticipation of the lower standard. One individual requested a clean air plan that will work and one individual requested a plan that will encourage lower future ozone levels.

Sections 108 and 109 of the FCAA govern the establishment, review, and revision, as appropriate, of the NAAQS. The FCAA requires the EPA to periodically review the NAAQS to determine whether or not existing standards are adequate to protect public health and welfare. The TCEQ has no authority under the FCAA concerning the evaluation and/or setting of the NAAQS. Comments regarding NAAQS levels are beyond the scope of this DFW AD SIP revision.

On December 17, 2014, the EPA proposed to lower the 2008 eight-hour ozone NAAQS. However, the purpose of this DFW AD SIP revision is to demonstrate attainment of the 2008 eight-hour ozone NAAQS, in accordance with FCAA requirements. The 2008 eight-hour ozone NAAQS is set at 75 ppb and states are required to submit plans to the EPA addressing attainment of the current standard. If the EPA lowers the current eight-hour ozone standard and the DFW area is designated nonattainment for the revised standard, the TCEQ will develop a SIP revision to address attainment of the revised standard for the DFW area.

Since the early 1990s, when the DFW area was designated nonattainment for the one-hour ozone standard, much has been done to bring the area into attainment with federal air quality standards. By 2006, ambient monitoring data reflected attainment of the one-hour ozone standard, which was acknowledged by the EPA on October 16, 2008, when the EPA published its final determination that the DFW area had attained the one-hour ozone standard, based on verified 2004 through 2006 monitoring data and was further supported by 2007 through 2008 monitoring data. The DFW area did not attain the 1997 eight-hour ozone standard by its original attainment date, June 15, 2010 by a narrow margin (2 ppb). However, the DFW area is now monitoring attainment of the 1997 eight-hour ozone standard, since its 2014 design value is 81 ppb. No changes were made in response to these comments.

<u>Comments Concerning the TCEQ</u>

One individual commented that the public pays taxes, elects officials, sends letters, and appears at hearings, all to stop polluters and requested that the TCEQ do its job. One individual commented that the public deserves and expects better protection of human health and the environment and one individual commented that the TCEQ should make decisions based on

environmental quality. One individual commented that the public deserved and expected better from environmental agencies.

An individual commented the public is "doomed to suffer" if its air is left to the TCEQ since those making money from dirty air seem to have bought everyone that has the power to do something to clean up the air, and that no TCEQ board member was present at the public hearing.

The TCEQ disagrees with these comments. The DFW area has seen considerable improvement in air quality since the time of the area's initial nonattainment designation under the one-hour ozone standard. In 2008, the EPA issued a determination that the DFW four-county one-hour ozone nonattainment area had attained the one-hour NAAQS based on certified 2004 through 2006 monitoring data and was further supported by 2007 through 2008 monitoring data. In addition, the eight-hour ozone design values in the DFW area have been trending downward since 2000 and the area is now monitoring attainment of the 1997 eight-hour NAAQS based on certified 2012 through 2014 monitoring data with a design value of 81 ppb.

The TCEQ does not agree that it has failed in carrying out its duties. The TCEQ takes its responsibilities to Texas citizens very seriously and endeavors to protect the public interest in every action it takes, including those intended to reduce air pollution. The TCEQ strives to protect Texas' human and natural resources, including those in the DFW area, consistent with sustainable economic development, as required by state and federal laws. The TCEQ is committed to working with area stakeholders to attain the 2008 eight-hour ozone standard as expeditiously as practicable in accordance with EPA rules and guidance and the FCAA. No changes were made in response to these comments.

The League of Women Voters of Dallas commented that the commission has the power to set and enforce standards stricter than those required by the federal government, and that the Texas Legislature should make funding available to enable the TCEQ to research, plan, and enforce regulations necessary to protect the public's health and the environment. The League of Women Voters also commented that it supports legislation to allow local and regional governments to set and enforce standards stricter than those of the state and encourages citizen involvement in rulemaking and enforcement.

Comments regarding legislative support for local and regional governments or legislative funding priorities are outside the scope of the commission's authority. The commission notes that the legislature appropriates significant funding to the TCEQ to research, plan, and enforce regulations necessary to protect public health and welfare. Under state law, neither the commissioners nor TCEQ staff may lobby the legislature for any particular purpose or program, and may only provide information to fulfill legislative mandates or to assist members of the legislature in legislative development or other duties. Additionally, the commission, through this DFW AD SIP revision and corresponding regulations, has provided its analysis of the control strategies appropriate to protect public health and welfare in regard to the ozone NAAQS for the DFW area. No changes were made in response to these comments.

CONTROL STRATEGY COMMENTS

The City of Mesquite supported the continued addition of *Appendix H: Local Initiatives submitted by the North Central Texas Council of Governments* as part of the DFW AD SIP revision targeted at reducing ozone-forming emissions in the region.

The TCEQ appreciates the support and is committed to working with local entities and interested parties to keep them updated on SIP developments and informed about technical issues related to air quality. No changes were made in response to this comment.

The EPA commented to the TCEQ that the EPA appreciates the list of local initiatives completed by the North Central Texas Council of Governments (NCTCOG) and requested a list of the local initiatives that will be completed by March 1, 2017 be included.

The NCTCOG has already begun to address development of a list of local initiatives that will be completed by March 1, 2017. The list reflecting a 2017 attainment year will be submitted to the TCEQ for the development of a future DFW AD SIP revision for the DFW 2008 eight-hour ozone nonattainment area. No changes were made in response to this comment.

The EPA commented that the contingency plan should be revised to reflect the 2017 attainment year.

The contingency plan in Chapter 4: *Control Strategies and Required Elements*, Section 4.9: *Contingency Plan* of this DFW AD SIP revision was revised to reflect the 2017 attainment year. The required emissions reductions for contingency are now for 2018 instead of 2019, and all contingency requirements continue to be met.

The EPA commented that because the contingency plan relies on on-road fleet turnover to achieve the necessary emissions reductions, the TCEQ should include a Motor Vehicle Emissions Budget (MVEB) for the contingency year as required by the proposed Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements Rule (78 FR 34178).

The requirement of an MVEB for the contingency year if on-road fleet turnover emissions reductions are relied upon was not included in the final Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements Rule (2008 ozone standard SIP requirements rule) published on March 6, 2015 (80 FR 12264). No changes were made in response to this comment.

The Sierra Club and Downwinders commented that the contingency measures detailed in the DFW AD SIP revision, primarily state mobile source measures and emissions reductions achieved through incentive programs, fail to meet the criteria for enforceability and are therefore not creditable as emissions reductions for contingency purposes. The commenters further claimed that the mobile source control measures included as contingency measures are not included in the DFW AD SIP revision, and are not enforceable by the EPA or through independent citizen action.

The TCEQ disagrees with this comment. The contingency measures for both the reasonable further progress (RFP) and AD SIP revisions are the Federal Motor Vehicle Control Program, the state inspection and maintenance program, the East Texas Low Reid Vapor Pressure Gasoline Program, the Texas Low Emission Diesel Program, federal non-road mobile new vehicle certification standards, non-road federal reformulated gasoline, and the non-road Texas Low Emission Diesel Program.

All of these programs are enforceable, quantifiable, permanent, and surplus. The reductions from these controls are creditable toward RFP and contingency requirements per the EPA's final 2008 ozone standard SIP requirements rule. Voluntary or incentive-based programs are not used as contingency measures for either RFP milestone years or the attainment year. No changes were made in response to this comment.

The Sierra Club and Downwinders commented that Texas consumers and taxpayers bear the cost of NO_X emissions reductions and that it would be more equitable to require selective catalytic reduction (SCR) on coal-fired electric generating units (EGU) and cement kilns. The commenters point to the Diesel Emissions Reduction Incentive (DERI) and Texas Clean Fleet programs as examples of control measures that the TCEQ could use that are reasonable even though the costs of these programs relative to the emissions reductions achieved is much greater than that of "reasonably available control technology," like SCR.

The DERI and Texas Clean Fleet are legislatively established and funded programs that are administered by the TCEQ. While the TCEQ believes that incentive programs such as these provide beneficial emissions reductions in the DFW area and other areas in the state, the agency makes no claim that these programs meet the criteria for either RACT or RACM. As such, these programs are described in Chapter 5: *Weight of Evidence* along with other existing measures for which emission reductions are not included in the future case modeling results, but are nevertheless expected to achieve emissions reductions.

The TCEQ did evaluate SCR on both EGUs and cement kilns in the RACM analysis for this DFW AD SIP revision. As detailed in Appendix G: *Reasonably Available Control Measures Analysis*, based on the information currently available, the TCEQ does not consider SCR systems on Portland cement kilns to be adequately demonstrated with regard to technological or economic feasibility and, therefore, it is not RACM for the existing Ellis County cement kilns. The TCEQ also researched SCR for EGUs outside the nonattainment area, and found that there are substantial costs associated with this control measure, insufficient time available to implement controls, and limited ozone reduction benefit to the DFW area. Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of this DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. Therefore, the TCEQ has determined that imposing additional controls on these attainment county EGUs is not justified. No changes were made in response to this comment.

Texas Emissions Reduction Plan (TERP)

One individual expressed concern that the TERP was not included as a measurable emissions reduction program in the DFW AD SIP revision. The individual commented that citizens work hard and are paying for the TERP and that the program has now spent a half billion dollars and reduced emissions by 22 tons per day (tpd).

The TCEQ appreciates the support given to the TERP incentive programs and agrees that substantial effort and money has gone into making the TERP successful in achieving reductions in NO_X emissions. The TCEQ understands the desire to include the TERP as a control measure that can be considered in the emissions modeling. The TCEQ considers TERP an important component in the WoE of this DFW AD SIP revision demonstrating that the DFW ozone nonattainment area is expected to attain the standard on or before 2018. No changes were made in response to these comments.

An individual commented that the State of Texas doesn't encourage the use of electric cars and has not set up enough electric charging stations around the metroplex. The commenter further stated that private companies, including NRG Energy, Inc. (NRG), are doing a good job setting up charging stations.

The TCEQ does not agree with the conclusion that the state is not encouraging the use of electric cars. Under the TERP Alternative Fueling Facilities Program (AFFP), the TCEQ recently awarded $318,958 for electric charging stations in two locations in Harris County and three locations in the DFW area. An additional $577,205 was awarded to a project for a facility providing both compressed natural gas and electric charging in Brazoria County.

In addition, the commission encourages the use of electric vehicles through the Light-Duty Motor Vehicle Purchase or Lease Incentive Program. Through February 9, 2015, the TCEQ provided $2,233,750 in rebates for the purchase or lease of 1,019 electric-drive cars. No changes were made in response to these comments.

Stationary Sources

East Texas Electric Generating Units (EGU)

The Dallas County Medical Society and the Texas Medical Society commented that the commission should require three East Texas coal-fired power plants to either install and operate SCR or convert to natural gas to reduce NO_X emissions and meet current EPA standards to protect their North Texas patients, as previously suggested in their August 2013 petition for rulemaking. The commission denied the petition in October 2013 because the concerns of the petition would be addressed during the upcoming SIP process. The Dallas County Medical Society and the Texas Medical Society commented that the denial of the petition could be viewed as a “delay tactic” since the proposed DFW AD SIP revision did not address their expressed concerns and contained no measures to reduce NO_X emissions from the three plants. The Dallas County Medical Society and the Texas Medical Society further commented that SCR technology is cost effective and feasible for application in these plants.

As indicated in the commission's October 2013 denial of the Dallas County Medical Society petition for rulemaking, the commission did evaluate in this DFW AD SIP revision sources of NO_X emissions located in the DFW area and the potential necessity for emissions reductions to attain the 2008 eight-hour ozone NAAQS as part of this DFW AD SIP revision. As part of the RACM analysis conducted for this DFW AD SIP revision, the commission considered the potential impact of increasing the stringency of the existing East and Central Texas EGU rules. The commission has previously implemented controls in attainment counties in East and Central Texas to address NO_X emissions and ozone transport from EGUs, including the three East Texas coal-fired power plants that were the subject of the Dallas County Medical Society petition. The total capital costs of achieving SCR control on the eight affected units are estimated to be $1,878,585,000.

Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. Given the substantial costs associated with this control measure, the insufficient time available to implement controls in time to advance attainment, the limited ozone reduction benefit to the DFW area from these sources outside the DFW area, and the current modeling results indicating that the DFW area will demonstrate attainment, the TCEQ has determined that imposing additional controls on these attainment county EGUs is not justified at this time. This decision reflects the data gathered during the year between the denial of the Dallas County Medical Society and Texas Medical Society petition and the proposal of this DFW AD SIP revision. Additionally, as discussed in this DFW AD SIP revision, the 76 ppb future design value for the Denton Airport South monitor is based on the "all days" attainment test recommended by the EPA modeling guidance from April 2007. Application of the "top 10 days" attainment test recommended by the draft EPA modeling guidance from December 2014 results in a 2018 future design value of 75 ppb at the Denton Airport South monitor, with the values for all other monitors ranging from 62-74 ppb, demonstrating attainment of the ozone standard.

Also, as discussed elsewhere in this response to comments regarding the June 2006 Environ study on East Texas EGU controls, the impact of the suggested NO_X controls on East Texas EGUs is not expected to have a substantive impact on Denton Airport South monitor in the DFW area.

At the time of the petition request, the TCEQ did not have final modeling for the projected 2018 design value. The commission's action in denying the petition did delay the decision regarding potential further control of the referenced power plants until sufficient data was available to assess if such controls were necessary to demonstrate attainment. Considering the SIP modeling and the RACM analysis, the commission has determined that the controls requested in the Dallas County Medical Society and Texas Medical Society petition are not necessary to demonstrate attainment of the 2008 eight-hour ozone NAAQS by the 2018 attainment deadline. No changes were made in response to this comment.

The SEED Coalition commented that coal-fired power plants in East Texas should have installed SCR 20 to 30 years ago to control emissions. In addition, the SEED Coalition, Downwinders, and 52 individuals commented that SCR technology is in place in other parts of the U.S. and in other parts of the world. Downwinders and 52 individuals further commented that SCR should be required for East Texas coal plants that impact DFW air quality to reduce smog pollution.

As discussed elsewhere in this response to comments, as part of the RACM analysis conducted for this DFW AD SIP revision, the TCEQ evaluated sources of NO_X emissions located in and around the DFW area and the potential necessity for emissions reductions to attain the 2008 eight-hour ozone NAAQS. The TCEQ considered the potential impact of increasing the stringency of the existing East and Central Texas EGU rules. In the past, the commission adopted controls in attainment counties in East and Central Texas to address ozone transport from coal-fired power plants and other sources of NO_X emissions as a result of modeling indicating NO_X emission reductions being needed to demonstrate attainment of the NAAQS. Although these previous rules did not specifically require an SCR level of control for these units, they were controlled appropriately in accord with federal and state laws.

Although SCR is technologically feasible and is used on some coal-fired power plants in Texas and in other parts of the U.S. and world, this alone does not qualify SCR-level control on East Texas coal-fired power plants as RACM for this attainment demonstration. As discussed elsewhere in this response to comments and in Appendix G of this DFW AD SIP revision, RACM is evaluated based on multiple criteria. Furthermore, although the EPA allows states the option to consider control measures outside the ozone nonattainment area that can be shown to advance attainment, such as the requirements adopted for East Texas EGUs, states are not required to exercise this option under the FCAA. Despite this, the TCEQ did consider additional NO_X controls on East Texas EGUs in the RACM analysis. Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. Given the substantial costs associated with this control measure, the insufficient time available to implement controls in time to advance attainment, the limited ozone reduction benefit to the DFW area from these sources outside the DFW area, and the current modeling results indicating that the DFW area will demonstrate attainment, the commission determined that imposing additional controls on these attainment county EGUs is not justified at this time and is not RACM. Additionally, as discussed elsewhere in this response to comments regarding the June 2006 Environ study on East Texas EGU controls, the impact of the suggested NO_X controls on East Texas EGUs is not expected to have a substantive impact on Denton Airport South monitor in the DFW area.

The TCEQ appreciates stakeholder technical input relating to control strategy development and may be able to use valid information for future air quality planning purposes. No changes were made in response to these comments.

The Sierra Club and Downwinders commented that East Texas coal-fired power plants are the largest sources of NO_X outside the DFW area, significantly contributing to the DFW area's continued nonattainment of the ozone NAAQS. Both also commented that at least 47% of the U.S. active coal-fired EGUs larger than 150 megawatts (MW) are equipped with SCR. The commenters indicated that well-maintained SCR systems regularly ensure NO_X emission reductions of at least 90%, resulting in emission limits of 0.05 pounds per million British thermal units (lb/MMBtu) or lower, such that a limit of 0.07 lb/MMBtu is consistently available on 30-day averages. The commenters also indicated that coal-fired power plant boilers in Texas equipped with SCR historically have achieved 30-day periods with average NO_X emission rates lower than 0.08 lb/MMBtu, as assumed by the source-apportioned modeling conducted by Environ in June 2006.

The Sierra Club and Downwinders further stated that the commission must reevaluate SCR as RACM for coal-fired EGUs outside the DFW nonattainment area even if the commission is not legally obligated to consider RACM for sources outside the nonattainment area. The commenters stated that a RACM determination of no higher than 0.07 lb/MMBtu for coal-fired power plant boilers in Texas was well-supported by actual historical operating experience, thus showing emission limits with SCR operation were both technologically and economically feasible. Downwinders and 52 individuals commented that for coal-fired power plants, SCR is commercially available technology. Downwinders and 40 individuals commented that SCR is readily available and that studies have shown this technology could cut ozone levels in the DFW area significantly.

The Sierra Club and Downwinders commented that the commission's failure to conduct a proper case-by-case analysis of SCR control on East Texas EGUs resulted in an under-estimation of emissions reductions and an over-estimation of the costs associated with SCR. The commenters asserted that such a case-by-case analysis of these sources would show SCR is RACM for East Texas coal-fired EGUs. Public Citizen commented that on a dollar-per-dollar basis, not only was reducing air pollution from power plants cheap compared to other control strategies, but also that SCR was a cost-affordable way to make significant reductions from power plants.

The Sierra Club and Downwinders indicated that, just as the EPA indicated in the Cross-State Air Pollution Rule that 24 to 30 months was sufficient time for affected sources to install SCR, two years is a sufficient amount of time for East Texas EGUs to implement and operate SCR.

For a state's RACM analysis, the EPA allows states the option to consider control measures outside the ozone nonattainment area that can be shown to advance attainment; however, the state does not have to exercise this option under the FCAA. Accordingly, and consistent with the EPA's technical RACM guidance, the commission researched the potential impact of increasing the stringency of the existing East and Central Texas EGU rules and East Texas combustion rules for sources of NO_X located outside the DFW nonattainment area.

To assess both the technical and economic feasibility of SCR control technology to further reduce NO_X emissions from East Texas coal-fired power plants, the

commission considered information from various sources. The commission evaluated EGU emissions and process rate data for reporting year 2012 from the EPA's Air Markets Program Database. The commission also evaluated available literature cost data for SCR control on coal-fired power plants from Sargent and Lundy and the Edison Electric Institute. Cost information was based on either 2008 or 2009 U.S. dollars.

However, at this time, the TCEQ disagrees with the commenters' assertions that the suggested control strategies for EGUs should be included in this DFW AD SIP revision. The commission determined that imposing additional controls, such as SCR, on EGUs in East Texas attainment counties is not justified at this time. The commission based this decision on the limited ozone reduction benefit to the DFW area from these sources outside the DFW area, the substantial costs associated with this control measure, the insufficient time available to implement SCR before the attainment date, and because the current modeling results indicate that the DFW area will demonstrate attainment. Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. Additionally, as discussed elsewhere in this response to comment regarding the June 2006 Environ study on East Texas EGU controls, the impact of the suggested NO_X controls on East Texas EGUs is not expected to have a substantive impact on Denton Airport South monitor in the DFW area.

The TCEQ has previously implemented controls in attainment counties in East and Central Texas to address NO_X emissions and ozone transport from stationary sources outside the DFW area, including East Texas coal-fired power plants at a time when these measures were determined to meet RACM criteria. These measures were included as part of the DFW AD SIP revision for the 1997 eight-hour ozone NAAQS adopted in April 2000 (Project No. 1999-055-SIP-AI).

The TCEQ notes that Texas Health and Safety Code, §382.017, prohibits the commission from adopting rules that require specific types of control equipment or manufacturing processes unless required by federal law or regulation. No changes were made in response to these comments.

The Sierra Club, Downwinders, and one individual commented that before dismissing SCR on coal-fired EGUs, the commission should have quantified the ozone improvements for the DFW area and compared the cost of SCR versus the cost of implementation of more stringent federal programs borne by the public.

The cost associated with the implementation of federal programs is beyond the scope of this DFW AD SIP revision and was not considered during the commission's concurrent rulemakings. The TCEQ did not identify any coal-fired EGUs within the DFW nonattainment area in the 2012 Point Source Emissions Inventory. Because these sources are located outside of the DFW nonattainment area, the ozone impact in the DFW area of these potential NO_X reductions is not expected to be sufficient to advance attainment of the 2008 eight-hour ozone

NAAQS, based on the photochemical modeling analysis documented in this DFW AD SIP revision. No changes were made in response to this comment.

Cement Kilns

The EPA, Downwinders, the SEED Coalition, the Greater Fort Worth Sierra Club, the Lone Star Sierra Club, the national Sierra Club, and 52 individuals requested that the DFW AD SIP revision include a RACM requirement for lower NO_X limits on cement kilns through use of SCR control technology. The EPA described the commission's estimated 4.6 tpd of NO_X reductions achieved from lowering the cement kiln source cap as a significant reduction and requested evidence of modeling or analyses conducted that led to the decision to not implement it as a RACM strategy.

The EPA, Downwinders, the SEED Coalition, the Greater Fort Worth Sierra Club, the Lone Star Sierra Club, the national Sierra Club, and 52 individuals argued that SCR systems are technologically feasible for cement kilns. Downwinders, the SEED Coalition, the Greater Fort Worth Sierra Club, the Lone Star Sierra Club, the national Sierra Club and 52 individuals noted that there are six operating SCR installations on cement kilns in Europe, one in the U.S., and a proposed permit to install SCR technology on one of the Holcim kilns in Ellis County. Downwinders and the Sierra Club commented that published reports of European kilns demonstrated an 80% to 90% NO_X reduction and 75% to 99% reduction of VOC emissions.

The EPA, Downwinders, the SEED Coalition, the Greater Fort Worth Sierra Club, the Lone Star Sierra Club, the national Sierra Club, and 52 individuals stated that the 2006 TCEQ Cement Kiln Study final report (Contract No. 582-04-65589) concluded that SCR technology was "commercially available." Downwinders and Sierra Club commented that recent SCR installations had solved the operational problems noted in the Cement Kiln Study and listed in the proposed RACM analysis, including catalyst poisoning and plugging due to high levels of dust, operating at the proper temperature, and problems due to sulfur compound formation.

The EPA, Downwinders, the SEED Coalition, the Greater Fort Worth Sierra Club, the Lone Star Sierra Club, the national Sierra Club, and 52 individuals stated that SCR systems are economically feasible for cement kilns because the Cement Kiln Study indicated that SCR systems on Ellis County kilns would have costs that are less than NO_X reduction costs for strategies used by the commission and other state environmental regulatory agencies for SIP purposes.

The EPA, Downwinders, the SEED Coalition, the Greater Fort Worth Sierra Club, the Lone Star Sierra Club, the national Sierra Club, and 52 individuals stated that the commission must evaluate SCR operational experience from all cement kilns and that based on the existing and planned installations, SCR is a proven effective and reasonably available technology. Downwinders and the Sierra Club asserted that two years is a sufficient amount of time to install SCR systems on cement kilns and such systems could be operational by summer 2017.

The TCEQ disagrees that the suggested control strategies need to be included in this DFW AD SIP revision. Based on the EPA's most currently accepted RACM guidance, the TCEQ evaluated the existing cement kilns in the DFW area and concluded that implementing RACM for this emission source category is not justified at this time. There are technological and economic feasibility issues

associated with the commenters' suggested SCR technology, as discussed in Appendix G of this DFW AD SIP revision.

Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. The modeling includes the current cement kiln source cap amount of 17.6 tpd of NO_X. No changes were made in response to these comments.

Energy Efficiency

The Lone Star Sierra Club and Public Citizen requested that the DFW AD SIP revision include energy efficiency due to enforced building codes, utility energy efficiency, and solar power, as enforceable emission reduction commitments.

The TCEQ supports energy efficiency and renewable energy programs and recognizes the air quality benefits of these programs. The Texas legislature has implemented many energy efficiency and renewable energy programs, including mandates for installation of new capacity of wind and other renewable energy generation. Texas is a leader in energy efficiency programs and especially in renewable energy such as wind energy. Installation of new wind generation facilities has greatly exceeded the milestones mandated by the legislature.

The TCEQ is aware of the EPA's updated guidance document for incorporating energy efficiency and renewable energy measures in the SIP. TCEQ staff has reviewed the draft guidance document entitled *Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State Implementation Plans/Tribal Implementation Plans*, (EPA-456/D-12-001a), and provided comments to the EPA. The TCEQ's current policy is to acknowledge the benefits of energy efficiency, renewable energy, and similar measures as WoE in SIP revisions.

In previous SIP revisions, the TCEQ has claimed specific SIP credit reductions for legislatively-mandated energy efficiency measures. Associating a specific amount of emissions reductions for ozone nonattainment areas from energy efficiency or renewable energy as SIP creditable reductions raises technical and legal issues considering the EPA's requirements for claiming such SIP credit. As outlined in the EPA's 2012 guidance[3], any SIP creditable emission reductions claimed for energy efficiency or renewable energy must meet the four standard criteria: enforceable, quantifiable, permanent, and surplus. Ensuring that SIP creditable reductions within a specific nonattainment area resulting from energy efficiency and renewable energy are permanent and surplus can be particularly problematic. The TCEQ relies on projections from the Electric Reliability Council of Texas (ERCOT) to model future expected operation of electrical generating utilities. Energy efficiency and renewable energy are accounted for in the SIP modeling to

[3] Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State Implementation Plans/Tribal Implementation Plans (http://epa.gov/airquality/eere/pdfs/EEREmanual.pdf)

the extent that these measures are accounted for in ERCOT's projections. If the TCEQ claimed additional reductions, this could result in double counting potential reductions. Furthermore, whether the emission reductions from energy efficiency and renewable energy occur at certain power plants within a specified nonattainment area is dependent on many factors in the electrical grid system. The Energy Systems Laboratory (http://www-esl.tamu.edu/terp/reports) at the Texas Engineering Experiment Station at Texas A&M University System uses the EPA's eGRID model to predict where emission reductions from energy efficiency and renewable energy programs, such as wind generation, will occur. However, electrical grid operations are subject to changes, such as shifts in transmission and distribution as well as units coming out of mothballed status to meet a reliability need. If changes in the electric grid system resulted in a shift in projected emission reductions outside of a nonattainment area that were relied upon as SIP creditable reductions, the state would face a shortfall in the SIP. The TCEQ does not dispute that energy efficiency and renewable energy programs work, or that such programs provide emissions reductions and air quality benefits. The TCEQ's concern is in being able to reliably predict for the future where those benefits will be realized to a degree that the commission can satisfy all of the EPA's criteria for SIP creditable reductions.

Based on current EPA guidance for claiming SIP credit for energy efficiency and renewable energy measures, the TCEQ considers the WoE discussion to be the most appropriate way at this time to acknowledge the benefits of energy efficiency and renewable energy measures in the DFW AD SIP revision. The commission may reconsider the current policy regarding how energy efficiency and renewable energy measures are accounted for in the SIP in future SIP development. Additional discussion regarding the various energy efficiency and renewable energy programs in Texas is included in Chapter 5, Section 5.4: *Qualitative Corroborative Analysis* of this DFW AD SIP revision. No changes were made in response to this comment.

Solar Energy

DFW Regional Concerned Citizens and three individuals commented that solar power was available, desired by the public, and would reduce NO_X emissions from fossil fuel-fired electricity generation. These commenters asserted that solar energy could provide a significant amount of cost-effective energy for transportation, residential, and commercial uses, especially for oil and gas production and transmission sites. The commenters requested that the commission be a leader in supporting solar energy, including recommending legislation to increase use of solar power in Texas. An individual also commented that the TCEQ should make a recommendation to the legislature to remove all restrictions against solar power.

Under state law, neither commissioners nor TCEQ staff may lobby the legislature for any particular purpose or program. The commission supports renewable energy generation and recognizes that it is and will continue to be an important part of the electricity generation profile in Texas and will help to meet electricity demand from all sectors of society. No changes were made in response to this comment.

An individual noted the potential emissions reductions if compressor engines were required to convert to electrical power, provided that a significant fraction used solar-powered electricity.

Based upon available information, compressor engines and other large electric motors require three-phase alternating current as a power source. Solar panels typically generate direct current and require specialized equipment to convert direct current to three-phase alternating current. Due in part to this and other limitations, current commercial solar power applications appear to be limited to powering small motors, which would typically not meet the requirements for compressing natural gas. **No changes were made in response to this comment.**

Compressor Electrification

Downwinders, Public Citizen, DFW Regional Concerned Citizens, and 52 individuals requested a requirement that compressors pressurizing natural gas be driven by electric motors, not fossil fuel-fired engines. One individual also suggested a requirement that all hydrocarbon drilling rigs be driven by electric motors rather than diesel fuel-fired engines. The commenters contended that the commission's decision not to require electrification of natural gas-fired compressors as a RACM strategy was not based on available studies or other supporting information.

Downwinders and the Sierra Club commented that electric motors driving natural gas compressors are both technologically and economically feasible; are required or encouraged by multiple Texas municipalities; and have higher reliability. The commenters further stated that this control strategy leads to greater operational efficiency; emits no NO_X; requires less extensive permitting; and has lower maintenance costs. Based on this economic and technological feasibility, the commenters requested a RACT or RACM strategy to reduce 90% of the NO_X emissions from compressor drivers on natural gas pipelines in the DFW area by either controlling natural gas-fired engines or by changing the engines to electric motors. The commenters suggested that the strategy emulate the ground support equipment electrification strategy implemented in the DFW area.

Downwinders and the Sierra Club commented that the commission's RACM analysis for compressor drivers was insufficient on four grounds. First, the commenters disagreed with the commission's reasoning that an engine replacement strategy could not be implemented because it would require a particular method to control or abate air pollution. The commenters stated that the commission previously justified adoption of emission standards for engines in the Houston-Galveston-Brazoria (HGB) ozone nonattainment area by assuming electrification of some large existing engines to achieve an 80% NO_X reduction across the compressor fleet. Second, the commenters indicated that the commission did not tally the number of compressors that would require electric service upgrades, or the extent of each upgrade. Third, the commenters indicated that the commission's analysis of increased electricity demand and associated NO_X emissions was insufficient, including the potential for expected future generation or increased future renewable energy to meet the demand. Lastly, the commenters stated that the commission did not provide an estimate of the total cost of engine electrification or a justification explaining why the commission considered the cost per ton of NO_X reduced to be prohibitively large.

The commission disagrees that the suggested control strategies should be included in this DFW AD SIP revision. During the planning phase of this DFW AD SIP revision, TCEQ staff evaluated the use of electric motors to drive natural gas compressors. TCEQ staff concluded that the potential RACM strategy is

economically infeasible and cannot be implemented by the compliance deadline. Additionally, modeling results based on the April 2007 EPA modeling guidance, which includes compressor engine and drilling rig NO_X emissions, project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. No additional NO_X controls are necessary at this time.

Commenters suggested a requirement for either total use of electric motors, or a 90% NO_X reduction from replacement of most of the engines with electric motors. According to Texas Health and Safety Code, §382.017(f)(3), unless required by federal law or regulation, the commission may not specify the type, design, method of installation, or type of construction of a manufacturing process or other kind of equipment. Therefore, the commission cannot require complete electrification of compressors or drilling rigs as the commenters suggest because that would be specifying the equipment type or design.

The commission acknowledges that it has previously adopted regulations in the DFW area to reduce NO_X by 90% from ground support equipment at certain airports and also to reduce NO_X by 80% from compressor engines in the HGB area and that both rules assumed partial electrification in combination with add-on controls and modifications of existing engines. However, both of these rules were adopted as RACM and designed to provide NO_X reductions needed to demonstrate attainment of the one-hour ozone NAAQS. The ground support equipment rules have since been repealed and replaced with individual agreements.

The TCEQ is aware of several electric motor-driven drilling rigs and large compressors in the DFW area and recognizes that powering compressors and drilling rigs with electric motors supplied by grid electricity is technologically feasible. The TCEQ acknowledges that this mode of operation results in greater system efficiency and lower overall NOX emissions. However, published articles indicate logistical concerns with this strategy, as described in Appendix G, Section 4.2.2: *Engines*, of this DFW AD SIP revision. Concerns include: the need for additional equipment beyond the electric motor at the compressor station, potential electric service upgrades, and potential replacement of the compressor, all of which need to be considered in addition to the cost of the electric motor itself. Published information also indicates that delivery time for necessary equipment and time required to install additional equipment at all affected sites renders a strategy of complete replacement unreasonable to accomplish by the regulatory deadline. The TCEQ is commencing an area source emissions inventory improvement study to quantify current use of electric-powered compressor engines.

In the past, when the TCEQ has provided fiscal analysis of proposed emission reduction strategies, staff used data from EPA alternative control techniques (ACT) documents to estimate costs of engine modifications and controls and data submitted to the commission for a property tax abatement request. For this analysis, TCEQ staff used these data sources, EPA Natural Gas Star information,

and electric motor and driver supplier cost data to conclude that the cost of this strategy was not justified at this time. Because this strategy is not considered RACM at this time, TCEQ staff did not include all calculated cost information or calculated NO_X reductions and offsetting electric generator NO_X emissions increases in the DFW AD SIP revision proposal.

The EPA has previously approved the commission's 30 TAC Chapter 117 rules addressing RACT for engines and the commission contends that these rules continue to satisfy RACT for this source category. The only amendments to these rules required as part of this DFW AD SIP revision are to include RACT emission specifications for major source engines in Wise County (Rule Project Number 2013-049-117-AI). No changes were made in response to these comments.

Engines

The EPA commented that previous NO_X control requirements for natural gas-fired compressor engines in the DFW nine-county 1997 eight-hour ozone nonattainment area and in East Texas counties relied on non-selective catalytic reduction catalytic convertors. The EPA commented that these catalytic convertors typically require periodic changes of catalysts to maintain NO_X control levels. The EPA questioned whether Texas performed any follow-up on the affected sources to confirm that proper maintenance occurred to ensure NO_X controls still met the applicable NO_X requirements.

To date, while the TCEQ has not initiated a targeted review of affected sources to confirm whether proper maintenance is occurring to ensure that NOx controls still meet the NOx control requirements, like the EPA, the TCEQ conducts investigation activities of affected sources where the required maintenance would be one of the issues that is reviewed and determines if an enforcement action is warranted. Source owners or operators of affected units subject to the DFW industrial rules are required to conduct testing every two years or within 15,000 hours of engine operation after the previous emission test and perform quarterly emission checks to ensure continued compliance with the NO_X emission specifications. Affected source owners and operators are also required to report in writing to the TCEQ executive director on a semiannual basis any excess emissions and the air-fuel ratio monitoring system performance. This includes the quarterly emission checks; the biennial emission testing required for demonstration of emissions compliance; and the specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the engine or emission control system, the nature and cause of any malfunction (if known), and the corrective action taken or preventative measures adopted. Owners and operators are also required to maintain records on-site for a period of at least five years.

Source owners or operators of affected units subject to the East Texas Combustion rules are required to conduct testing every two years or within 15,000 hours of engine operation after the previous emission test and perform quarterly emission checks to ensure continued compliance with the NO_X emission specifications. Owners and operators are also required to maintain records on-site for a period of at least five years. These records also include information relating to the catalytic converter, air-fuel ratio controller, or other emissions-related control system maintenance, including the date and nature of corrective actions taken. The

commission considers the current quarterly emissions checks, periodic testing, recordkeeping, and reporting requirements for engines subject to the Chapter 117 requirements to be sufficient to ensure proper operation and maintenance of catalyst controls. No changes were made in response to these comments.

Oil and Natural Gas Production

The Lone Star Sierra Club and one individual commented that the DFW AD SIP revision needed to include control measures on existing oil and natural gas production and processing equipment. Specifically, the commenters requested reduced emission completions on both natural gas and oil wells, low or non-emitting pneumatic devices on wellhead processing equipment and pipelines, compressor maintenance requirements, and improved leak detection including the use of optical gas imaging and gas sensors.

The EPA has developed new source performance standard (NSPS), 40 Code of Federal Regulations Part 60, Subpart OOOO, for natural gas wells. It requires, among other things, reduced emission completion methods, low or no-bleed pneumatic devices on wellhead processing equipment and pipelines, and periodic compressor maintenance. Subpart OOOO applies to all new natural gas wells. The EPA has indicated that it is considering adding similar controls to oil wells, but the impact to the DFW area is not expected to be significant due to the low fraction of wells targeting crude oil.

The control suggestions made by the commenters would not be RACT because the controls specified would not reduce VOC from a piece of equipment capable of emitting over the applicable VOC major source threshold in the DFW area. The EPA has also not released a control techniques guideline (CTG) or ACT document covering these pieces of equipment that would require RACT consideration.

The requested strategies are also not RACM because they would reduce VOC and photochemical modeling indicates VOC reductions will not advance attainment. No changes were made in response to this comment.

The Lone Star Sierra Club and one individual suggested that the commission adopt rules similar to the State of Colorado for oil and natural gas production, transmission, and processing, with a special emphasis on reducing venting and flaring of hydrocarbons and VOC from the largest sources, condensate tanks, and pneumatic devices.

Concurrent with this DFW AD SIP revision, the commission is adopting rulemaking (Rule Project Number 2013-048-115-AI) to update existing control requirements for VOC sources in the DFW area to implement RACT. The rule changes in Chapter 115, Subchapter B, Division 1, Storage of VOC, will implement RACT for storage tanks storing condensate with the potential to emit VOC of at least the applicable major source threshold for all counties in the DFW 2008 eight-hour ozone nonattainment area. Specifically, the rules will require proper maintenance of equipment and additional inspections of tank openings. As part of the RACT evaluation for this rulemaking, staff reviewed available information from many different sources, including the recent rule changes in Colorado and the EPA's NSPS for condensate storage tanks. The commission is amending Division 1, Storage of VOC, but declines to add controls on pneumatic devices.

There is no existing CTG that establishes presumptive RACT for pneumatic devices used in the oil and natural gas industry. In addition, the rule proposal did not include any controls for pneumatics so affected parties would not be afforded the opportunity to provide comment on potential controls. The requested strategies are also not RACM because they would reduce VOC and photochemical modeling indicates VOC reductions will not advance attainment. No changes were made in response to this comment.

The Lone Star Sierra Club and one individual requested that the DFW AD SIP revision include control requirements for all stages of flowback following fracking of natural gas and oil wells. The commenters suggested requiring closed flowback tanks that route vapors to vapor recovery units. Another individual commented that green completions should be required by rule.

The commission disagrees that green completions or associated flowback VOC emissions should be addressed in this DFW AD SIP revision. The EPA has addressed both green completions and associated flowback VOC emissions in NSPS, 40 Code of Federal Regulations (CFR) Part 60, Subpart OOOO, for natural gas wells. Since the proposal of this DFW AD SIP revision, the EPA has revised Subpart OOOO to clarify that owners or operators must control all flowback VOC by 95% during what it calls the "separation flowback stage."

The EPA evaluated closed flowback tanks with controls and found them to be infeasible during the initial flowback stage. During this stage, the material produced by the well is characterized by high volumetric flow water containing sand, fracturing fluids, and debris from the formation with very little gas being brought to the surface. During the initial flowback stage, there is insufficient volume and consistency of flow to enable recovery of the gas by separation. Therefore, there is no practical way to route the gas stream to a pressurized tank as the commenter suggested.

Once the flowback material becomes more consistent in rate and composition later in the process, the EPA requires 95% control by any means, including vapor recovery units, flares, and other devices.

Since Subpart OOOO applies to all new natural gas wells and all refractured existing natural gas wells, it covers all future flowback situations from natural gas wells in the DFW area. The EPA has indicated that it is considering adding similar controls to oil wells, but this is expected to have little impact to the DFW area due to the low fraction of new wells targeting crude oil.

No changes were made in response to this comment.

General Reasonably Available Control Technology (RACT) Demonstration and Reasonably Available Control Measure (RACM) Demonstration

The Sierra Club and Downwinders acknowledged that the state may limit RACT to existing sources in the area, but that RACM has no geographical limitations and should be applied to any source regardless of whether the source is within the designated area.

Downwinders and the Sierra Club indicated that the EPA has made clear that restrictive available control measures are required for all sources contributing to the nonattainment situation even if it requires significant sacrifice, contrary to the commission's assertion that RACT or RACM is optional for contributing sources.

The TCEQ notes that although the commenter characterizes the requirement as "restrictive" available controls, the statute actually requires "reasonably" available control technology and measures.

The TCEQ disagrees that the EPA requires every source in a nonattainment area to comply with RACT. RACT is required for major sources of VOC and NO_X emissions and emission source categories addressed in a CTG document. The TCEQ continues to rely on the most currently accepted EPA definition to fulfill its RACT obligations under the FCAA, basing its RACT determinations on analyses of "the lowest emissions limit that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility."

The EPA's 2008 ozone standard SIP requirements rule follows the EPA's existing policy with respect to area-wide average emission rates, which recognizes that states may demonstrate that the weighted average NO_X emission rate from all sources in the nonattainment area subject to RACT meets NO_X RACT requirements. In the preamble to the rule, the EPA states that, "The EPA believes that the statute, as interpreted by the court in *Natural Resources Defense Council (*NRDC) *v. EPA*, provides a state with the option of demonstrating that its program achieves RACT level reductions by showing emission reductions greater than or equal to reductions that would be achieved through a source-specific application of RACT in the nonattainment area...In sum, nothing in the CAA or in *NRDC v. EPA* requires that 'each and every source' in the area employ RACT or achieve RACT-level reductions. Consistent with previous guidance, the EPA continues to believe that RACT can be met on average by a group of sources within a nonattainment area rather than at each individual source."

Recent action taken by the EPA (80 FR 16291, March 27, 2015) to approve the state's VOC and NOx RACT regulations in Chapters 115 and 117, respectively, indicates the EPA's support of the commission's reliance upon this definition and the technical support upon which the commission based its RACT regulations.

The TCEQ also disagrees that RACM should be applied to every source, regardless of whether the source is in a nonattainment area or not. The FCAA requires RACM only for sources in nonattainment areas, under Section 172, but as discussed elsewhere in this RTC, the EPA has indicated that states may consider measures for sources outside an attainment area, as appropriate. Additionally, because RACM are control strategies that are implemented to provide for and advance attainment of the ozone NAAQS, RACM can be determined to not be necessary at all in the event no additional emissions reductions are needed, such as with this DFW AD SIP revision. The TCEQ acknowledges its obligation to make RACT and RACM determinations based on technical analyses during each AD SIP revision,

although not all analyses support adopting new controls to satisfy RACT or RACM. No changes were made in response to these comments.

The Sierra Club and Downwinders provided comment regarding the evaluation criteria and legal standards the state must rely on to complete its RACT and RACM analyses. The Sierra Club, Downwinders, Dallas County Medical Society, and 52 individuals commented that the proposed DFW AD SIP revision does not implement RACT and RACM in accordance with the FCAA requirements.

The commenters claimed that because the TCEQ's RACM analysis cannot be deemed "reasoned decision-making" it cannot be approved by the EPA. Downwinders and 52 individuals further commented that there are existing technologies that are readily available to reduce pollution in the DFW area. In addition, one individual expressed disappointment with the current air quality conditions of the DFW area and questioned why Texas doesn't take steps to make improvements.

The TCEQ conducts both RACT and RACM analyses in accordance with currently accepted EPA guidance and with FCAA requirements and disagrees that the RACM analysis is unreasonable. For this DFW AD SIP revision, the TCEQ assessed available technologies and ideas including those submitted by stakeholders. The technical assessments and the evidence supporting regulatory action taken by the commission are provided in Appendix F: *Reasonably Available Control Technology Analysis* and Appendix G of this DFW AD SIP revision. As discussed in these appendices, the TCEQ's RACT and RACM analyses consider several factors and are based on reasoned decision-making.

The EPA's guidance provides states the option to either make a demonstration that RACT is in place with existing control requirements and that additional controls are not necessary; make a negative declaration; or adopt new requirements implementing RACT for major sources of NO_X and other FCAA-specified sources of VOC, including major sources. Consistent with this guidance, the TCEQ determined that for certain NO_X and VOC emission source categories, additional regulations are needed to assure RACT is in place. These additional regulations comprise the rulemakings concurrent with this DFW AD SIP revision (Rule Project Nos. 2013-048-115-AI and 2013-049-117-AI). For all other emission source categories not addressed in these rulemakings, the current RACT regulations or negative declarations provided continue to satisfy VOC and NO_X RACT.

Although not obligated under the FCAA, the TCEQ recognizes that the EPA allows states the option to consider control measures outside the ozone nonattainment area that can be shown to advance attainment, and meet the remaining determining criteria. The EPA's interpretation of RACM in the April 16, 1992 publication of the *Federal Register*, states §172(c)(1) "imposes a duty on all nonattainment areas to consider all available control measures and to adopt and implement such measures as are reasonably available for implementation in the area." The EPA continues to support this interpretation, as evidenced in the EPA's 2008 ozone standard SIP requirements rule, that a state should consider all available measures, including those outside the nonattainment area, but that a

state must only adopt measures for an area if those measures are technologically and economically feasible and will advance attainment of the NAAQS.

Consistent with this currently accepted EPA RACM guidance, the TCEQ provides its analysis of potential control measures and its determination that there are none that met the criteria to be considered RACM, partially due to the current modeling results indicating that the DFW area will demonstrate attainment. Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. Based on these considerations, the TCEQ determined that imposing additional controls as RACM is not justified at this time. No changes were made in response to this comment.

The Sierra Club and Downwinders commented that just as in 2011, the commission's claim that RACT and RACM are unnecessary because it has modeled attainment of the NAAQS is wrong and that the commission must meaningfully evaluate RACT and RACM controls.

The TCEQ disagrees with the commenter's claim that the TCEQ did not meaningfully evaluate RACT and RACM during the 2011 DFW AD SIP revision. The 2011 SIP revision provided both the RACT and RACM analyses in Appendices F and G, respectively, as well as corresponding rulemaking implementing RACT for various CTG source categories and storage tanks (Rule Project Nos. 2010-016-115-EN and 2010-025-115-EN). The 2011 DFW AD SIP revision, however, did not include implementing RACM because the modeling showed that the DFW nonattainment area would attain the 1997 eight-hour ozone NAAQS without additional control measures. As explained elsewhere in this response to comments section, implementing RACM is not a requisite component of the SIP revision without adequate supporting justification. No changes were made in response to this comment.

The Sierra Club and Downwinders urged the commission to consider RACT or RACM for coal combustion and cement kilns. In addition, the Lone Star Sierra Club, Greater Fort Worth Sierra Club, and two individuals further commented that RACT must be developed for sources such as East Texas coal plants, industrial boilers, steel mills, cement kilns, and the Barnett shale gas facilities; the Lone Star Sierra Club and one individual suggested requiring SCR as the means of control. Additionally, the Sierra Club and Downwinders commented that SCR is RACT for cement kilns because it is technologically and economically feasible, as demonstrated through the pending Holcim permit in Midlothian and the existing cement kiln with SCR in Joppa, Illinois. One individual and the Lone Star Sierra Club referenced a technical presentation given to the NCTCOG that indicated targeted, optimized control strategies on point sources during early morning hours would significantly lower ozone formation in the afternoons.

As described in Appendix G of this DFW AD SIP revision, based on the EPA's existing RACM guidance, the commission evaluated sources of NO_X emissions located in the DFW area and the potential necessity for emissions reductions to attain the 2008 eight-hour ozone NAAQS as part of this DFW AD SIP revision. For

both coal combustion and cement kilns, the commission concluded that implementing RACM is not justified at this time.

The TCEQ disagrees with the commenters that RACT controls must be considered for coal-fired electric generating units. RACT obligations under the FCAA apply to existing sources within the nonattainment area; the commission did not identify any coal-fired electric generating units in the 2012 Point Source Emissions Inventory located within the 10-county DFW nonattainment area. The TCEQ maintains that, at this time, RACT is either proposed concurrently with this DFW AD SIP revision (Rule Project No. 2013-049-115-AI) or is currently in place for all emission source categories identified in the 2012 EI data. Because the current modeling current modeling results indicate that the DFW area will demonstrate attainment, RACM is not necessary. Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. Additional information regarding both the commission's RACT and RACM analyses are located in Appendix F and Appendix G, respectively, of this DFW AD SIP revision. Further, the commission does not agree that SCR is NOx RACT for cement kilns, nor does the pending Holcim permit, for which SCR is not being installed for NOx control, prove that SCR is NOx RACT.

The TCEQ appreciates stakeholder technical input relating to control strategy development and may be able to use valid information for future air quality planning purposes. No changes were made in response to these comments.

The SEED Coalition commented that best available control technology (BACT) and lowest achievable emission rate (LAER) standard, classifications which are more stringent than RACT, should be considered for this DFW AD SIP revision and that the associated costs are irrelevant. Another individual commented a reasonable standard is more akin to a California-level standard.

BACT and LAER are permitting requirements that apply to new sources and modified sources meeting certain criteria and are implemented in the DFW nonattainment area through the TCEQ's air permitting process. BACT and LAER fulfill different FCAA obligations for programs outside of those included in this DFW AD SIP revision. For these reasons, these standards are not contemplated as part of this plan. The FCAA requires RACT to be in place to assure that major sources of NOx emissions and FCAA-specified sources of VOC emissions, including major sources, are controlled to a reasonable extent, but not necessarily to BACT and LAER levels.

The EPA considers economic and technological feasibility when determining the lowest emission limitation a source is capable of meeting. Because economic feasibility is an integral component in determining RACT, the state must evaluate and consider fiscal impacts associated with potential control options. This information along with the technical feasibility component is relied upon to justify

the state's final RACT determination. No changes were made in response to these comments.

Solar and the TPA opposed the January 1, 2017 compliance deadline and suggested a phased-in compliance schedule to allow industry the time to develop and implement technology upgrades necessary to comply with proposed RACT standards.

An alternative compliance schedule, such as a phased-in compliance schedule suggested by the commenter, is unnecessary at this time, especially given that the affected Wise County turbines are not expected to require retrofits. The EPA's implementation rule for the 2008 eight-hour ozone NAAQS specifies the January 1, 2017 date as the compliance deadline for implementation of RACT requirements. The commission retains in the rule the compliance deadline of January 1, 2017 for affected units. No changes are made in response to this comment.

RACT Demonstration

The EPA commented that it supports the inclusion of major sources of VOC located in Wise County to become subject to the requirements in 30 TAC Chapter 115. The EPA also expressed support of the commission's clearly identified sections, which pertain to control of ammonia and carbon monoxide emissions. Ammonia and carbon monoxide emissions are not ozone precursors and are therefore not necessary components of the Texas ozone SIP. The EPA also expressed support of the commission's inclusion of major sources of NO_X located in Wise County to become subject to the requirements of Chapter 117.

The TCEQ appreciates the EPA's support. No changes were made in response to these comments.

The EPA commented that it cannot approve the proposed compliance schedule that states that, upon publishing notice in the *Texas Register*, Wise County is no longer nonattainment for the 2008 eight-hour ozone NAAQS, the rule applicability for sources in Wise County remains as it was prior to this rulemaking. The EPA indicated it cannot approve this provision because it does not contain "a replicable procedure" and to accomplish changing the applicability for sources in Wise County, the state would need to undergo rulemaking and submit a subsequent SIP revision. The EPA commented that Appendix B of the attainment demonstration analysis quantified NOx and VOC reductions from the rules proposed for sources in Wise County. The EPA stated that any SIP revision removing these proposed rules would need to include updated modeling so that emission reduction credit from these strategies would not be taken improperly.

The commission disagrees that a replicable procedure is necessary to change the applicability of RACT rules in Wise County in the event the ozone nonattainment designation for Wise County is no longer legally effective. If the ozone nonattainment designation is no longer legally effective, then there is no underlying legal basis or support for the RACT requirement to apply in Wise County. The inclusion of Wise County in the DFW ozone nonattainment area is currently in litigation, awaiting a decision from the D.C. Circuit Court. A final decision from the court that vacates the ozone nonattainment designation for Wise County would mean that the EPA would no longer have the authority to require or

enforce RACT requirements in an area that is not legally designated nonattainment for ozone.

Only in the absence of a legally valid ozone nonattainment designation would the commission be able to act under this rule provision, and such action would merely provide notice that it would no longer be legally required to comply with provisions that are no longer legally valid. Further action from the EPA would not be required if a final court decision vacates the ozone nonattainment designation of Wise County; therefore, no §110(l) demonstration could be required to remove a requirement that would no longer be legally required. Furthermore, the 2018 future year attainment demonstration modeling documented in the 2015 DFW AD SIP revision does not include NOx and VOC reductions from any rules proposed in the concurrent rulemakings (Rule Project Nos. 2013-048-115-AI and 2013-049-117-AI) for Wise County. The EI portions of both Chapter 3: *Photochemical Modeling* and Appendix B: *Emissions Modeling for the DFW Attainment Demonstration SIP Revision for the 2008 Eight-Hour Standard* of this DFW AD SIP revision do not discuss or quantify any control strategies specific to Wise County. Since no emission reductions from these rulemakings were included in the 2018 future case modeling for Wise County, additional scenarios would not be required for attainment demonstration purposes.

To ensure that the rule language clearly establishes this standard, the commission is replacing the proposed language "Wise County is no longer designated nonattainment for the 2008 Eight-Hour Ozone National Ambient Air Quality Standard" with "the Wise County nonattainment designation for the 2008 Eight-Hour Ozone National Ambient Air Quality Standard is no longer legally effective" in the compliance schedules in the concurrent Chapter 115 and Chapter 117 RACT rulemakings (Rule Project Nos. 2013-048-115-AI and 2013-049-117-AI).

The Lone Star Sierra Club and one individual requested that vapor recovery units be required on VOC major source condensate tanks.

The adopted rule changes in Chapter 115, Subchapter B, Division 1, will extend control requirements to Wise County to implement RACT for storage tanks storing condensate with the potential to emit VOC of at least the applicable major source threshold for all counties in the DFW 2008 eight-hour ozone nonattainment area. The adopted rules require 95% control of VOC from condensate storage tanks in Wise County, as is required in the other nine DFW ozone nonattainment counties, but do not specify use of vapor recovery units because Texas Health and Safety Code, §382.017, prohibits the commission from adopting rules that require specific types of control equipment unless required by federal law or regulation. No changes were made in response to this comment.

The Sierra Club and Downwinders stated that advancing timelines is not a factor to consider when implementing RACT and that nothing in the FCAA or the EPA's guidance supports rejecting RACT because it cannot be installed and operational in sufficient time to advance attainment. The Sierra Club and Downwinders commented that precluding measures that cannot be installed before 2017 discourages the use of the most effective measures for reducing NO_X, delays attainment of the NAAQS, and affords Texas an excuse to do nothing.

Although advancing attainment is not a factor considered during a RACT analysis, the EPA prescribes implementation deadlines by which sources must be in compliance with RACT requirements. In the EPA's 2008 ozone standard SIP requirements rule, similar to previous implementation rules, the RACT compliance date is a fixed date based on the effective date of area designations. For the RACT portion of AD SIP revisions, the EPA established the implementation deadline as January 1st of the 5th year after the effective date of designation, or January 1, 2017. No changes were made in response to these comments.

The EPA requested that the commission either lower the Ellis County cement kiln source cap or set lower rate-based emission limits that reflect RACT for each dry kiln. Downwinders and the Sierra Club commented that the FCAA requires case-by-case RACT determinations for each of the cement kilns in Ellis County to determine technologically and economically feasible controls. The EPA argued that the 2007 source cap equation used production and emissions from wet kilns that have been supplanted by dry kiln use with intrinsically lower emissions, thus giving the dry kilns an effectively less stringent allowed emission rate that no longer satisfies RACT.

The TCEQ disagrees that the existing cement kiln NO_X rules no longer satisfy RACT. The EPA has previously approved the current Ellis County ozone season NO_X source cap as meeting the FCAA RACT requirements for these sources (74 FR 1927, January 14, 2009), which is consistent with the EPA's policy with respect to area-wide average emission rates. These existing sources have complied with the cap in part by replacing higher-emitting wet kilns with dry kilns. The cement kiln RACT rules were written and approved with a provision that emissions from new construction must fit under the cap and that all ongoing operations would continue to be bound by the cap based on 2003 to 2005 production. Therefore, RACT continues to be met on average by this group of sources under the current cap. Further evaluation of RACT for these cement kilns on an "each and every source" basis to establish new limits based on the replacement of wet kilns is not necessary, and the currently approved NO_X source cap continues to represent RACT for these sources.

The EPA's 2008 ozone standard SIP requirements rule follows the EPA's existing policy with respect to area-wide average emission rates, which recognizes that states may demonstrate that the weighted average NO_X emission rate from all sources in the nonattainment area subject to RACT meets NO_X RACT requirements. In the preamble to the rule, the EPA states that, "The EPA believes that the statute, as interpreted by the court in *NRDC v. EPA*, provides a state with the option of demonstrating that its program achieves RACT level reductions by showing emission reductions greater than or equal to reductions that would be achieved through a source-specific application of RACT in the nonattainment area...In sum, nothing in the CAA or in *NRDC v. EPA* requires that 'each and every source' in the area employ RACT or achieve RACT-level reductions. Consistent with previous guidance, the EPA continues to believe that RACT can be met on average by a group of sources within a nonattainment area rather than at each individual source." No changes were made in response to these comments.

The TPA disagreed with the commission's analysis that 0.50 grams per horsepower-hour (g/hp-hr) represents RACT for gas-fired rich-burn engines. One TPA member determined that six gas-

fired rich-burn engines from its fleet, already controlled by catalyst, could not meet the proposed NO_X level even with additional catalyst. For a particular 1,680 hp engine, an emission control system conversion kit would cost $90,000 ($540,000 in total) for the engine to meet 0.50 g/hp-hr. The member estimated the cost per ton of NO_X reduced for this one engine to be $11,100. The TPA therefore requested the commission establish 1.0 g/hp-hr as NO_X RACT for Waukesha engines.

The commission disagrees that an emission limit of 0.50 g/hp-hr is not representative of RACT for gas-fired rich-burn engines. The commission estimated the total costs for nonselective catalytic reduction (NSCR) catalyst retrofits for gas-fired rich-burn engines in Wise County based on some rich-burn engines needing entire catalyst system retrofits and some engines already equipped with catalyst systems only needing additional catalyst elements. The $30/hp estimate used by the commission for capital costs for new NSCR systems (39 TexReg 10351) is an overall estimate, and capital costs for an individual engine may be higher than this estimate. The $90,000 capital cost estimate provided by the TPA would equate to approximately $54/hp. While higher than the commission's estimate, the commission still considers the TPA's cost estimate for NSCR on rich-burn engines to be economically feasible. The TPA's estimated cost effectiveness of $11,100 per ton appears to be based on only first year capital costs and is not annualized. Capital costs associated with control requirements are typically annualized over a period of time when calculating cost effectiveness on a dollar per ton basis. Calculating cost effectiveness based on first-year capital costs and a single year of emission reductions inflates the dollar per ton estimate. The cost effectiveness estimate used by the commission in the RACT and fiscal analyses for this rulemaking included annual operating and maintenance costs and annualized capital costs over the first five years the rules are in effect. The first-year cost effectiveness estimate by the TPA cannot be compared to the commission's cost effectiveness estimates without being converted to the same basis.

Furthermore, the TPA's cost per ton estimate of $11,100 is also based on a NO_X reduction from 1.0 g/hp-hr to 0.50 g/hp-hr, when it should be from 2.0 g/hp-hr to 0.50 g/hp-hr. Site-specific data of annual NO_X emissions and operating hours reported to the 2012 Point Source Emissions Inventory indicate the 1,680 hp engine operated at a performance level of 2.0 g/hp-hr. Based on the TPA's cost information of the conversion kit, annualized over five years, the commission estimates the cost per ton for the 1,680 hp engine to be $1,027. This figure includes the $90,000 capital cost for the conversion kit, a capital cost of $2,500 for one totalizing fuel flow meter, annual maintenance costs of $3,000 for catalyst washing and O_2 or NO_X sensor replacement, annual average costs of $2,525 for compliance testing, and an emission reduction of approximately 23.4 tons per year. The commission notes that this estimate of $1,027 per ton for NSCR systems using the TPA capital costs is lower than the overall average of $1,563 per ton the commission cited for all affected units, including rich-burn engines, in the proposed rulemaking (39 TexReg 10350). The commission maintains that the NO_X emission specification of 0.50 g/hp-hr represents RACT for gas-fired rich burn engines. No changes are made in response to this comment.

Solar and the TPA suggested that the commission maintain the 4,500 hp level as the threshold for units subject to the NO_X standards and adopt emission levels in 40 Code of Federal Regulations (CFR) Part 60, Subpart KKKK, the current New Source Performance Standard (NSPS) for industrial combustion turbines, for modified and reconstructed industrial turbines. Solar and the TPA commented that the proposed emission values are stricter than 40 CFR Part 60, Subpart KKKK levels for modified and reconstructed units, and 40 CFR Part 60, Subpart KKKK contains emission standards for modified and reconstructed units were set at emission levels existing units were capable of meeting. For modified and reconstructed units with a heat input less than or equal to 50 MMBtu/hr, 40 CFR Part 60, Subpart KKKK contains an emission standard of 150 ppm. The proposed RACT requirements set a NO_X limit of 122 ppm for similarly sized industrial turbines, i.e., turbines rated less than 4,500 hp. For two affected units in Wise County, Solar commented that a dry low-NO_X retrofit is available but at significant capital cost. The other two affected units in Wise County will require uprating to a higher power rating and retrofitting with dry low-NO_X technology; this will impose significant capital costs. For these two units, Solar commented the results of the uprate and retrofit will potentially require corresponding compressor or other equipment upgrading, replacement, or modification; may trigger additional new source review permitting and/or Federal Energy Regulatory Commission permitting issues; and may result in the site running at a lower, less efficient load.

The TPA and Solar also disagreed with the commission's analysis that no capital costs due to retrofits or combustion modifications were expected for industrial gas-fired turbines in Wise County to meet the proposed NO_X emission specifications. Solar and the TPA estimated the compliance cost to be as high as $2 million to $4 million for each of the four affected Solar industrial turbines to comply with the RACT rulemaking. One TPA member determined that two industrial gas-fired turbines from its fleet would require retrofit technology estimated to cost between $1.5 million to $4 million per turbine. The member estimated the cost per ton for emissions reductions to be $38,800. The TPA contended this would approach a complete source replacement, contrary to RACT requirements. Solar contended that a source-specific RACT cost estimate is imperative to assess the cost effectiveness of the proposed RACT rulemaking on each affected unit in Wise County. Similarly, the TPA commented that consideration on a case-by-case basis of the specific technological and economic circumstances of an individual unit is the best way to ensure emission limits are complied with while accounting for exceptional circumstances that may arise in particular cases. The TPA endorsed and incorporated fully Solar's comments.

While the commission may consider Federal rules such as 40 CFR Part 60, Subpart KKKK when determining NO_X RACT control levels, RACT is not defined by rules such as the NSPS. The referenced NSPS rules are national rules, whereas the NO_X RACT rules that the commission is adopting for the DFW 2008 eight-hour ozone nonattainment area are specific to the facilities in that area. Furthermore, RACT requirements can be, and are in some circumstances, more stringent than NSPS or National Emission Standards for Hazardous Air Pollutants rules. The commission declines to make the suggested change to create an exemption threshold based on unit size. However, based on supplemental data and information provided by, and comments received from, owners or operators of these units in Wise County, the commission has determined that some of the affected turbines in Wise County in the proposed mid-size category, 4,500 hp and greater but less than 10,000 hp, may not be able to meet the proposed 0.20 lb/MMBtu NO_X emission specification without making significant modifications or

retrofits at substantial costs. The commission determined at proposal that these costs did not represent RACT for these turbines in Wise County. The commission's proposed emission standards were based on existing emissions data for the units, but the commission's assessment of the ongoing emissions performance based on this data for the midsize category of turbines may have been too conservative. This resulted in the emissions standard being lower than what would be consistent with the commission's determination of RACT for industrial turbines in Wise County. Furthermore, additional information was provided by the TPA and stack test data was provided by an affected source owner or operator for specific units identified in Wise County, which supplemented and clarified the 2012 EI data, upon which the commission proposed the NO_X RACT standards for industrial turbines in Wise County. The additional information and data indicated unit performance variability among the various turbine model ratings and showed test results as high as 0.50 lb/MMBtu.

Therefore, the commission is removing the unit size category for units with a hp rating of less than 4,500 hp and the unit size category for units with a hp rating of 4,500 hp or greater but less than 10,000 hp. The commission is replacing these two unit size categories with a unit size category for units with a hp rating of less than 10,000 hp. Furthermore, the commission adopts a NO_X emission limit of 0.55 lb/MMBtu for turbines rated less than 10,000 hp. Based on the supplemental information provided by source owners or operators of affected units and considering the variation in test data for some units, the commission determines that 0.55 lb/MMBtu for units rated less than 10,000 hp is an appropriate RACT control level considering current performance levels of existing units in Wise County. While this control level is numerically the same as the current NSPS rule for modified and reconstructed industrial gas turbines with a heat input less than or equal to 50 MMBtu/hr, the commission makes clear that 0.55 lb/MMBtu is the appropriate RACT level of control specifically for the units rated less than 10,000 hp identified in Wise County considering the specific factors associated with those units. This control level is also consistent with the commission's determination of RACT for industrial turbines in Wise County made at proposal. Furthermore, based on unit specific information, the commission expects that no NO_X control technology retrofits will be necessary to comply with the RACT rule requirements for any of the affected industrial combustion turbines in Wise County. Therefore, the commission expects no fiscal impacts associated with controls for units in Wise County to comply with the adopted RACT emission standards. Based on the revised NO_X emission specifications, no affected sources are anticipated to undergo retrofits of any kind in order to meet the emission limits for industrial gas-fired turbines in Wise County. Due to public comment, the commission revises the unit power rating threshold of 4,500 hp in proposed §117.405(b)(3)(A) to 10,000 hp. The commission also removes proposed §117.405 (b)(3)(B) and re-letters proposed subsection (b)(3)(C) to subsection (b)(3)(B).

The TPA commented that the proposed 500 parts per million by volume (ppmv) leak definition for valves at natural gas processing plants in Wise County is not RACT because it is not economically feasible and suggested regulatory alternatives. The TPA estimated that at one affected natural gas processing plant in Wise County, 494 valves would be affected by the 500 ppmv leak definition and that 75% of these valves would need repair and 25% of theses valves

would need replacing. Using an average cost of $25,000 per valve to replace and $1,000 per valve to repair, the TPA estimated the plant to incur a total compliance cost of $3.45 million. The TPA indicated that the number of components requiring replacement or repair is even higher at another natural gas processing plant in Wise County.

The TPA claimed that the commission's estimate of repair costs is too low. Specifically, the TPA disagreed with the commission's assumption that on-site personnel would conduct monitoring, questioned the commission's assumption of two annual valve repairs per site, and noted an inconsistency in how the commission described repair costs in the fiscal note.

The TPA recommended allowing the two affected natural gas processing plants in Wise County to monitor valves with their current permit-based 10,000 ppmv leak definition. The TPA requested a limited exemption if a Wise County natural gas plant could demonstrate that leak detection and repair of valves with a 500 ppmv leak definition would be economically infeasible. The suggested exemption would expire if the valve became subject to 40 CFR Part 60 Subpart OOOO. The TPA supported its recommendation because DFW area ozone formation is not dependent on Wise County VOC emissions and only two facilities are affected.

The commission disagrees that the fugitive emission control rules in Chapter 115, Subchapter D, Division 3, are not RACT for natural gas processing plants in Wise County. The 500 ppmv leak definition is already established as RACT for the other nine counties of the DFW 2008 eight-hour ozone nonattainment area, as well as the HGB 1997 eight-hour ozone nonattainment area. The commenter did not provide data demonstrating that unique technological and economic circumstances exist for the natural gas processing plants in Wise County that warrant a leak definition different than the current 500 ppmv RACT-level leak definition to which natural gas processing plants in the other nonattainment counties and areas are subject. The commission determined, and contends, that these rule requirements are just as technologically and economically feasible for the applicable facilities in Wise County as the requirements are for facilities already subject to the rules. The commission's staff based the fiscal analysis, including the repair cost of $150 per valve, on EPA Natural Gas Star documents and articles published in *Oil and Gas Journal*. The commission continues to expect that Wise County natural gas processing plants will not incur additional expenses for monitoring valves with a 500 ppmv leak definition, whether they are monitored by on-site personnel or a contractor, since these valves are already monitored on the same schedule as those with a 10,000 ppmv leak definition. The commission also expects that the percentage of valves at a natural gas plant leaking more than 500 ppmv should be far lower than the 100% characterized in the comment.

The costs for replacing valves was not considered because the commission anticipates that valves would be designed and maintained to leak less than 500 ppmv. There may be an initial cost to replace leaking valves but adequate information was not provided to justify $25,000 per replaced valve as an appropriate replacement cost. No changes are made in response to this comment.

RACM Demonstration

The Sierra Club and Downwinders commented that given the commission will not, and admits that it will not attain the 2008 eight-hour ozone standard by 2018, reliance on an "arbitrary" 2017 cutoff date for RACM is unreasonable. The commenters also stated that nothing in the EPA's interpretation or the FCAA suggests that a measure fails to qualify as RACM if it cannot be installed and in operation an entire year before the attainment date, but that the control measure should only be capable of advancing attainment.

The TCEQ disagrees that it has admitted that it cannot and will not attain by 2018. Modeling results based on the April 2007 EPA modeling guidance project the future ozone design value to be 76 ppb. Use of the newer EPA draft guidance projects this 2018 future ozone design value to be 75 ppb. These 2018 design values and the WoE analysis included in Chapter 5 of the DFW AD SIP revision demonstrate attainment of the 2008 eight-hour ozone NAAQS. Additionally, as discussed in this DFW AD SIP revision, the 76 ppb future design value for the Denton Airport South monitor is based on the "all days" attainment test recommended by the EPA modeling guidance from April 2007. Application of the "top 10 days" attainment test recommended by the draft EPA modeling guidance from December 2014 results in a 2018 future design value of 75 ppb at the Denton Airport South monitor, with the values for all other monitors ranging from 62-74 ppb, demonstrating attainment of the ozone standard.

The 2017 cutoff date the commenters refer to is the date by which control measures considered to be RACM would need to be implemented as part of this DFW AD SIP revision in order to advance the December 31, 2018 attainment date by at least one year to December 31, 2017. The TCEQ relied on the EPA's interpretation of RACM criteria, including whether the control measure can advance the attainment date by at least one year (74 FR 2945, January 16, 2009) to evaluate whether each control measure constituted RACM. Advancing the attainment date to December 31, 2017 would require controls to be installed and in operation no later than March 1, 2017, allowing time to realize the emissions reduction benefit from implementing the control measures. The TCEQ anticipates that without requiring operation of a control a year prior to attainment, the full benefit/effect of a control measure would not be realized in monitoring data and may not, in reality, actually advance attainment of the NAAQS by at least a year. If a control measure does not meet this criteria point, it is not a valid RACM control.

As explained in Appendix G of this DFW AD SIP revision, the implementation deadlines for RACM are established by the EPA's interpretation of FCAA, §172(c)(1) that states incorporate into their SIP all RACM that would advance a region's attainment date after determination that such measures are reasonably available for implementation in light of local circumstances (57 FR 13498). This interpretation was subsequently upheld by several courts. No changes were made in response to these comments.

TECHNICAL ANALYSIS

Future Attainment Year

The EPA referenced a December 23, 2014 U.S. Court of Appeals ruling that concluded the end of year attainment dates required by the EPA for the 2008 eight-hour ozone standard "were not

consistent with Congressional intent...Therefore, the EPA intends to promulgate rulemaking to revise the attainment dates to a timeframe consistent with the courts' decision...the attainment year ozone season for the DFW nonattainment area will likely be 2017 rather than 2018." The EPA stated that the TCEQ should "revise the applicable elements of the attainment demonstration submittal to reflect the earlier attainment date" and that a "SIP requirements rule will be finalized soon addressing the Court's decision regarding the attainment date." The EPA requested that the AD MVEB be revised to reflect the earlier attainment date, and that the attainment analysis be supplemented "to show that the area will attain by 2017."

The D.C. Circuit did not make its ruling until December 23, 2014 and the TCEQ did not receive this comment from the EPA until February 11, 2015. The TCEQ approved proposal of this DFW AD SIP revision on December 10, 2014. The complex information gathering and photochemical modeling assessments required by the EPA to submit an AD do not permit the TCEQ to merely change the attainment year and provide an analysis within such a short time. The proposed DFW AD SIP revision was developed based on the EPA's May 21, 2012 implementation rule for the 2008 eight-hour ozone NAAQS (77 FR 30160), which set 2018 as the attainment year for areas classified as moderate. The TCEQ began AD SIP revision development work in 2012 when this rule was published and designations under the 2008 eight-hour ozone standard were made by the EPA. The deadline to submit AD SIP revisions for areas classified as moderate for the 2008 eight-hour ozone NAAQS is July 20, 2015, which EPA has not altered.

Due to the timing of the court's ruling and the EPA's subsequent rulemaking action, it was not possible to complete all work necessary for this DFW AD SIP revision to demonstrate attainment in 2017 and still meet the July 20, 2015 submission deadline. Therefore, this DFW AD SIP revision includes the work completed to date to demonstrate that the DFW nonattainment area will attain the 2008 eight-hour ozone NAAQS by 2018 as proposed, and to demonstrate progress toward attainment by the new 2017 attainment year. The DFW AD SIP revision also commits to develop a new AD SIP revision for the DFW 2008 eight-hour ozone nonattainment area as long as 2017 remains the attainment year. The new DFW AD SIP revision would include the following analyses to reflect the 2017 attainment year: a modeled AD, a RACM analysis, and an MVEB. Because significant additional analysis was not needed to complete the contingency plan for attainment, Chapter 4, Section 4.9 was revised to reflect a 2017 attainment year.

Draft Modeling Guidance

The EPA recommended that the TCEQ continue to perform the attainment test calculations in accordance with both the April 2007 final guidance for the 1997 eight-hour ozone standard and the December 2014 draft guidance for the 2008 eight-hour ozone standard.

The TCEQ agrees with this recommendation and will include calculations of future ozone design values in accordance with both guidance documents until the version for the 2008 eight-hour ozone standard is finalized. The guidance dated April 2007 recommends calculation of the future design values based on all episode days per monitor modeled in the baseline above a specific threshold, such as 75 parts per ppb. The newer draft guidance released December 3, 2014 recommends

calculation of the future design values based on the 10 days in the baseline episode per monitor with the highest modeled design values. All of the modeling work documented in the proposed DFW AD SIP revision was done prior to the release of the new draft guidance by the EPA. In a supplement released on January 12, 2015, the TCEQ included tables for the future design values based on the older "all days" test and the newer "top 10 days" test. Chapter 3, Section 3.7.2: *Future Baseline Modeling* of this DFW AD SIP revision includes 2018 ozone design value results for both attainment tests.

The EPA requested that further analysis and documentation be provided evaluating the specific days used in the attainment test. Specifically, the evaluation of modeling performance and meteorology/transport should be provided for each day included in the design value calculation per monitor. Each day should also be evaluated to ensure consistency with the conceptual model description for the area. The EPA also states that more than 10 days may be needed in the calculation of design values for each monitor.

The current draft modeling guidance from December 2014 describes the "top 10 days" test in detail, but does not specify any of these additional requirements. Preparing detailed analyses for the top 10 days for all 19 monitors is a significant work effort that cannot be completed in time for adoption of this DFW AD SIP revision. If these provisions are recommended in the final version of the modeling guidance for the 2008 eight-hour ozone standard, the TCEQ will work with the EPA to determine how to most efficiently perform these analyses and to appropriately determine if and when a specific monitor will need more than 10 days in the attainment test calculation. Therefore, this detailed analysis for the top 10 days for all 19 monitors was not performed at this time. No changes were made in response to this comment.

Model Performance

The EPA commented that the modeling is performing reasonably well, but has some concerns with performance related to transported ozone and ozone precursors. The EPA noted that on a number of days, the model overestimates ozone at upwind monitors in the DFW nonattainment area, and infers that ozone over-prediction at upwind monitors farther away is influencing model performance in the DFW nonattainment area, taking particular note of nighttime over-prediction of ozone at rural monitors. The EPA further speculated that this issue may lead to the model being more responsive to regional background changes than to local changes.

The TCEQ is aware of the performance issues at upwind monitors, and has determined that the cause of this phenomenon is at least partially attributable to the model predicting higher levels of ozone blowing onshore from the Gulf of Mexico than are actually measured. The TCEQ has used a contractor project to implement halogen chemistry over ocean waters into recent modeling activities and to also explore improving the accuracy of boundary conditions over the Gulf of Mexico and Atlantic Ocean. These approaches are currently being evaluated and may be implemented in future modeling if appropriate. This modeling will provide a platform for assessing the model's responsiveness to changes to both background and local ozone precursors. No changes were made at this time in response to this comment.

The EPA commented that it has concerns that the model is overly sensitive to low-level NO_X reductions and has some concerns about NO_X predictions in the DFW nonattainment area. The EPA suspected the model's vertical mixing of pollutants emitted at ground-level is too vigorous, based on a comparison of observed and modeled nitrogen dioxide (NO_2) concentrations throughout the modeling domain. The EPA suggested that applying a vertical diffusivity (Kv) "patch" to the standard Weather Research and Forecasting (WRF) model output as it is being converted to Comprehensive Air Quality Models with Extensions (CAMx) input may be causing surface emissions to mix up too rapidly, thus artificially lowering surface concentrations and ultimately making the model too sensitive to NO_X emissions.

The Kv patch, which increases mixing through the first 100 meters in the vertical dimension, is routinely used in modeling to account for enhanced nocturnal mixing in urban areas due to heat island and increased mechanical mixing in those areas. However, since the minimum Kv value at the surface is land-use weighted, and in rural areas this minimum Kv is a fraction of the urban value, the neighboring vertical cell layers will also generally exhibit lower values than in urban areas. Most importantly, this feature is completely marginal during the daylight hours when all mixing is significantly greater than at nighttime. Therefore, this contribution to any NO_X sensitivity is likely to be of much less consequence than other factors.

A review of modeled versus observed NO_X concentrations in eastern Texas does show that some, but not all, rural sites' NO_X concentrations are under-predicted by the model. Any tendency towards under-prediction in rural areas may be due more to local effects than to any product of the Kv patch or other modeling artifact. While performance evaluation of precursor concentrations is valuable, the commensurability of the model and observations must be considered. The model predicts average concentrations over a 4 kilometer (km) by 4 km grid cell, while a monitor only measures concentrations at one location. If a monitor is near a source such as a major roadway within the same cell, it will likely record concentrations higher than the modeled average concentration, and vice-versa for a monitor on the opposite side of a cell from a large source. Even in rural areas, monitors are often sited relatively close to roads, since physically moving the monitoring trailer requires vehicular access, so a rural monitor often may over represent NO_X levels when compared to the entire modeling grid cell in which the monitor resides. No changes were made in response to this comment.

The EPA acknowledged the issue of incommensurability in the case of the Hinton Street monitor and its proximity to the Interstate 35 corridor, but the EPA statement that "modeled values would likely be higher for both the bilinear interpolation values and the 3x3 array values" is ambiguous since it is unclear what the "values would likely be higher" than.

Modeled vertical mixing within a few hundred meters of the surface has traditionally been difficult to verify because most air quality data are collected at ground level or by aircraft flying several hundred meters or more above the surface. The Deriving Information on Surface conditions from COlumn and VERtically resolved observations for Air Quality (DISCOVER-AQ) study led by National Aeronautics and Space Administration was conducted in September 2013 in the Houston area. DISCOVER-AQ collected a rich set of data that can be used to

better characterize vertical mixing, and the TCEQ is actively supporting analyses that promise to improve modeled treatment of vertical mixing in the near future. No changes were made at this time in response to this comment.

The EPA expressed concern over model performance in the August-September 2006 episode, specifically general over-prediction of maximum daily eight-hour average (MDA8) ozone concentrations of over 10 ppb, under-prediction of NO_X concentrations at the Kaufman monitor upwind of the main urban areas, slight over-prediction of NO_X concentrations at the Hinton Street monitor, over-prediction of ozone at the Fort Worth Northwest monitor coupled with under-prediction of NO_X at high measured concentrations and over-prediction of isoprene, and over-prediction of highly reactive VOC (HRVOC) species at both the Hinton Street and Fort Worth Northwest monitors.

The TCEQ is aware of these concerns and addresses many of them specifically in Appendix C: *Photochemical Modeling for the DFW Attainment Demonstration SIP Revision for the 2008 Eight-Hour Ozone Standard* of this DFW AD SIP revision. The overall performance for the June 2006 episode is better than the August-September 2006 episode. The TCEQ has attempted to identify specific causes of the difference in performance between the episodes. Part of the difference may simply be that June had more high ozone days than did August-September in 2006, and regulatory models tend to be optimized to perform better for days important for regulatory purposes. At the Hinton Street monitor, the modeled concentrations of isoprene are reasonably close to the observations, but modeled concentrations of anthropogenic VOC are too high. Meanwhile, at the Fort Worth Northwest monitor, modeled concentrations of anthropogenic VOC are much closer to the observations than at the Hinton Street monitor, but modeled isoprene concentrations are several times as high as the observed values. The differences may be indicative of issues with the model, but also may simply be the result of incommensurability of the model and observational data as discussed previously. Finally, the new draft modeling guidance states that "Where feasible, it is recommended that days with model biases greater than ±20% percent be examined to make sure that they can be appropriately used in calculating the expected response." Modeled MDA8 ozone concentrations on most high-ozone days, even in the August-September 2006 period, are within ±20% of the observed values. In accordance with the draft guidance, the TCEQ plans in future AD SIP revisions to not perform relative response factor (RRF) calculations on episode days with bias greater than ±20%. No changes were made in response to this comment.

<u>Background Ozone Levels</u>

The EPA commented that the source apportionment modeling indicated lower contributions from outside of Texas than the upwind monitoring analysis that Texas included. The EPA noted that upwind monitor analyses can overestimate background contributions since most monitors are not in a location that precisely separates upwind and downwind contributions. The EPA stated that the non-Texas ozone contribution on high transport days was usually less than 50 ppb, and often 40-45 ppb or less. The EPA concluded that Texas sources contribute approximately half of the ozone formed in the DFW nonattainment area.

The TCEQ acknowledges that the assessment of background ozone is different between modeling and upwind monitor analyses. Both approaches are imperfect tools for assessing background ozone levels, and it would be surprising if they matched. Out of necessity, modeling analyses are confined to a base and/or future year for which extensive modeling files exist. In contrast, monitoring data cannot be used to estimate future background levels, but several years of historical monitoring data can be analyzed. Table 3-47: *2018 Ozone DV_F Denton, Parker, and Kaufman Aggregate Summary* of this DFW AD SIP revision shows source apportionment results for the 2018 future year with the non-Texas contribution ranging from 43 ppb at the "low" Kaufman monitor to 45 ppb at the "high" Denton Airport South monitor. The Texas contribution is then shown to total 20 ppb at Kaufman and 32 ppb at Denton Airport South. The TCEQ disagrees with the EPA's conclusion that Texas sources contribute approximately half of the ozone formed in the DFW nonattainment area, because these results show the relative Texas contribution at 32% for Kaufman and at 42% for Denton Airport South, which implies that the non-Texas contribution is at 68% for Kaufman and 58% for Denton Airport South.

For the historical years of 2001 through 2014, the TCEQ analyzed monitoring data for each eight-hour ozone exceedance day to conclude that the mean non-Texas background contribution for each year ranges from 60-70%. This range correlates very well with the 58-68% results shown for the Kaufman and Denton Airport South monitors, which are the most upwind and downwind monitors within the DFW nonattainment area, respectively. The monitoring analysis showed that mean background ozone on exceedance days appears to range during 2001 through 2014 from roughly 49 to 61 ppb. The 2001 through 2014 monitoring analysis also shows that the background ozone levels during an entire season may average in the range of 40 ppb, but that this could increase by 10-20 ppb to 50-60 ppb on any given exceedance day. Both the monitoring and the TCEQ's modeling analyses indicate that all DFW exceedance days are accompanied by high non-Texas background levels, and that this background contributes the majority of peak ozone. No changes were made in response to this comment.

<u>Episode Selection</u>

The EPA commented that June 2006 is a "good episode and representative of the type of days from the conceptual model that drive the early summer exceedances in the DFW area." The EPA also stated that the inclusion of the August-September 2006 episode was "a step in the right direction," but that the late summer 2006 episode days were "not typical" and "actually light on ozone exceedances compared to the conceptual model." The EPA states that the episode days driving the future design values may be more heavily weighted toward the June 2006 rather than August-September 2006 episode.

The TCEQ agrees that the 33-day June 2006 episode is good and representative of the types of days that occur during early summer ozone exceedances in the DFW nonattainment area. The TCEQ also agrees that the inclusion of the 34-day August-September 2006 episode is an improvement over previous modeling work. The June 2006 episode was chosen over the August-September 2006 episode in the previous eight-hour ozone SIP revision from 2011 because it tended to have overall improved performance and representation. Even though the August-September

2006 episode is not as optimal in this respect as June 2006, the TCEQ believes it would be more representative to include it rather than exclude it. Table 3-1: *DFW 75 ppb Ozone Exceedance Days by Month from 2006 through 2012* of this DFW AD SIP revision shows that the August-September 2006 period had 13 ozone exceedance days. Based on the summary of exceedance days by month provided in Table 3-1, the TCEQ disagrees with the EPA's statement that this portion of the episode is light on exceedance days in comparison to the conceptual model.

The TCEQ also disagrees with the EPA's suggestion that the future design value calculations have insufficient representation from the later summer period. Table 3-40: *2006 Baseline Design Value Summary for the Attainment Test* of this DFW AD SIP revision shows that 36 days of the combined 67-day episode were used in the attainment test calculation for the Denton Airport South monitor. Seventeen of these days were from the June 2006 period, while 19 were from the August-September 2006 period. If the "top 10 days" test is used, there are five from each period. The full set of modeling output files used to make these determinations for each monitor are available via the TCEQ Air Quality Modeling Web page (https://www.tceq.texas.gov/airquality/airmod/data/tx2006). No changes were made in response to this comment.

The SEED Coalition commented that the AD uses outdated computer modeling. Several individuals, the Sierra Club, and Downwinders commented that the AD relies on an outdated 2006 episode that was already used in DFW nonattainment area SIP revisions submitted in 2007 and 2011. The Sierra Club and Downwinders also stated that the 2006 episode is not consistent with the requirement of the draft modeling guidance that the EPA released in December 2014. The Sierra Club and Downwinders stated that the episode should model representative time periods and meteorological conditions when peak ozone levels are monitored. Several individuals, the Sierra Club, and Downwinders further commented that 2011 should have been chosen because it was a year with exceptional drought conditions and high monitored ozone levels. Several individuals, the Sierra Club, and Downwinders stated that the TCEQ failed to account for climate change effects in the episode selection process even though these are required by the draft December 2014 modeling guidance.

The 2006 episode was not used in two previous SIP revisions. It was used in the DFW AD SIP revision that was adopted on December 7, 2011, but was not used in the DFW AD SIP revision adopted in May 2007. This SIP revision also added a 34-day episode from August 13-September 15, 2006, which results in a combined 67-day episode.

Episode selection is covered in Chapter 3, Section 3.3: *Episode Selection* of this DFW AD SIP revision. A representative episode for the DFW nonattainment area would need to include the bi-modal peaks that historically occur in ozone exceedances during both June and August-September, as shown in Figure 3-2: *DFW Eight-Hour Ozone Exceedance Days by Month from 1991 through 2012* of this DFW AD SIP revision. The TCEQ demonstrates that the only acceptable candidates identified for such representation are 2006 and 2012. Table 3-1 shows how the years from 2007 through 2011 had far fewer exceedance days in June compared with August-September. For example, there were only four exceedance days in June 2011 but 26 in August-September. This is a skewed distribution that is

not representative of the historical ozone exceedance patterns in the DFW nonattainment area. 2012 has been identified as an acceptable candidate episode, and Chapter 3, Section 3.3.2: *DFW Ozone Episode Selection Process* indicates that the TCEQ has begun development work on this episode.

Table 3-1 also shows that 2006 had more ozone exceedance days than the 2011 episode suggested by the commenters. According to the Palmer Drought Severity Index (PDSI), the north central Texas area was in extreme drought for all months from June through September during both 2006 and 2011. Prior to 2006, the north central Texas area had only been categorized in extreme drought for all four of these successive months in six different years spanning from 1909 through 1956.

The December 2014 modeling guidance was not used by the TCEQ in the episode selection process for this DFW AD SIP revision because it was not available when the TCEQ was required to begin SIP development. The episode selection review began in 2012 when the EPA made nonattainment designations under the 2008 eight-hour ozone standard. This process was documented in the draft modeling protocol that was submitted to the EPA in August 2013. All of the technical work included in this DFW AD SIP revision had to be completed by June 2014 in order to be included in the December 2014 proposal. Chapter 3, Section 3.3.1: *EPA Guidance on Episode Selection* of this DFW AD SIP revision states "When development work commenced for this AD SIP revision in 2012, the EPA's former modeling guidance for the 1997 eight-hour ozone standard of 84 ppb was in effect. The episode selection work for this attainment analysis was done in accordance with this former guidance."

The updated draft modeling guidance references climate change issues in Section 2.6.2: *Assessing Impacts of Future Year Meteorology*. However, the EPA does not provide any instruction on how meteorological modeling inputs are to be adjusted to predict these future levels. Out of necessity, ozone episodes are from the past and meteorological measurements are used to drive the model accordingly. Furthermore, the EPA states the following in the draft guidance: "Given the relatively short time span between base and future year meteorology in most SIP demonstrations, the EPA does not recommend that air agencies explicitly account for long-term climate change in attainment demonstrations." No changes were made in response to this comment.

<u>Emissions Banking and Trading</u>

The EPA noted that the discussion of ERCs and DERCs in Appendix B: *Emissions Modeling for the DFW AD SIP Revision for the 2008 Eight-Hour Ozone Standard* of the proposal indicated that there are 363 tons per year (tpy) of NO_X ERCs and over 6,000 tons of NO_X DERCs. The EPA requested clarification of how the 17 NO_X tpd figure was developed for modeling sensitivity purposes. The EPA also requested documentation on how the NO_X and VOC emissions for ERCs and DERCs were spatially allocated in the model. The EPA requested clarification regarding emergency use of DERCs beyond the flow control limit.

The rulemaking in 30 TAC Chapter 101, Subchapter H, Division 4 (Rule Project Number 2014-007-101-AI) adopted concurrently with this DFW AD SIP revision

replaces the previous annually calculated NO_X DERC limit in §101.379(c) with a fixed limit of 17.0 tpd of NO_X DERCs. This limit applies only to NO_X DERCs generated and used in the nine-county DFW 1997 eight-hour ozone nonattainment area. The 17.0 tpd limit was selected based on the 2013 NO_X DERC limit of 16.9 tpd, which was the second highest limit that had been set at the time the modeling sensitivity was conducted. In addition, the 17.0 tpd limit is consistent with the 16.3 tpd average of all of the NO_X DERC limits established from 2009 through 2015. The limit is one and a half times greater than the largest request to use DERCs submitted from 2009 through 2015, and more than 11 times greater than any actual DERC use from 2009 through 2014. Adoption of the fixed limit does not affect the exemption for ERCOT-declared emergencies, which was established in 2013 because the effects on air emissions from an electrical grid emergency and potential blackout could be more significant than the use of DERCs above the limit. To date the exemption has not been used.

Section 3.7.4.2: *Discrete Emissions Reduction Credit (DERC) Sensitivity* of the adopted DFW AD SIP revision presents the model-predicted results of adding 17.0 tpd of NO_X DERCs in the 2018 future case to the non-cement kiln non-EGU point sources located throughout the DFW nonattainment area. Section 3.7.4.2 discusses how these 17.0 tpd of NO_X emissions were allocated based on the proportional contributions from these point source facilities to the 22.99 NO_X tpd total projected for 2018. The 17.0 NO_X tpd limit on DERC use is consistent with attainment and maintenance of the 1997 and 2008 eight-hour ozone NAAQS because the modeling sensitivity conducted shows that the adopted limit will not cause any monitor to exceed the 73-78 ppb weight of evidence range for the 75 ppb standard. Section 3.7.4.2 of the adopted DFW AD SIP revisions provides additional detail regarding the modeled ozone impacts of the 17.0 NO_X tpd DERC limit.

The TCEQ acknowledges that the wording in Table 2-15: *Banked Emissions as of June 2013* and Table 2-16: *Texas Non-EGU "No-Rules" Growth Summary* in Appendix B might cause the reader to infer that the entries of Table 2-15 are actually the emissions that were modeled. The TCEQ has corrected the table entries and improved the wording in Appendix B to match the wording in Section 3.7.4.2 of the adopted DFW AD SIP revision.

The TCEQ concludes that the 17.0 NO_X tpd value in the "Total Modelable NO_X Bank (tpd)" column of Table 2-15 is incorrect. The correct entry should be 16.5 NO_X tpd, which is the sum of the DFW NO_X ERCs and DERCs and is the maximum amount (worst case) of NO_X credits that could be applied to the future case. The EPA identified the ERCs and DERCs in the "DFW Registry" row of that table when, in fact, the modelable banked emissions are always less than the registry total, as provided in the last row of Table 2-15 (see explanation in the paragraphs following Table 2-15 on page 47 of Appendix B). As described in the paragraphs above Table 2-15 on page 47 of Appendix B, the "Total Modelable NO_X Bank" is the absolute maximum that would be modeled if there were no other limitations applied. As documented, there is no reason to expect that the entire bank would be used prior to the required ozone attainment date in 2018, and in fact, there is no history of more than 1.5 NO_X tpd usage of the DFW DERCs in any one year, and the bank would be used only for potential growth in the DFW nonattainment area. This is

another example of modeling potential worst case, when in practice, DERCs have never been used for growth (expansions, new units, etc.)– only for compliance with applicable TCEQ rules and permit limits.

Section 2.3.3.1.2: *NAA non-EGU Projections and Control Implementation* of Appendix B explains that the growth projected by the Eastern Research Group, Inc. (ERG) analysis was actually the limiting factor. As shown in Table 2-16, the ERG projection factors predict 2018 DFW NO_X to be reduced by 0.55 tpd from the 2012 projection year. This is also made more clear in the DERC sensitivity modeling as documented in Section 3.7.4.2 of the adopted DFW AD SIP revision. The modeling did not address any additional DERC use that may or may not occur due to the exemption for ERCOT-declared emergencies, which as stated above, to date have never been used. Changes for the purposes of clarification were made to Appendix B in response to this comment.

<u>On-Road Emissions Inventory</u>

An individual commented that the TCEQ is waiting on the gasoline fuel controls to take effect in 2017. The Sierra Club and Downwinders commented that the AD "relies almost entirely on implementation of the unenforceable, future low-sulfur motor vehicle emission standards that are not scheduled to become effective until 2017, at the earliest." The Sierra Club and Downwinders further stated that the TCEQ estimates of on-road emissions "will account for an unprecedented 57% reduction" in NO_X emissions by 2018. The Sierra Club and Downwinders stated that "federal fuel measures are unenforceable by TCEQ and...will not be fully implemented until 2025, TCEQ cannot reasonably rely on those measures to demonstrate attainment by 2018." The Sierra Club and Downwinders stated the EPA now estimates that these federal mandates will result in 2018 emission reductions of 9.98 NO_X tpd and 2.39 VOC tpd per day within the DFW nonattainment area.

The TCEQ disagrees with this assessment. The standards for fuels and vehicles are separate, but both are enforceable by the federal government. The commenters incorrectly suggest that the TCEQ should not be accounting for reductions from these measures because it is the federal government that regulates them instead of the state. The state is required to use the EPA's latest version of the on-road model at the time that inventory work is done, and these models incorporate the benefits of various federal measures for fuels and vehicles that will be in place for the specific calendar year modeled.

The EPA finalized rulemaking in March 2014 for more stringent vehicle emission and fuel standards. The vehicle emission standards required for manufacturers are referred to as Tier 3 and are phased-in between the 2017 through 2025 model years. There is a separate standard for gasoline refiners that requires 10 parts per million (ppm) sulfur instead of the 30 ppm level currently required. This takes effect starting in the 2017 calendar year, and will have an immediate emission reduction benefit from emissions from vehicles currently being used, referred to as "in-use vehicles."

Chapter 3, Section 3.7.4.1: *Tier 3 Standards Sensitivity* of the proposed DFW AD SIP revision references the research conducted by the EPA about the emission reductions that will result from in-use vehicles operating on 10 ppm sulfur

gasoline instead of 30 ppm. The report is referenced in Chapter 3, Section 3.8.2: *Modeling References* and is entitled *The Effects of Ultra-Low Sulfur Gasoline on Emissions from Tier 2 Vehicles in the In-Use Fleet*. The commenter suggests that the benefits of 9.98 NO_X tpd and 2.39 VOC tpd were estimated by the EPA, but Chapter 3, Section 3.7.4.1 clearly states that these benefits were estimated by the TCEQ using the EPA's MOVEST3NPRM model.

In Chapter 3, Section 3.5.4.2 of this DFW AD SIP revision, the 2006 and 2018 on-road emission estimates are compared. Using the latest available vehicle activity and emission rate information applicable to these years, DFW nonattainment area on-road NO_X emission estimates are shown to drop by 58% from 284.27 tpd to 119.69 tpd. This is a result of the ongoing fleet turnover effect where older higher-emitting vehicles are constantly removed from the fleet while newer lower-emitting vehicles are introduced. The net reduction over time in the fleet average emission rate is greater than the net increase in miles traveled, thus resulting in substantial emission reductions. The commenter suggests that a 57% reduction in NO_X in the 12-year period from 2006 through 2018 is "unprecedented," but offers no alternative on-road emission figures for these years. Fuller descriptions of the on-road inventory development process are available in Appendix B and on the TCEQ on-road mobile FTP directory (ftp://amdaftp.tceq.texas.gov/pub/Mobile_EI/). No changes were made in response to this comment.

Oil and Gas Emissions Inventory

The Sierra Club and Downwinders commented that TCEQ staff, during an August 2014 presentation, attributed a full 1 ppb reduction in future modeled ozone at the Denton Airport South monitor solely to changes in oil and gas emission estimates. The Sierra Club and Downwinders stated that the monitors with future design values close to the 75 ppb standard are historically the worst-performing monitors in the DFW nonattainment area, the ones setting the ozone design values now and in the future, and that these are greatly impacted by oil and gas pollution. The Sierra Club and Downwinders cited a University of North Texas study that divided the DFW nonattainment area monitors into western "fracking" ones and eastern "non-fracking" ones. The study concluded that the higher ozone levels recorded at the western fracking monitors were due to emissions from oil and gas sources.

During an August 2014 presentation held at the NCTCOG offices in Arlington, TCEQ staff did not say that changes in 2018 oil and gas emission estimates were entirely responsible for a 1 ppb change in modeled ozone at the Denton Airport South monitor. Slide 7 from the November 5, 2013 presentation shows that the 2018 future design value modeled at the time was 77.09 ppb for the Denton Airport South monitor. Slide 9 from the August 12, 2014 presentation shows that the 2018 future design value being modeled was 76.67 ppb. The net reduction is 0.42 ppb and not a full 1 ppb. The TCEQ intentionally reports modeled design values out to two decimal places so that these types of effects can be properly reported. After rounding to one decimal place and truncating in accordance with the EPA modeling guidance, the 77.09 ppb becomes 77 ppb, and the 76.67 ppb becomes 76 ppb. These presentations are available both on the TCEQ's DFW Photochemical Modeling Technical Committee Web page (https://www.tceq.texas.gov/airquality/airmod/committee/pmtc_dfw.html) and

through the NCTCOG Air Quality Technical Committee Web page (http://www.nctcog.org/trans/committees/AQTC/).

The commenters incorrectly attribute this truncated 1 ppb change exclusively to oil and gas emission impacts. Under the EPA's modeling guidance, the modeled design value would only have to change 0.01 ppb from 76.94 ppb to 76.95 ppb to result in rounded and truncated differences of 76 ppb and 77 ppb, respectively. In this hypothetical example, it is incorrect to conclude that emission changes having resulted in a 0.01 ppb ozone difference are really a 1 ppb impact.

The TCEQ did revise its 2018 emission projections for many of the anthropogenic source categories between November 2013 and August 2014. These are reported on slide 36 of the November 2013 presentation and slide 9 of the August 2014 presentation. The TCEQ was initially projecting oil and gas production NO_X emissions for 2018 to be 12.20 tpd, but the newer information resulted in a drop of 5.05 tpd down to 7.15 tpd. The TCEQ was initially projecting oil and gas drilling NO_X emissions for 2018 to be 5.83 tpd, but the newer information resulted in a drop of 3.01 tpd down to 2.82 tpd. The combined reduction for both of these categories is an 8.06 NO_X tpd reduction from 18.03 tpd to 9.97 tpd. These presentations are available both on the TCEQ's DFW Photochemical Modeling Technical Committee Web page (https://www.tceq.texas.gov/airquality/airmod/committee/pmtc_dfw.html) and through the NCTCOG Air Quality Technical Committee Web page (http://www.nctcog.org/trans/committees/AQTC/).

The best estimate of the amount of ozone attributed to the Denton Airport South monitor from oil and gas production and drilling emissions is presented in the source apportionment results within Table 3-46: *2018 Ozone DV_F Denton, Parker, and Kaufman Contributions* of this DFW AD SIP revision. These two combined categories are shown to be responsible for 0.40 ppb of the 76.72 ppb design value for 2018. The four major anthropogenic source categories within the DFW nonattainment area are reported to be on-road (8.66 ppb), non-road (3.39 ppb), off-road (2.96 ppb), and area (2.77 ppb). Table 3-47 shows how the 76.72 ppb design value for the Denton Airport South monitor is broken out into contributions from DFW (20.27 ppb), non-DFW Texas (11.67 ppb), non-Texas (18.59 ppb), biogenic sources (4.40 ppb), and boundary/initial conditions (21.79 ppb).

The University of North Texas study oversimplified its analysis by simply breaking out monitors into "fracking" and "non-fracking" categories without appropriately accounting for the dominant wind direction in the analysis. For each calendar year, the monitor(s) establishing the design value are listed in the table below. All of the listed monitors are located in the northwest corner of the DFW metroplex. The Barnett Shale boom in drilling activity occurred from 2005 through 2008, which resulted in a subsequent natural gas production peak in 2012. Oil and gas activity was relatively low from 2000 through 2004, yet the peak design values were still being set by ozone monitors located northwest of the urban core. Therefore, it is incorrect to attribute oil and gas emissions as the primary factor influencing peak ozone values being monitored at these locations. As discussed

previously with respect to source apportionment, the TCEQ is not suggesting that emissions from oil and gas activity have no impact on ozone levels recorded at these monitors. No changes were made in response to this comment.

Table 1: DFW Area Peak Eight-Hour Ozone Design Values from 2000 through 2014

Calendar Year	DFW Area Ozone Monitor Establishing the Design Value	Ozone Design Value (ppb)
2000	Denton Airport South	102
2001	Denton Airport South	101
2002	Denton Airport South	99
2003	Grapevine Fairway / Keller	100
2004	Grapevine Fairway / Keller	98
2005	Eagle Mountain Lake / Fort Worth Northwest / Keller	95
2006	Eagle Mountain Lake	96
2007	Eagle Mountain Lake	95
2008	Denton Airport South	91
2009	Eagle Mountain Lake / Keller	86
2010	Keller	86
2011	Keller	90
2012	Keller	87
2013	Denton Airport South	87
2014	Denton Airport South	81

The Sierra Club and Downwinders commented that the TCEQ arbitrarily assumed production levels would remain constant from 2013 through 2018, but then applied emission rates from 2018 retroactively. The Sierra Club and Downwinders also stated that the TCEQ cannot assume drilling levels will remain constant through 2018. The Sierra Club and Downwinders commented that by applying 2018 emission rates to wells and facilities built and operating before 2018, the TCEQ is constructing a "best case scenario that is already being betrayed by the real world." The Sierra Club and Downwinders points out that there were 940 wells drilled in 2013 versus 1,004 wells drilled in 2014.

The comment does not accurately characterize the manner in which drilling rig emissions were estimated by the TCEQ. The TCEQ is not arbitrarily assuming that production levels will remain constant. When inventory development on this DFW AD SIP revision was performed during 2014, the 2013 drilling information was the latest full year for which information was available from the RRC. Chapter 3, Section 3.5.4.4: *Area Sources* of this DFW AD SIP revision describes how the magnitude of feet drilled in 2013 for three different categories was multiplied by 2018 drilling rig emission rates to arrive at the estimates of 2.82 NO_X tpd and 0.21 VOC tpd for this category.

The figures referenced by the commenters of 940 for 2013 and 1,004 for 2014 refer to the number of drilling permits issued by the RRC for the entire Barnett Shale area, which encompasses more than the 10-county DFW nonattainment area. Also,

the issuance of a drilling permit within a given calendar year does not automatically mean that a well was drilled within that same year. This is why comprehensive data sets from the RRC are used to determine the total feet drilled within a calendar year. Even though the number of drilling permits issued is not used to estimate drilling emissions, the general trend over time is useful to review and is available for 2000 through 2014 on the RRC Barnett Shale Information Web page (http://www.rrc.state.tx.us/oil-gas/major-oil-gas-formations/barnett-shale-information/). During the pre-boom years of 2002 through 2004, the number of drilling permits issued hovered between 900 and 1,200. Due to high natural gas prices from 2005 through 2008, the number of these permits issued climbed to 4,065 in 2008 alone. Due to the lower natural gas prices that have occurred starting in 2009, the number of permits issued has been back to the pre-boom levels hovering between 900 and 1,200 from 2012 through 2014. At this time there is no reason to believe that drilling levels will start increasing to the degree seen from 2005 through 2008. Therefore, it is appropriate to take the latest full year of drilling activity and hold it constant per county when projecting forward to 2018. This same approach was used for counties in the Eagle Ford Shale area where the relatively high 2013 drilling levels were held constant for the purposes of projecting to 2018. No changes were made in response to this comment.

The Sierra Club and Downwinders commented that the TCEQ's "no growth" assumption about oil and gas activity is wrong. The commenters stated there is growth in oil production and associated production equipment in 2014, and that the bell-shaped Hubbert peak theory that estimates a drop off in production starting in 2011 is incorrect. The commenters further stated that if the number of new wells increases, the level of production will also likely increase. The commenters also stated that even though production has leveled off, 2014 production was roughly the same as 2010. The commenters referred to data from the U.S. Energy Information Administration (EIA) about production levels within the Barnett Shale. The commenters concluded that it is unreasonable to assume that all the pre-2018 wells will have 2018 emission rates, as the TCEQ does in the DFW AD SIP revision.

The comment does not accurately characterize the manner in which oil and gas production emissions are estimated. For the drilling category, fleet-average emission rates for 2018 were applied to 2013 activity levels. Emission estimates of oil and gas production are based on rates for individual types of equipment that, unlike drill rigs, are not associated with specific fleet turnover effects that show an emission rate decrease over time. For example, the single largest source of NO_X for natural gas production is from compressor engines needed for transport. In Chapter 3, Section 3.5.4.4 of this DFW AD SIP revision, 0.61 NO_X grams per horsepower-hour (gm/hp-hr) is referenced as the emission rate used in calculating total compressor engine emissions as a function of natural gas production. This emission rate of 0.61 NO_X gm/hp-hr applies to natural gas produced from all wells operating in 2018, whether they were drilled in 2018 or earlier.

The commenters made several statements regarding growth in oil and gas production. In one sentence, the commenters state that there is "growth in oil production and associated production equipment in 2014" but then later states "even though production has leveled off, 2014 production was roughly the same as 2010."

According to the latest data from the RRC Barnett Shale Information page (http://www.rrc.state.tx.us/oil-gas/major-oil-gas-formations/barnett-shale-information/), natural gas production in the Barnett Shale peaked during 2011 and 2012, and has begun to decline, with the 2013 production level 7% lower than 2012, and the 2014 production level 15% lower than 2012. According to the latest available RRC data, the 2014 daily average production level of 4,877 million cubic feet (MMcf) per day is closer to the 4,921 MMcf value for 2009 rather than the 5,159 MMcf value for 2010.

The historical production curve reported by the RRC from 2000 through 2014 follows the bell-shaped Hubbert peak theory very closely with steady increase from 2000 to peaks in 2011 and 2012, followed by a decline. As new data become available from the RRC, the TCEQ will continue to revise these projections. No changes were made in response to this comment.

The SEED Coalition and the Greater Fort Worth Sierra Club commented that the AD SIP revision underestimates emissions from Barnett Shale production. Greater Fort Worth Sierra Club stated that NO_X and VOC emissions from compressor engines are increasing, and should be better reflected in the TCEQ's modeling. The Sierra Club and Downwinders commented that the TCEQ underestimates 2018 oil and gas production levels by taking the latest available RRC data from 2013 and forecasting based on the Hubbert peak theory. The Sierra Club and Downwinders stated the oil and gas industry forecasts emissions based on the number of wells in operation and the number of facilities to exploit those wells, compressors, tanks, pipelines, dehydrators, separators, and associated equipment. The Sierra Club and Downwinders also commented that the number of wells in the Barnett Shale is expected to increase and that the TCEQ is only counting new wells in its estimates of oil and gas pollution. The Sierra Club and Downwinders reference a Rand Corporation study from 2013. The Sierra Club and Downwinders also quoted an industry representative regarding annual production yields after each well is drilled. The Sierra Club and Downwinders also referenced a 2013 University of Texas at Austin (UT-Austin) study that forecasted continued development of the Barnett Shale out to 2030, and quoted from a press release about the study. The Sierra Club and Downwinders stated that this UT-Austin study predicts the Barnett Shale will not reach its production peak until 2018, and it estimates that a majority of the wells will have a 25-year life span.

The TCEQ agrees with the Rand Corporation study conclusion that long-term production emissions associated with each well are higher than the short-term drilling emissions for that well. However, the TCEQ uses different methodologies for estimating drilling and production emissions, and reports the drilling and production emission categories separately within the DFW AD SIP revision to document these distinctions. Table 3-28: *2013 Oil and Gas Drilling Activity for the 10-County DFW Area* and Table 3-29: *2018 Oil and Gas Drilling Rig Emissions for 10-County DFW Area* of this DFW AD SIP revision summarize 2018 drilling emissions estimation. 2018 oil and gas production emissions estimation is summarized in Table 3-30: *Barnett Shale Emission Projection Factors from 2013 to 2018*, Table 3-31: *2018 Oil and Gas Production Emissions for 10-County DFW Area*, and Table 3-32: *2018 Point Source Oil and Gas Emissions for 10-County DFW Area*.

The TCEQ has funded 15 oil and gas EI improvement studies since 2007, with 12 of those being completed from 2010 through 2014. They are all available on the TCEQ Air Quality Research and Contract Reports Emissions Inventory Web page (http://www.tceq.texas.gov/airquality/airmod/project/pj_report_ei.html). Many of these reports focus on improving the estimation of emissions from various oil and gas drilling and production equipment. The TCEQ uses the latest available production activity data from the RRC both to estimate and to spatially allocate compressor engine emissions.

The comment that emissions should be estimated simply on the number of wells in operation is incorrect. This could only be true if natural gas wells annually produced the same amount of gas on average over an indefinite period of time. During 2014, the RRC reported a total well count "snapshot" throughout the Barnett Shale of roughly 17,500. If all of these wells had been drilled in 2013, the 2014 production levels would be extremely high. If all of these wells had been drilled 20 years earlier in 1994, the 2014 production levels would be extremely low. Emission levels from equipment such as compressors are directly dependent on the amount of gas produced/compressed, and not on the number of wells. The latest available RRC data show Barnett Shale natural gas production declining since 2012, which indicates that NO_X and VOC compressor engine emissions associated with production will also decline.

The UT-Austin study previously referenced concluded that it takes roughly five years to extract 50% of the estimated ultimate recovery of Barnett Shale natural gas wells. It then takes another 20 years to extract the remaining 50%. These conclusions detailed in the study are in agreement with the industry representative referenced by the commenter that said "production stays very level after initial declines in the first few years." The commenter provides no documentation or data set to support the assertion that the oil and gas industry forecasts emission levels.

The commenters state that the UT-Austin study showed Barnett Shale natural gas production peaking in 2018. However, the commenters did not mention that this was the result of a sensitivity analysis where the Henry Hub spot price for natural gas was assumed to remain constant over several years at $10 per million British thermal units. According to the EIA, the summer of 2008 was the last time the Henry Hub spot price was at or above the $10 level. It declined to as low as $3 in September 2009 and has hovered between $3 and $5 since then. The UT-Austin study performed a total of four price sensitivity analyses for Henry Hub spot prices at levels of $3, $4, $6, and $10. The $3 scenario has a production peak around 2012 and this matches the historical production peak being reported by the RRC.

The TCEQ stands behind its use of the Hubbert peak theory approach for predicting future production. All of the sensitivity analyses shown in the UT-Austin study show some form of the bell-shaped Hubbert curve, with production steadily rising to a peak year, and then falling off over time. The TCEQ believes that the UT-Austin study did a very good job of predicting Barnett Shale production for a Henry Hub spot price of $3 based on the 2010 drilling and 2011 production data

that were available at the time the work was done. The study specifically says that a "model update that will include all wells drilled through 2012 and their production through mid-2013 will be run in 2014." When this update is available, the TCEQ will review it.

The TCEQ used the full year of 2013 drilling and production data as the basis for projecting to 2018. When the full year of 2014 drilling and production data are available from the RRC, the TCEQ will use it instead for projection purposes for future SIP revisions. The TCEQ concurs with the results of studies suggesting that Barnett Shale production will likely continue out to 2030 and perhaps beyond. However, the future attainment year modeled for this DFW AD SIP revision is 2018, and the TCEQ has used the latest available information for projecting to it. No changes were made in response to this comment.

The Sierra Club and Downwinders commented that the TCEQ is underestimating oil and gas emission from the Haynesville Shale. The Sierra Club and Downwinders stated that the four counties of Falls, Leon, Limestone, and Robertson have a large number of permitted compressor stations that emit as much or more NO_X tons than electric utilities located within these counties. The Sierra Club and Downwinders state that the TCEQ has never released any estimates for the magnitude of NO_X and VOC emitted from these sources in its 2018 modeling efforts.

The TCEQ disagrees with the comment. Section 2.3: *2018 Future Year Point Source Modeling Emissions Development* of Appendix B of this DFW AD SIP revision includes a thorough discussion of the 2018 point source EI development work that was done for all 254 Texas counties. The full set of modeling files and inputs for these point source data sets are available on the TCEQ FTP site (ftp://amdaftp.tceq.texas.gov/pub/TX/ei/2006/fy2018/point/). A summary of the 2018 emission estimates for the 13 point source facilities within these four counties is presented below. Please note that Falls County currently has no large point sources.

Table 2: 2018 Point Source Emission Estimates for Fall, Leon, Limestone, and Robertson Counties

RN Code	County Name	Standard Industrial Classification Description	NO_X (tpd)	VOC (tpd)
RN100542927	Limestone	Electric Services	43.04	0.96
RN100216191	Robertson	Electric Services	14.31	0.23
RN100226570	Robertson	Electric Services	5.34	0.02
RN102979473	Limestone	Crude Petroleum and Natural Gas	0.22	0.51
RN104137146	Limestone	Crude Petroleum and Natural Gas	0.10	0.05
RN100929645	Robertson	Crude Petroleum and Natural Gas	0.05	0.01
RN104898978	Robertson	Natural Gas Liquids	0.26	0.21
RN100542646	Limestone	Natural Gas Transmission	<0.01	<0.01
RN101700060	Limestone	Natural Gas Transmission	0.39	0.28
RN101627792	Robertson	Petroleum Bulk Stations and Terminals	<0.01	0.07
RN100215672	Limestone	Minerals and Earths	0.03	0.00

RN Code	County Name	Standard Industrial Classification Description	NO_X (tpd)	VOC (tpd)
RN100211093	Leon	Blast Furnaces and Steel Mills	0.58	0.22
RN102039575	Robertson	Transportation Services	0.01	0.09
Total			64.34	2.66

The 2018 non-point oil and gas production emission estimates for all Texas counties are available on the TCEQ FTP site (ftp://amdaftp.tceq.texas.gov/pub/Oil_Gas_EI/2018/). A summary of these emission estimates for these four counties is provided in the table below.

Table 3: 2018 Oil and Gas Production Estimates for Falls, Leon, Limestone, and Robertson Counties

County Name	NO_X (tpd)	VOC (tpd)
Falls	0.01	0.12
Leon	4.07	9.99
Limestone	3.37	4.00
Robertson	6.51	13.07
Total	13.96	27.18

Figures presented in the above tables have been aggregated into four-county totals by categories for electric services and oil and gas activities during 2018. As shown, all electric utility emissions are estimated to be 62.69 NO_X tpd and 1.22 VOC tpd, while all oil and gas emissions are estimated to be 14.99 NO_X tpd and 28.31 VOC tpd. No changes were made in response to this comment.

Table 4: 2018 Summary of Electric Services and Oil and Gas Production Emissions for Falls, Leon, Limestone, and Robertson Counties

Source Type Description	NO_X (tpd)	VOC (tpd)
Electric Services – Point	62.69	1.22
Oil and Gas – Point	1.03	1.13
Oil and Gas - Non-Point	13.96	27.18
Oil and Gas – Total	14.99	28.31

The Sierra Club and Downwinders commented that the TCEQ radically changed its own forecasts of 2018 Barnett Shale air pollution based on new Barnett Shale production figures from the RRC. The Sierra Club and Downwinders stated that the TCEQ reported these estimates in January 2014 to be 39 NO_X tpd and 58 VOC tpd. The Sierra Club and Downwinders further stated that TCEQ reported these estimates in January 2015 to be 16.5 NO_X tpd and 50 VOC tpd. The Sierra Club and Downwinders stated that these significant changes in the 2018 projections indicate high uncertainty in the AD analysis.

The TCEQ has updated the emission estimates to reflect the latest available data in order to have the most accurate DFW AD SIP revision. On slide 4 of a January 2014

presentation given by the TCEQ (https://www.tceq.texas.gov/assets/public/implementation/air/am/committees/pmt_dfw/20140131/20140131-DFW-Ozone-Emissions-Inventory-Kite.pdf), the 2018 oil and gas total (from both drilling and production) is reported to be 18.04 NO_X tpd and 43.69 VOC tpd. In Table 12: *2006 and 2018 DFW Area Anthropogenic Emissions Summary* of the technical supplement to the proposed DFW AD SIP revision released in January 2015, the TCEQ reported revised 2018 emission projections for these categories to be 11.13 NO_X tpd and 24.45 VOC tpd. The net change in the NO_X emissions projection is 6.91 NO_X tpd.

The TCEQ has publicly stated that the 2018 projections would change based on the availability of new information. For VOC emissions, the net change in projection from January 2014 to January 2015 is 19.24 VOC tpd. The reduction in VOC was due primarily to a change in the methodology for estimating condensate storage tank emissions. An emissions estimation change of 19.24 VOC tpd versus 8 VOC tpd will have little impact on modeled ozone formation from this category because the reactivity levels of this type of VOC are low compared with those for the abundant and highly reactive biogenic category. Since changes in NO_X have so much more of an effect on ozone formation in the DFW nonattainment area, it would be misleading to combine NO_X and VOC of low reactivity together for emission comparison purposes. No changes were made in response to this comment.

The Sierra Club and Downwinders referenced a July 2012 study: Olaguer (2012): *The potential near-source ozone impacts of upstream oil and gas industry emissions*, Journal of the Air & Waste Management Association, 62:8, 966-977. The commenters stated that the study concludes the following: "Routine emissions from a single gas compressor station or large flare can raise ozone levels by 3 ppb as far as five miles downwind, and sometimes by 10 ppb or more as far as 10 miles downwind." The commenters provided excerpts from the study stating that "aggregations of oil and gas sites may act in concert so that they contribute several parts per billion to 8-hr ozone during actual exceedances" and that "major metropolitan areas in or near shale formations will be hard pressed to demonstrate future attainment of the federal ozone standard, unless significant controls are placed on emissions from increased oil and gas exploration and production."

The comment's use of the first quote summarized above is not referenced from the study itself. In January 2013, the TCEQ provided formal comments in the form of a letter to the editor of the *Journal of the Air & Waste Management Association* in response to this study (Brymer, David, (2013), Letter to the Editor, *Journal of the Air & Waste Management Association*, 63:2, 125-126). In this letter to the editor, the TCEQ explains that the 2012 Olaguer study has numerous shortcomings. For example, the author of the study states that significant controls should be placed on oil and gas exploration and production, ignoring that the TCEQ had already done so in 2007 when it required a low emission rate for all stationary engines above 50 horsepower in the DFW nonattainment area as part of the Chapter 117 rules. By not acknowledging the existence of these rules, the author modeled a much higher unregulated NO_X emission rate, thus increasing overall NO_X emissions for the scenario by a factor of 10.

The most notable flaw in the 2012 Olaguer study, however, was artificially collocating a large and highly reactive propylene flare with the NO_X emissions from a compressor engine.

This flare, described as receiving natural gas in the abstract, was modeled as receiving a significant amount of propylene (an HRVOC that can increase ozone production efficiency). No evidence or citation was presented to substantiate the addition of propylene to the modeled flare's input stream at a natural gas facility. HRVOCs are rarely present in upstream oil and gas operations according to TCEQ study data.

The author's addition of propylene to an oil and gas service flare appears highly unrealistic, even for an emissions event.

The TCEQ's letter concluded that because of noted flaws, the results of the study cannot be considered reliable (Brymer, 2013). No changes were made in response to these comments.

An individual commented that oil and gas operations are the dominant sources of VOC precursors for ozone formed in the winter.

The TCEQ disagrees with the statement that oil and gas operations are the dominant source of VOC precursors during winter or any other time of year in the DFW nonattainment area. The DFW AD SIP revision clearly shows that area source emissions are the dominant category for anthropogenic VOC precursors within the DFW nonattainment area. This is shown within this DFW AD SIP revision in Table ES-1: *Summary of 2006 Baseline and 2018 Future Year Anthropogenic Modeling Emissions for DFW*, Table 3-19: *2006 Summer Baseline Anthropogenic Emissions for 10-County DFW*, Table 3-33: *2018 Future Case Anthropogenic Emissions for 10-County DFW*, and Table 3-34: *2006 Baseline and 2018 Future Modeling Emissions for DFW Area*. Development of area source emission estimates is discussed in Chapter 3, Sections 3.5.2.3: *Area Sources* for 2006 and 3.5.4.4: *Area Sources* for 2018. No changes were made in response to this comment.

<u>Ozone Impacts of Cement Kiln NO_X Emissions</u>

The Sierra Club and Downwinders stated that the concentration of the three cement kilns in the Midlothian area effectively forms a "super plume" upwind of the DFW metropolitan area during ozone season. The commenters referenced three studies demonstrating that Midlothian cement plant pollution significantly affects DFW ozone levels:

- An August 2005 Environ study funded by the TCEQ entitled *Accounting for the Impacts of Variable Cement Kiln Emission Rates on Ozone Formation in the Dallas/Fort-Worth Area*. The Sierra Club and Downwinders included a plot from Figure 3-5: *Daily maximum 8-hour ozone for the 2012 baseline using CAMx 4.31 and a2 emissions and differences from the 2009 baseline* of that study for the "worst case" scenario for all three cement kilns at full operation resulting in a 1-11 ppb ozone increase throughout various Texas counties.

- A June 2006 Environ report entitled *DFW APCA Run for 2009 with East Texas EGU Controls*. Using a baseline of 28 NO_X tpd for the three cement kilns, this study performed sensitivity tests by dropping the NO_X emissions by 10 tpd to 18 tpd, and by 20 tpd to 8 tpd. The Sierra Club and Downwinders emphasized that the highest modeled ozone reductions from these sensitivity tests were in Tarrant County.
- A University of Texas at Arlington (UT-Arlington) analysis presented at the NCTCOG offices in November 2013. This UT-Arlington study applied a 90% cement kiln NO_X reduction from 6 AM to 12 PM on the August 16 episode day from a 1999 episode. The Sierra Club and Downwinders included a table from slide 30 of the presentation showing that a 2.04 ppb ozone reduction was modeled from 7:00 PM to midnight compared with the previous episode day of August 15 for the Denton Airport South monitor for the 2009 future year. The Sierra Club and Downwinders commented that this 2.04 ppb ozone reduction could be achieved for the 2018 future design value currently being modeled by the TCEQ at the Denton Airport South monitor.

The TCEQ disagrees with this comment. The ozone episode modeled for all three referenced studies spanned 10 days from August 13-22, 1999, and 2009 was the future year modeled in the analyses. The episode for this DFW AD SIP revision is more recent and spans 67 days during 2006, covering all of June and parts of both August and September. As shown in Table 3-37: *Summary of Ozone Modeling Platform Changes* of this DFW AD SIP revision, the TCEQ now has a much more updated modeling configuration that is an improved predictor of future ozone for the DFW nonattainment area.

Table 3-1: *NO_X emissions by source region and emission category on August 17* on page 7 of the August 2005 Environ study shows Ellis County point source NO_X at 45 tpd, most of which is from cement kilns. Environ modeled five scenarios, multiplying the mean emission rate by adjustment factors ranging from 0.538 to 1.462. The chart referenced by the commenter is the "worst case" where 65.8 NO_X tpd total was modeled for the three kilns, which is almost four times the current cement kiln cap of 17.64 NO_X tpd modeled in this DFW AD SIP revision. These sensitivity tests were run in 2005 and 2006 to help determine the appropriate level of control for cement kilns in the DFW nonattainment area. The subsequent cement kiln rule caps issued in 2007 were the results of these efforts.

The June 2006 Environ study started with a cement kiln baseline of 28 NO_X tpd, and considered two reduction scenarios for the 2009 future year: a 10 tpd reduction for a control level of 18 NO_X tpd, and a 20 tpd reduction for a control level of 8 NO_X tpd. The ozone impacts of these scenarios were reported in Table 4-12: *2009 future design values with high and low-end cement kiln controls and differences from the 2009 a1 baseline* on page 4-27 of the report. The maximum eight-hour ozone design value reductions of 0.46-1.02 ppb were predicted in Arlington roughly 17 miles downwind of Midlothian. The Denton Airport South monitor, which is located roughly 52 miles downwind of Midlothian, saw impacts of 0.03-0.07 ppb from these reduction scenarios. The 18 NO_X tpd control scenario is roughly equivalent to the current 17.64 NO_X tpd cap limits currently modeled for 2018.

Table 3-46: *2018 Ozone DV_F Denton, Parker, and Kaufman Contributions* of this DFW AD SIP revision includes 2018 ozone source apportionment results for eight different source category groups within the DFW nonattainment area. At the Denton Airport South monitor, cement kilns at 17.64 NO_X tpd are shown to be the smallest local contributor to the future design value at 0.21 ppb, while the on-road sector is shown to be the highest contributor at 8.66 ppb with 119.69 NO_X tpd of emissions. Ozone source apportionment analyses were done for all monitors. Of the 19 monitors operating in DFW during the 2006 episode, the monitor with the highest 2018 cement kiln contribution to the future design value was Arlington Municipal Airport at 0.58 ppb. Chapter 3, Section 3.7.2 of this DFW AD SIP revision shows that the Arlington Municipal Airport monitor, which is located 13 miles downwind of Midlothian, has a 2018 future design value of 69 ppb for the "all days" attainment test and 68 ppb for the "top 10 day" attainment test.

As of December 2014, the Arlington Municipal Airport monitor has a design value right at 75 ppb and is currently in compliance with the standard. This 75 ppb level is based on a three-year average of fourth-high readings of 92 ppb, 68 ppb, and 65 ppb from 2012, 2013, and 2014, respectively. Although studies done several years ago modeled very high NO_X levels for cement kilns and thus showed relatively higher ozone impacts, the 17.64 NO_X tpd cap contributes only 0.21 ppb of ozone at the Denton Airport South monitor, which is currently the highest ozone design value monitor for the DFW nonattainment area. Compared with the others, the Arlington Municipal Airport ozone monitor is more sensitive to cement kiln NO_X emissions but is currently in compliance with the 75 ppb standard.

The purpose of the UT-Arlington study referenced by the commenter was to show that the temporal distribution of NO_X emissions can have a significant impact on ozone formation. The TCEQ agrees with this principle because it is a fundamental aspect of ozone chemistry. The results of a 2.04 ppb ozone reduction modeled at the Denton Airport South monitor are taken out of context. The table excerpted stated that this reduction is from 7:00 PM to midnight compared with the previous day. Peak ozone levels at specific monitors, whether monitored or modeled, can change much more than 2 ppb from one day to the next. Furthermore, the 7:00 PM to midnight diurnal period does not drive the daily maximum eight-hour ozone values monitored. Since the presence of solar radiation is necessary for ozone formation, peak eight-hour ozone levels on exceedance days are typically monitored and modeled from mid-day through mid-afternoon. Since monitored ozone values are already quite low from 7:00 PM to midnight, it is erroneous to conclude that an extra 2.04 ppb of ozone reduction during this period will impact a modeled future design value for this DFW AD SIP revision. The Environ sensitivity work with the same August 1999 episode and a 2009 future case showed that reducing cement kiln NO_X by 20 tpd (from 28 tpd down to 8 tpd) resulted in a 0.07 ppb eight-hour ozone design value reduction at Denton Airport South. The source apportionment work reported in the DFW AD SIP revision for 2018 shows a 0.21 ppb contribution from 17.64 NO_X tpd emitted by the cement kilns. No changes were made in response to this comment.

<u>Ozone Impacts of EGU NO_X Emissions</u>

Public Citizen commented that a 2.4 ppb ozone reduction in the future design value at the

Denton Airport South monitor could be achieved by application of SCR on coal-fired power plants to the south and east of DFW. The League of Women Voters of Dallas and Greater Fort Worth Sierra Club commented that the dominant wind direction from the southeast brings polluted air from coal-fired power plants in east Texas. One individual and the Greater Fort Worth Sierra Club commented that requiring SCR on East Texas coal-fired power plants would have a measureable impact on the air pollution in North Texas. The Sierra Club and Downwinders stated that NO_X emissions from Texas coal-fired EGUs contribute to ozone nonattainment in the DFW nonattainment area and that application of SCR controls would significantly reduce NO_X emissions, resulting in dramatically reduced ozone levels within DFW. The Sierra Club and Downwinders referenced a June 2006 Environ study funded by the TCEQ entitled *DFW APCA Run for 2009 with East Texas EGU Controls* in which SCR NO_X controls on nine EGUs in eastern Texas showed ozone design value reductions of 1.0 and 1.5 ppb at the Arlington and Midlothian monitors, respectively. The remaining DFW area monitors showed reductions from 0.5 to 0.8 ppb from this analysis.

The ozone episode modeled for this study spanned 10 days from August 13-22, 1999, and 2009 was the future year modeled in the analyses. The episode for this DFW AD SIP revision is more recent and spans 67 days during 2006, covering all of June and parts of both August and September. As shown in Table 3-37 of this DFW AD SIP revision, the TCEQ now has a much more updated modeling configuration that is an improved predictor of future air quality for DFW. The southeasterly winds are dominant during DFW ozone seasons, and this updated 2006 episode reflects that.

Based on 2014 monitoring data, the regulatory design values at the Midlothian and Arlington Municipal Airport monitors are 71 ppb and 75 ppb, respectively, using the fourth-high values from 2012, 2013, and 2014. Since these monitors are already attaining the 75 ppb standard, additional reductions of 1-1.5 ppb from NO_X controls on EGUs in eastern Texas are not needed to help these monitors demonstrate attainment.

Table 3-46 of this DFW AD SIP revision contains 2018 ozone source apportionment results for the 67-day episode from 2006. At the Denton Airport South monitor, the 12 EGU facilities within the DFW nonattainment area are shown to account for 0.41 ppb of the 76.72 ppb design value for 2018. The non-DFW Texas EGUs are shown to account for 2.64 ppb of the 2018 future design value. This latter non-DFW group consists of 125 EGU facilities located throughout the 244 non-DFW Texas counties, and are modeled at a total of 474.27 NO_X tpd for 2018 in accordance with the Clean Air Interstate Rule Phase II caps discussed in Chapter 3, Section 3.5.4.1: *Point Sources* of this DFW AD SIP revision. The June 2006 Environ analysis showed that the Denton Airport South monitor received a 0.6 ppb reduction in its 2009 design value from application of the SCR NO_X controls on nine east Texas EGUs. If this figure still applied, the Denton Airport South design value for 2018 would be reduced from 76.72 ppb to 76.12 ppb, which still rounds to one digit and then truncates to the 76 ppb future design value referenced in this DFW AD SIP revision. No changes were made in response to this comment.

Modeling of Catastrophic Accidents

An individual commented that the TCEQ's modeling should account for catastrophic accidents that can and will occur. The commenter noted specific examples such as broken gas pipelines, explosive storage tanks, earthquakes, car/rail collisions, and car/truck collisions. The individual also stated that the TCEQ's modeling does not account for the synergistic effects of NO_X and VOC reacting to form ozone. An individual stated that the pollution from General Motors mixes with the gas wells and the cement kiln plants pluming this way, and no one is looking at that in the ozone SIP.

The TCEQ disagrees that its ozone modeling does not account for the interaction between NO_X and VOC. This is precisely what photochemical models are designed to do, and the TCEQ currently uses the latest version of the CAMx for this purpose. The NO_X and VOC emission inputs for CAMx from various sources are spatially and temporally allocated throughout the entire modeling domain, which encompasses most of North America. The VOC emissions from each source are matched to appropriate reactivity values for forming ozone. The meteorological inputs to CAMx account for the appropriate hourly wind speed and wind direction.

Ozone formation typically occurs downwind of where NO_X and VOC precursors are emitted, so this pollutant has to be modeled on a regional basis versus a micro-scale one. Since ozone exceedances tend to occur over several days and weeks, the episodes for modeling them must match these longer periods of time. The types of accidents mentioned by the commenter can only be appropriately modeled at a micro-level geographic scale within very short periods of time. Inclusion of such accidents in large-scale multi-week ozone modeling is not practical because each hour of each episode day would need to include some type of accident within each of the several thousand grid cells contained in the modeling domain. Such an approach is unrealistic for future year modeling because the dates, times, and locations of accidents are unknown. These events can only be modeled in historical years if this information is known, along with the magnitude of additional NO_X and reactive VOC emissions that resulted from the event. No changes were made in response to this comment.

WEIGHT OF EVIDENCE (WOE) COMMENTS

General Weight of Evidence

The EPA stated that the WoE components raise some concern about whether the DFW nonattainment area will be able to attain the 2008 eight-hour ozone standard of 75 ppb in 2018.

The TCEQ disagrees that the DFW nonattainment area will not attain the 2008 eight-hour ozone standard of 75 ppb in 2018, or possibly earlier. The most essential observed ozone precursor, NO_X, is trending downward, which suggests that the ozone design value will be below the 75 ppb NAAQS by 2018. Moreover, the modeling component of the WoE also strongly suggests that the NAAQS will be met. No changes were made in response to this comment.

The Sierra Club, Downwinders and forty-two individuals commented that future ozone design values for some of the DFW nonattainment area monitors are above 75 ppb in the analysis. The Sierra Club and Downwinders stated that this "close enough" approach for approval from the EPA is not satisfactory.

The 2007 EPA modeling guidance lists an 82-87 ppb WoE range for the attainment test, which equates to a range of 73-78 ppb for the 2008 eight-hour ozone standard of 75 ppb. In Chapter 3, Section 3.0: *Introduction* of this DFW AD SIP revision, this was the latest available guidance from the EPA when attainment modeling work was done for this AD analysis. All of the future design values modeled and presented in the documentation fall well below this 78 ppb threshold. The updated draft guidance issued by the EPA in December 2014 no longer specifies a numeric WoE range for future design values. Instead, Section 4.9.3: *Weight of Evidence Summary* on page 190 of this the draft guidance requires a "fully-evaluated, high-quality modeling analysis that projects future values that are close to the NAAQS." This AD is meeting both the older requirement of modeling future design values at or below 78 ppb, and the new requirement that projected future design values be "close to the NAAQS." No changes were made in response to this comment.

<u>Voluntary Measures</u>

The Sierra Club and Downwinders commented that the WoE analysis improperly relies on unenforceable and uncertain measures. The Sierra Club and Downwinders stated that the TCEQ improperly assumes benefits from energy efficiency, renewable energy, and voluntary programs. The Sierra Club and Downwinders stated that the TCEQ is improperly assuming benefits for federal fuel and engine standards that will not be fully implemented until 2025, and that the TCEQ is also double-counting these benefits.

The TCEQ disagrees with this assessment and notes that the claims are inconsistent with the EPA guidance. Section 4.9.1.3: *Additional Emissions Controls/Reductions* on page 186 of the draft guidance specifically states that "there may be various emissions sources and/or controls that are difficult to represent in the modeling analysis and the effects of some emissions controls may be difficult to quantify." This section specifically lists energy efficiency and renewal energy measures as an example of items that can be included in a WoE analysis without quantification. Page 187 of the draft guidance specifically states that voluntary measures that are not enforceable should be listed in the AD SIP because "they can still lead to positive actions in the nonattainment area that can lead to lower emissions" and that they "should be documented to the fullest extent possible." The TCEQ mentions these voluntary measures in the WoE section, but does not quantify them, and is therefore not claiming specific benefits for them.

The commenter does not properly characterize how the benefits of fuel and vehicle emission standards are referenced in the DFW AD SIP revision. Chapter 3 of the proposed DFW AD SIP revision notes that the MOVES2010b model did not include the benefits of Tier 3 vehicles and 10 ppm "low sulfur" gasoline. Chapter 3, Section 3.7.4.1 of the proposed DFW AD SIP revision presents the results of an analysis that estimated the 2018 benefits that could be obtained from these federal rules, and showed that the reductions estimated by the TCEQ are consistent with those estimated by the EPA. Just because the Tier 3 vehicle standards are not fully phased-in until the 2025 model year does not mean that benefits from the tighter vehicle and fuel standards will not exist in the 2018 calendar year. The commenter indicates that these benefits are being double-counted just because they are referenced in different portions of the DFW AD SIP revision. Simply referencing the same benefit in both Chapter 3, Section 3.7.4.1 and Chapter 5, Section 5.5:

***Conclusions* of the proposed DFW AD SIP revision does not mean it is being double-counted in the analysis. No changes were made in response to this comment.**

Meteorological Trends

The EPA concluded that the WoE analysis is not overly supportive that the modeling is conservative. The EPA noted that the TCEQ has provided information on recent ozone trends to support its conclusion the area will attain by 2018. The EPA believes, however, that most of the recent years have been average or below normal in overall conduciveness for ozone formation. The EPA stated that temperatures have been high for some of these years, which does lead to higher ozone, but wind speeds have also been higher than normal and this leads to lower ozone concentration with more dispersion. The EPA noted that 2011 was one of these types of years. The EPA believes that 2014 had very favorable meteorology and was one of the lowest ozone monitoring years in the Eastern half of the U.S. with a 2014 DFW nonattainment area regulatory design value of 81 ppb. The EPA's view is that 2014 was abnormal due to its lower than average temperature and frequency of frontal passages that led to reduced background buildup, and is thus not likely to be repeated.

The TCEQ disagrees with the EPA that the most recent years of 2012 through 2014 are less conducive to ozone formation. The TCEQ agrees that higher than average temperatures can lead to higher ozone; however, winds speeds were not faster than normal. In addition, the TCEQ does not believe that wind speed is the sole factor that determines ozone concentrations. The National Oceanic and Atmospheric Administration's National Climatic Data Center places the winds from the second half of the DFW ozone season for the years of 2011-2014 in the climatological normal range, with winds in 2014 slower than the climatological normal. Relying only on wind speeds would lead one to believe that ozone should have been high in 2014, which was not the case. Moreover, if meteorology remains normal (in the statistical sense), the 2014 ozone season is more likely to be repeated. Due to the downward trend of ozone precursors, an ozone season with normal meteorological conditions will in turn lead to lower ozone concentrations. No changes were made in response to this comment.

The Sierra Club and Downwinders stated that the TCEQ does not properly account for uncertainties in the meteorological trends analysis. The Sierra Club, Downwinders and forty-two individuals commented that the state relied on overly optimistic 2006 meteorology in its AD.

The TCEQ disagrees with this assessment. A full discussion of meteorological trends is provided in Section 3.6: *Meteorological Characterization and Trends* of Appendix D: *Conceptual Model for the DFW Attainment Demonstration SIP Revision for the 2008 Eight-Hour Standard*. The TCEQ also disagrees with the claim that 2006 represented an "overly optimistic" meteorological year for modeling purposes. As documented in Chapter 3, Section 3.3: *Episode Selection* of this DFW AD SIP revision, there were a total of 50 exceedance days of the 75 ppb standard in 2006, 18 of which occurred in June and 13 of which occurred in August/September. This is more exceedance days than occurred in any of the years from 2007 through 2012.

A geographical area is considered to be in extreme drought if its Palmer Drought Severity Index (PDSI) is in the range of -0.4 through -0.7. The DFW nonattainment area is included within the North Central Climate Division of Texas. In the 120 years from 1895 through 2014, there were eight years that this region experienced extreme drought during the four consecutive months of June, July, August, and September. Table 5: *PDSI Values for Extreme Drought Years in North Central Texas* summarizes these figures. As shown in Table 5: *PDSI Values for Extreme Drought Years in North Central Texas*, both 2006 and 2011 are included in this group of extreme drought for four consecutive summer months, and 1956 was the most recent year prior to 2006 that the same pattern occurred. No changes were made in response to this comment.

Table 5: PDSI Values for Extreme Drought Years in North Central Texas

Year	June	July	August	September
1909	-4.47	-5.16	-4.77	-5.10
1911	-5.97	-5.41	-4.68	-4.93
1918	-5.26	-5.78	-6.11	-5.57
1925	-6.03	-6.41	-6.40	-5.93
1952	-4.04	-4.45	-5.12	-5.29
1956	-5.30	-6.03	-6.31	-6.82
2006	-4.27	-4.84	-4.93	-4.58
2011	-4.36	-5.42	-5.80	-5.99

Emission Trends

The EPA commented that NO_X trends are flat in the western portion of the DFW nonattainment area, and that these monitors are impacted by oil and gas activity. Furthermore, the EPA believes that NO_X reductions from on-road and non-road sources in the urbanized area will not help these western monitors come into compliance.

The TCEQ disagrees with this conclusion. As documented in Chapter 5, Section 5.2.2.2: *Ambient NO_X Trends* of this DFW AD SIP revision, the greatest NO_X concentrations are at highly urbanized locations, such as the Hinton monitor, which are most sensitive to on-road emissions. The Parker County monitor is in a more rural location at the western edge of the DFW nonattainment area, so it is expected that the trend at the Parker County monitor would be relatively flat. Historical ozone data from before the oil and gas boom shows that the northwest monitors have always had the highest eight-hour ozone design values. However, these monitors have also had the largest decline in eight-hour ozone design values. The TCEQ also disagrees that ozone levels monitored in areas with significant oil and gas development are primarily impacted by oil and gas activity. An examination of the NO_X concentrations at the monitors located near oil and gas development show some of the lowest NO_X concentrations monitored throughout the DFW nonattainment area. No changes were made in response to this comment.

The Sierra Club and Downwinders stated that the TCEQ does not properly account for uncertainties in the emissions trends.

The TCEQ disagrees with this comment. Figure 5-10: *90th Percentile Daily Peak NO_X Concentrations in the DFW Area* of the DFW AD SIP revision includes monitored trends in NO_X concentrations at twelve monitors spanning from 1997 through 2013. All but the most western rural monitor in Parker County show downward trends in monitored NO_X, and those monitors within the urban core (such as Dallas Hinton and Redbird Airport) show the most pronounced NO_X reductions over time. These concentrations are corroborated within this DFW AD SIP revision by Figures 5-4: *Reported Point Source NO_X Emissions for the 10-County DFW Area* through 5-9: *Ozone Season (March through October) Daily Peak NO_X Trends in the DFW Area*. This series of figures presents long-term NO_X emission trends for on-road, non-road, point, and electrical generation (subset of point) sources. If these downward emission trends were not occurring over the span of several years, all of the monitors would be showing flat NO_X concentration trends from 1997 through 2013. No changes were made in response to this comment.

<u>Ozone Trends</u>

The EPA commented that the 2013 regulatory design value for the DFW nonattainment area was 87 ppb, and states that it is unlikely that this value can drop down to 75 ppb within the five years necessary to show attainment in 2018. The EPA acknowledged that the regulatory design value dropped 6 ppb in the one-year span from 2013 to 2014, but considers this to be anomalous and not likely to be repeated in the future. The Sierra Club and Downwinders commented that the DFW AD SIP revision underestimates future ozone design values.

The TCEQ disagrees with the EPA's statement that a one-year drop in the eight-hour ozone design value of 6 ppb is not likely to occur again. The eight-hour ozone design value has dropped by 6 ppb or more in past years as well. The eight-hour ozone design value dropped 6 ppb from 2013 to 2014, and it dropped by 7 ppb from 2006 to 2007. In the successive five-year year time periods from 2004-to-2009, 2005-to-2010, 2006-to-2011, and 2007-to-2012, the design value dropped 11 ppb, 13 ppb, 12 ppb, and 11 ppb, respectively. The TCEQ modeling effort predicts attainment by 2018 and all observed trends for ozone and its precursors support this statement. No changes were made in response to this comment.

The EPA commented that extrapolating the ozone design value data provided by the TCEQ shows that the DFW nonattainment area will not meet the 2018 attainment date. The EPA also states that there are not enough NO_X reductions, including from the on-road source category, to attain the ozone standard. The Sierra Club and Downwinders commented that the DFW AD SIP revision misevaluates emission reductions necessary to demonstrate attainment. The EPA notes that the TCEQ provides a trend analysis in the DFW AD SIP revision that includes a roughly linear relationship to demonstrate the long-term trend in monitored ozone reductions. This equation indicates the eight-hour ozone design values have dropped at a rate of 1.1 ppb per year. The EPA modified the table to extrapolate the DFW eight-hour ozone design values in 2017 and 2018, and noted that the area will be in the 80-82 ppb design value range for these future years. The EPA concluded that, since the majority of NO_X reductions are from federal measures for on-road and non-road sources, it seems unreasonable to expect this rate of reduction to accelerate. Based on these monitoring data and emission inventory trends, the EPA states that it is difficult see how the area would reach attainment in 2018.

The TCEQ disagrees with the EPA's comment and misuse of extrapolating beyond the data limits in the linear regression. The linear regression fit-line helps the reader visualize the downward trend, but an extrapolation of these data to a future year should not be relied upon to demonstrate attainment. Because of current observed downward trends in ozone and ozone precursor data, and the more advanced modeling methods available with tools such as CAMx, the AD shows that the DFW nonattainment area will meet the 2018 ozone attainment date. The EPA's own photochemical modeling in support of the Tier 3 and 10 ppm sulfur rule projected 2018 future ozone design values for Denton County at 75 ppb and Tarrant County at 76 ppb. The TCEQ notes that the 2014 ozone design value is already at 81 ppb, but the EPA comment indicates it will not drop to the 80-82 ppb level until 2017 and 2018. No changes were made in response to this comment.

The EPA noted that the TCEQ provided a large chapter on WoE using recent monitoring data as the principal form of evidence. The EPA stated that the monitoring data trends do not show the large drops in local ozone levels, and that this therefore raises a fundamental question about whether the photochemical modeling is working as an accurate tool for assessing attainment for the DFW nonattainment area in 2018.

The TCEQ disagrees with this statement because the evidence at monitoring sites does show strong downward trends, as discussed below in this response to comment and in Chapter 5, Section 5.2.1: *Ozone Design Value and Background Ozone Trends* in this DFW AD SIP revision. Furthermore, the EPA acknowledges in both the former and draft guidance documents that, by definition, models are simplistic approximations of complex phenomena. No changes were made in response to this comment.

Public Citizen commented that the air in the HGB nonattainment area is getting better than the air in the DFW nonattainment area because the business community in HGB got together and actually did something about air quality. The commenter states that the HGB nonattainment area began to do a number of measures suggested over time, and it is working.

Air quality in both the HGB and DFW nonattainment areas continues to improve. Both areas have seen ozone levels reduced 29% and 21%, respectively, during the last 15 years. The ozone design value is currently 81 ppb in the DFW nonattainment area and 80 ppb in the HGB area. Fifteen years ago, the eight-hour ozone design value was 120 ppb in the DFW nonattainment area and 112 ppb in the HGB nonattainment area. The business communities in each area have implemented control measures as required by federal, state and local regulations. Businesses in both areas have worked with their councils of government on voluntary pollution reduction strategies, which are documented in state plans. Unlike the DFW nonattainment area, the HGB nonattainment area is home to one of the largest industrial complexes in the U.S., and those facilities are subject to stringent pollution requirements. However, citizens in both areas participate in vehicle emissions testing programs designed to reduce pollution from motor vehicles. All of the measures in both areas are working to improve air quality. No changes were made in response to this comment.

The Texas Medical Association commented that ozone levels in the DFW nonattainment area have been increasing since 2007 and not decreasing. The Texas Medical Association noted that exceedances of the 75 ppb ozone standard have been occurring each summer. The League of Women Voters of Dallas commented that air quality in DFW got worse between July 2011 and July 2012. Several individuals commented that ozone levels have gotten worse since 2011, while other individuals commented that ozone levels have been flat for the last five years. One individual commented that air quality has significantly worsened due to the fracking and drilling occurring in the DFW nonattainment area.

The TCEQ acknowledges that the DFW nonattainment area has not yet reached attainment of the 75 ppb standard, and that exceedances of this standard have occurred during each ozone season over the last several years. The TCEQ disagrees with the statements that ozone levels have been flat and/or increasing rather than decreasing since years such as 2007 and 2011. From 2011 through 2014, the peak eight-hour ozone design value for the DFW nonattainment area dropped from 90 ppb to 81 ppb. From 2007 through 2014, the peak eight-hour ozone design value dropped from 95 ppb to 81 ppb.

The TCEQ disagrees with the statement that air quality has worsened during the time that drilling and fracking has occurred. According to RRC data, the drilling "boom" in the Barnett Shale area started in 2005 and reached its peak in 2008, but that drilling has reverted back to pre-2005 levels from 2012 through 2014. At the end of the 2004 ozone season just prior to the start of the drilling boom, the DFW nonattainment area ozone design value was 98 ppb, but was 81 ppb at the end of 2014.

The TCEQ disagrees with the comment that air quality worsened between 2011 and 2012. As part of the general downward trend in monitored ozone levels, the DFW nonattainment area ozone design value dropped from 90 ppb in 2011 to 87 ppb in 2012. These data sets use the design values for the complete 2011 and 2012 ozone seasons, rather than intermediate ozone season values that would be needed for comparing the July 2011 and July 2012 ozone levels inferred by the commenter. No changes were made in response to this comment.

Motor Vehicle Emission Simulator (MOVES)

The City of Mesquite and the RTC, support the use of on-road mobile emission inventories based on MOVES2014 in this DFW AD SIP revision to fulfill the transportation conformity rule requirements.

The TCEQ appreciates the support and is committed to working with local entities and keeping interested parties updated on SIP developments and informed about technical issues related to air quality. No changes were made in response to this comment.

Emissions Inventory

Emissions from Oil and Gas Well Drilling

Public Citizen commented that the TCEQ did not reduce air pollution from fracking, which caused air pollution to increase in the DFW area. Two individuals commented that the TCEQ does not address or regulate the pollution from oil and gas drilling.

The TCEQ disagrees with the assertion that air pollution has increased in the DFW area. Overall, emissions from DFW-area anthropogenic sources have decreased from 2005 to 2011 despite the rapid growth in Barnett Shale oil and gas exploration and production activities during this time. Ozone levels decreased by 5 ppb over the same time period, 2005 to 2011.

Analyzing the anthropogenic EI from 2005 to 2011 for the 10-county DFW 2008 eight-hour ozone nonattainment area indicates that NO_X emissions have decreased by approximately 29,000 tons (16%) and VOC emissions have decreased by approximately 80,000 tons (34%). The TCEQ ensures these estimates include emissions from oil and gas exploration and production activities, including drilling.

Concerning regulation of oil and gas drilling activities, oil and gas drillers and producers are subject to rules established to meet and maintain air quality standards in Texas. The commission enforces its rules through various means, such as monitoring, recordkeeping, testing, and reporting requirements. In addition, the TCEQ conducts investigations of companies in all areas of the state to determine compliance with the rules and regulations.

Regarding air pollution reductions for drilling rigs, these sources are considered non-road mobile sources due to their portability. The FCAA generally preempts state authority to adopt or enforce emissions standards for mobile sources. As a result, the commission cannot regulate drilling rig emissions in the same manner as stationary source emissions. No changes were made in response to these comments.

An individual provided information excerpted from a blog post (Arlington TX Barnett Shale Blogger, [https://barnettshalehell.wordpress.com/2014/03/26/gm-needs-1479-yrs-to-10-yrs-of-drilling-rig-barnett-shale-created-nox/]) discussing attempts to understand emissions specifics related to oil and gas drilling in the Barnett Shale area.

The TCEQ used a different method than the individual to estimate drilling rig engine emissions for this DFW AD SIP revision. The TCEQ estimated drilling rig engine emissions using the calculation methodology from the ERG report *Development of Texas Statewide Drilling Rigs Emissions Inventories for the Years 1990, 1993, 1996, and 1999 through 2040*, combined with drilling activity data from the RRC. For example, the calculation methodology from the ERG report was combined with actual 2011 drilling activity data from the RRC to develop the 2011 EI. No changes were made in response to this comment.

An individual commented that the TCEQ Barnett Shale Phase I and II EI did not include preproduction emissions such as drilling, fracking, and flowback.

The purpose of the Barnett Shale Phase I and Phase II Special Inventories was to obtain detailed inventory information for stationary sources associated with Barnett Shale oil and gas production, transmission, processing, and related activities. These sources are typically not required to report as point sources per 30 TAC 101.10. As noted by the individual, information on exploration and preproduction emission sources such as drilling rigs, hydraulic pump engines, or well completions was outside the scope of this special inventory. However, the TCEQ estimates these types of emissions as area source and non-road mobile emissions, and these emissions are included in this DFW AD SIP revision. No changes were made in response to this comment.

Oil and Gas Emissions Inventory Development

An individual commented that oil and gas operations have significant emissions, must be accounted for in this DFW AD SIP revision, and make a significant contribution to ozone. The individual further commented that oil and gas operations are the dominant sources of VOC precursors for ozone formed in the winter.

The TCEQ did account for oil and gas operations in this DFW AD SIP revision. Multiple tables in both the Executive Summary and Chapter 3: *Photochemical Modeling* show 2018 emission estimates for oil and gas drilling and production at 11.13 NO_X tpd and 24.45 VOC tpd, which represent 4% and 5% of the total 2018 NO_X and VOC emissions, respectively, for the DFW nonattainment area. The TCEQ disagrees with the statement that oil and gas operations are the dominant source of VOC precursors during winter or any other time of year. The DFW AD SIP revision clearly shows that oil and gas operations are not the dominant source of VOC precursors in the DFW nonattainment area. The single largest contributor to 2018 VOC emissions is the portion of the area source category that excludes oil and gas operations. This segment is projected to emit 284.94 VOC tpd, which represents 62% of the total 460.72 VOC tpd estimated for the entire DFW nonattainment area in 2018. The single largest contributor to 2018 NO_X emissions is the on-road category at 119.69 NO_X tpd, which represents 41% of the total 292.17 NO_X tpd estimated for the entire DFW nonattainment area in 2018.

The TCEQ agrees that oil and gas operations contribute to the ozone formed in the DFW nonattainment area. The ozone source apportionment results in Table 3-46: *2018 Ozone DV_F Denton, Parker, and Kaufman Contributions* show that drilling and production of oil and gas operations contributes 0.40 ppb to the Denton Airport South monitor located far northwest, 0.79 ppb to the Parker County monitor located far west, and 0.02 ppb to the Kaufman County monitor located far southeast. The TCEQ acknowledges that some ozone is formed during winter months, but monitoring data show that these concentrations fall within the very low range of 10-50 ppb, which is well below the standard of 75 ppb. No changes were made in response to these comments.

An individual commented that oil and gas exploration and production emissions in the Barnett Shale are severely underrepresented and under-regulated. The Sierra Club and Downwinders commented an accurate oil and gas EI is necessary for DFW to attain the ozone standard.

The TCEQ disagrees that oil and gas exploration and production emissions are severely underrepresented in the DFW AD SIP revision. The TCEQ develops the EI in accordance with EPA reporting requirements and works closely with the EPA to ensure the inventory is accurate, updated, and comprehensive.

The EI reflects two decades of continuous improvement. The TCEQ has performed state-of-the-science studies to identify and quantify potentially under-reported emissions sources. These studies result in refined emissions factors, activity data, or emissions determination methods that are incorporated directly into the development of the appropriate inventory source category. As one example, a recent study refined upstream oil and gas industry storage tank emissions factors. More information on these studies can be found on the TCEQ's Air Quality Research and Contract Projects Web page (http://www.tceq.texas.gov/airquality/airmod/project/pj.html).

Area (nonpoint) EI estimates are developed using the best available data and emissions determination methods or models available at the time. For example, the area source oil and gas inventory uses the current production data and well statistics from the RRC to develop specific county-level estimates. As noted above, the TCEQ has invested significant resources in advancing area source inventory development methods. The methods the TCEQ uses to develop its area source oil and gas inventory serve as a model for other agencies. No changes were made in response to these comments.

The Sierra Club of Greater Fort Worth and an individual commented that the TCEQ must get an accurate count of the number of gas wells, compressor stations, and compressor engines in the DFW area. The Sierra Club and Downwinders commented that using a production-based approach to estimate compressor engine emissions underestimates ozone precursor emissions from these sources.

The TCEQ does use an accurate count of the number of gas wells in the DFW area when developing area source (nonpoint) oil and gas emissions estimates. The number of gas wells used to develop the oil and gas EI was obtained from the RRC. Publicly available well count information is available on the RRC's Well Distribution by County Web page (http://www.rrc.state.tx.us/oil-gas/research-and-statistics/well-information/well-distribution-by-county-well-counts/).

The TCEQ does not use the number of compressor stations or compressor engines in the DFW area when developing area source oil and gas compressor engine emissions estimates. Since the number of compressor stations and the number of compressor engines changes over time, and the operating conditions of each compressor engine (such as operating horsepower, number of hours operated, and engine load) can vary from year to year, knowing the number of compressor stations or the number of compressor engines alone would not provide enough information to develop accurate emissions estimates for these sources.

Instead, the TCEQ uses a compressor engine profile developed from a comprehensive DFW-specific compressor engine data set obtained from the Barnett Shale Phase II Special Inventory completed in 2011 combined with gas production data obtained from the RRC to estimate area source compressor engine emissions. No changes were made in response to these comments.

The Sierra Club and Downwinders stated that underestimating natural gas blowdown emissions would jeopardize attainment of the ozone standard.

Point source annual emissions include emissions from blowdown activities in accordance with TCEQ's Emissions Inventory Guidelines document and are included in both the attainment demonstration and reasonable further progress SIP revisions. Information on compressor engine blowdown emissions was not available to accurately estimate these emissions for the 2011 area source EI. This category has been identified as a potential area for further research for upcoming fiscal years.

Since natural gas is typically released to the atmosphere during blowdowns, a significant portion of these emissions are methane and ethane, which do not react readily to form ozone. No changes were made in response to this comment.

Natural Gas Compressor Engines

The Sierra Club and Downwinders commented that "untold thousands" of smaller compressors remained unidentified in a systematic manner.

The TCEQ disagrees with this comment. The TCEQ conducted a comprehensive inventory of nonpoint (area) oil and gas emissions sources in the Barnett Shale in 2011 to determine the location, number, and type of these sources. The TCEQ received special inventory data from companies that accounted for more than 99% of the 2009 production in the Barnett Shale formation. Specifically, data for 9,123 upstream leases/facilities and 519 midstream sites/facilities has been received. It should be noted that midstream sites/facilities process or transport gas from formations other than the Barnett Shale formation. Operations were reported in all 23 counties that comprise the core Barnett Shale area.

Smaller compressor engines, such as those added to help boost pressure at aging gas wells, are typically rated less than 360 horsepower. In Phase II of this special inventory, operators reported engine characteristics such as horsepower rating for 1,911 engines. Of these engines, 76% were rated less than 360 horsepower, indicating that a sizeable number of smaller compressor engines were inventoried. The TCEQ also collected emissions and location data from these engines, and used the provided data to refine its area source EI emissions estimation methodology for the source type. Since the commenter provided no support or otherwise identified the "untold thousands" of smaller compressors, the TCEQ has no information upon which to base changes in response to this comment.

An individual commented that gas compressor engines are usually fueled with gasoline or diesel, and that these engines are a significant source of ozone precursor emissions.

The TCEQ disagrees that gas compressor engines are typically fueled with gasoline or diesel; the vast majority of natural gas compressor engines used for pipeline transmission are fueled by natural gas in Texas and the DFW area. Comprehensive compressor engine data for the DFW and surrounding areas was obtained from the Barnett Shale Phase II Special Inventory completed in 2011. In this mandatory special inventory, three gasoline-fired compressor engines and three diesel-fired compressor engines were reported out of approximately 1,900 engines; the remaining engines (99%) were fueled by natural gas.

The commission has adopted rules to reduce emissions from natural-gas fired compressor engines. In May 2007, in addition to NO_X control requirements on many other sources, the commission adopted stringent NO_X control requirements in 30 TAC Chapter 117 for gaseous fuel-fired stationary reciprocating internal combustion engines which includes compressor engines used in oil and natural gas industry. These rules for the DFW area include Chapter 117, Subchapter B, Division 4 for major sources and Chapter 117, Subchapter D, Division 2 for minor sources. The compressor engine controls required to meet the Chapter 117 emission limits result in compressor engine NO_X emissions that are about 92% lower than those from typical uncontrolled compressor engines. No changes were made in response to this comment.

An individual commented that a recent study measured higher emissions from compressor engines than traditional emissions estimation methods.

The commenter did not provide a reference to a particular study. Based on the information provided, it is not possible to address the study mentioned by the commenter. No changes were made in response to this comment.

The Sierra Club and Downwinders commented that the TCEQ has never released information regarding compressor engine emissions from counties in the lower Haynesville Shale play.

The TCEQ disagrees with this comment. Annual emissions from large stationary sources including compressor stations and gas processing plants are reported to the TCEQ's point source EI. Site-level reported criteria pollutant emissions data are posted on the TCEQ's Point Source Emissions Inventory Web page (https://www.tceq.texas.gov/airquality/point-source-ei/psei.html). Currently, this Web page includes 2011 through 2013 annual criteria pollutant emissions for sites that reported point source emissions inventories.

The TCEQ develops emissions estimates for sites that fall below the point source EI reporting thresholds in its area source EI. The TCEQ reports the area source inventory triennially to the EPA; this data is available on the EPA's National Emissions Inventory Web page (http://www.epa.gov/ttnchie1/net/2011inventory.html).

The TCEQ is currently commencing an area source emissions inventory improvement study to quantify current use of electric-powered compressor engines.

Future Emissions Inventory Development Regarding Oil and Natural Gas Activity

Downwinders and 52 individuals commented that the TCEQ's projected oil and gas emissions omit increased reliance on lift compressors at older Barnett Shale wells, which underestimate future case ozone precursor emissions. The Sierra Club and Downwinders stated that TCEQ's future case oil and gas inventory does not include re-fracked wells and the corresponding increase in compressor emissions estimates.

Artificial lift compressors at oil wells are typically powered by electricity and electric compressors are not included in current or future emissions estimates. The TCEQ accounts for artificial lift compressors that use petroleum fuels for energy in its area source EI.

For gas wells, compression requirements may vary with many factors, including well age, as noted in the comment. New wells potentially do not require compression; as wells age and well pressures decrease, compression requirements can increase. The TCEQ's area source inventory accounts for increased compression requirements as gas wells age through the activity data used to develop compressor engine emissions estimates.

The TCEQ has surveyed natural gas production companies and trade organizations to calculate the amount of compression required to transmit natural gas. These surveys have captured a wide range of data for wells of varying age, pressure, and production levels, as well as the horsepower rating of the associated compressor engines. This survey data is averaged on a regional basis to determine the compression factor for wells in the area. The compression factor, in turn, is incorporated into the county-level compressor engine emissions factor.

Therefore, compressor engine emissions estimates reflect the entire population of engines and the wells serviced, both old and new. More details on how this factor is developed can be found in the report *Characterization of Oil and Gas Production Equipment and Develop a Methodology to Estimate Statewide Emissions* (https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/5820784003FY1026-20101124-ergi-oilGasEmissionsInventory.pdf). No changes were made in response to these comments.

Downwinders and 52 individuals commented that the TCEQ estimates for future oil and gas emissions do not account for new markets for natural gas, such as new liquefied natural gas plants on the Texas Gulf Coast. The Sierra Club and Downwinders commented that the TCEQ underestimated oil production and its air quality impacts, and questioned the Hubbert model oil and gas production predictions since the number of Barnett Shale wells are increasing.

The TCEQ uses the most currently available EI information and the EPA-approved models and growth factors to estimate growth of oil and gas emissions. The growth factors include economic factors such as projected supply and demand. Gas production in the Barnett Shale peaked in 2012, began to decrease in 2013, and continued to decrease in 2014 according to historical reported production data from the Barnett Shale RRC Web page (http://www.rrc.state.tx.us/media/22204/barnettshale_totalnaturalgas_day.pdf).

This trend correlates well to the projected production curve from the 2012 study Forecasting Oil and Gas Activities, which the TCEQ used to estimate 2017 and 2018 area source oil and gas emissions. It also correlates well to actual drilling activity, which peaked in 2008. RRC data for 2014 indicate total drilling permits issued were about 25% of the 2008 level. With drilling levels declining, it is unlikely that the Barnett Shale production will increase. RRC data indicate that Barnett Shale peak production levels occurred in 2012, and production has continued to decline each year from 2012 through 2014.

The TCEQ will continue to develop updated emissions inventories using the most recent activity data available and any changes in production will be reflected in future emissions estimates. No changes were made in response to these comments.

Point Sources

An individual commented that the General Motors Arlington plant emitted 557 tons per year (tpy) of VOC (4,447 pounds per ozone season day [ppd]), 56 tpy (436 ppd) of NO_X, and 37 tpy (271 ppd) in 2011.

The TCEQ agrees with this comment. General Motors Arlington plant's emissions as stated by the commenter are within 1 tpy for annual emissions and 1 ppd for ozone season emissions reported to the TCEQ. No changes were made in response to this comment.

An individual commented that the natural gas operations located on or near General Motors Arlington plant do not report emissions to the TCEQ point source EI.

The TCEQ agrees that the oil and gas sources located near or on the General Motors Arlington plant do not report emissions to the TCEQ point source EI. However, these oil and gas sources are independently operated from the General Motors Arlington plant. Many stationary sources, including some oil and gas sources, do not meet the reporting requirements of 30 TAC 101.10. The TCEQ develops estimates for these sources and includes them in the area (nonpoint) source inventory. No changes were made in response to this comment.

COMPLIANCE AND ENFORCEMENT

Enforcement

Two individuals commented that action and enforcement are lacking. Another individual commented that there were too many violations overlooked. An individual expressed dissatisfaction with the TCEQ's inability to enforce and make rules and stated that the TCEQ should develop some "regulatory teeth."

The commission vigorously pursues enforcement against any person or business that is in non-compliance and whose violations meet the criteria for referral to enforcement as laid out in the commission's Enforcement Initiation Criteria. All penalties assessed are done so in accordance with the commission's Penalty Policy.

Citizens may contact the Region 4 office in Fort Worth at 817-588-5800 to report an environmental complaint and are encouraged to report conditions thought to

contribute to adverse health and/or welfare effects. No changes were made in response to these comments.

Monitoring

An individual commented that the TCEQ relies on measurements that are heavily manipulated to favor industry, using old data to mask current trends in deteriorating air quality. The commenter also stated that monitors are placed to avoid picking up emissions from the highest sources of air pollution, and gas drilling compressors are completely ignored even though their use in the monitoring area has increased exponentially since 2006.

An individual commented that the General Motors plant in Arlington has their own gas well pad sites on their property and there are no monitors there.

The TCEQ monitors ambient air quality in the DFW area at over 40 sites for a variety of objectives, including evaluation of population exposure, background concentrations, upwind and downwind concentrations, and concentrations in areas that are expected to have the highest concentrations. These ambient monitoring sites include monitors that measure ozone, NO_2, particulate matter, sulfur dioxide, lead, carbon monoxide, and/or several species of VOC emissions. Many of these monitors operate continuously, providing ambient air quality data online and available to the public every hour.

The location of these monitoring sites is selected based on the specific monitoring objective of the site and following the siting criteria specified in EPA regulations located in 40 CFR Part 58. These criteria include the requirement for an unobstructed pathway for the air allowing the monitor to measure an unbiased sample from the surrounding area. The monitors cannot distinguish between industrial pollutant emissions and pollutant emissions from mobile or area wide sources. Monitors are operated in a manner consistent with the operations of the other regulatory monitors in the country and measurements are quality assured to ensure that they are representative of the surrounding ambient air quality.

Information about the sites and data from the monitors can be accessed using TCEQ's interactive geographical air monitoring data tool, GeoTAM (http://tceq4apmgwebp1.tceq.texas.gov/geotam3/). No changes were made in response to these comments.

Field Investigations

An individual commented that after calling in a complaint, the TCEQ took two to three days to come out to investigate gas wells and compressor sites. Additionally, the commenter noted that the TCEQ did not cite Eagleridge for known violations.

Complaints received by the agency are prioritized according to the individual characteristics of the event, and its potential impact on human health, safety, and the environment. The agency works to address complaints as soon as possible, within the assigned priority deadlines. Based on Regional management discretion, assigned priority for all complaint responses, except emergency response, could be postponed due to weather or weekend/holiday consideration. A complaint's prioritization is based on the information provided by the complainant. For the

complaints made by the commenter to the TCEQ, all were investigated within the assigned prioritization deadline.

In regard to the complaint concerning the natural gas sites at Eagleridge, the individual did not provide any specific detail about the site or sites mentioned in the comment. There are two natural gas sites operated by Eagleridge in Mansfield, the Woodland Estates West 12H 14H 16H site and the Woodland Estates East Unit. During an investigation conducted between October 16 and 25, 2013, the TCEQ determined that the Woodland Estates West site was failing to capture or route flowback emissions to a completion device. This was in violation of Title 40 of the CFR Chapter 60.5375(a)(3), and was cited in a Notice of Violation letter sent to Eagleridge on December 20, 2013. Sufficient action was taken at the Woodland Estates West site prior to the completion of the investigation to resolve the violation, and actions had been taken to prevent a similar violation at the Woodland Estates East Unit.

There are different categories of violations. Once a violation is documented, the TCEQ uses established criteria to determine the level of the enforcement that is warranted based on the potential impact to health and the environment. If a violation is referred for formal enforcement action, a penalty will be assessed and technical requirements to correct the violation will be included in an order. For violations that are not referred for enforcement action, the company is given an opportunity to correct the violation through a "notice of violation" (NOV). In this instance, the violation was not of the level to initiate an enforcement action; therefore, no technical requirements were put in place and no penalties were assessed. No changes were made in response to this comment.

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