3.8 Air Quality

Air quality issues associated with the proposed Rusk Permit Area include potential impacts of mining equipment exhaust emissions, fugitive dust, and the handling of lignite. Air quality issues related to public health and safety are discussed in Section 3.14.

The study area for project-related impacts to air quality encompasses the area within the proposed permit boundary, including areas where the public would have unrestricted access. The air quality cumulative effects study area encompasses Rusk, Panola, and Harrison counties. The cumulative effects analysis includes emissions from the proposed project and past, present, and RFFAs (Section 2.7), inclusive of the existing Pirkey Power Plant and other existing and known proposed lignite mines surrounding the proposed Rusk Permit Area, including Sabine's existing South Hallsville No. 1 Mine.

3.8.1 Affected Environment

3.8.1.1 General Climatic Setting

The climate of Texas is determined by geographical features external to the state. To the southeast, the Gulf of Mexico provides a source of warm, moist air throughout the year. During the summer, the entire state comes under the influence of the Gulf, as southeasterly and southerly winds settle into place. Air approaching Texas from the Gulf may have originated over the tropical waters of the Caribbean and the Atlantic, or it may recently have moved offshore from the southeastern U.S. The latter circumstance leads to air that is more polluted and is hazier in summertime. Tropical Atlantic air is relatively clean, and visibility tends to be excellent despite the high humidity. Most of the water that falls as precipitation in eastern Texas has entered the state from the Gulf Coast.

Annual mean temperatures in Texas are cooler to the north and warmer to the south. Annual mean precipitation is heaviest in the east and lightest in the west. Precipitation changes are more substantial than the temperature changes, as the near-desert in the west gradually gives way to annual rainfall accumulations close to 60 inches along the Louisiana border. The eastern third of Texas has a subtropical humid climate that is most noted for warm summers.

Relative humidity is highest in the coastal region and decreases gradually inland as the distance from the Gulf of Mexico increases. As temperatures increase, relative humidity generally decreases, and when temperatures fall, the relative humidity tends to rise. The lowest relative humidity generally occurs in the daytime, especially in the afternoon, while the highest values usually occur in the early morning.

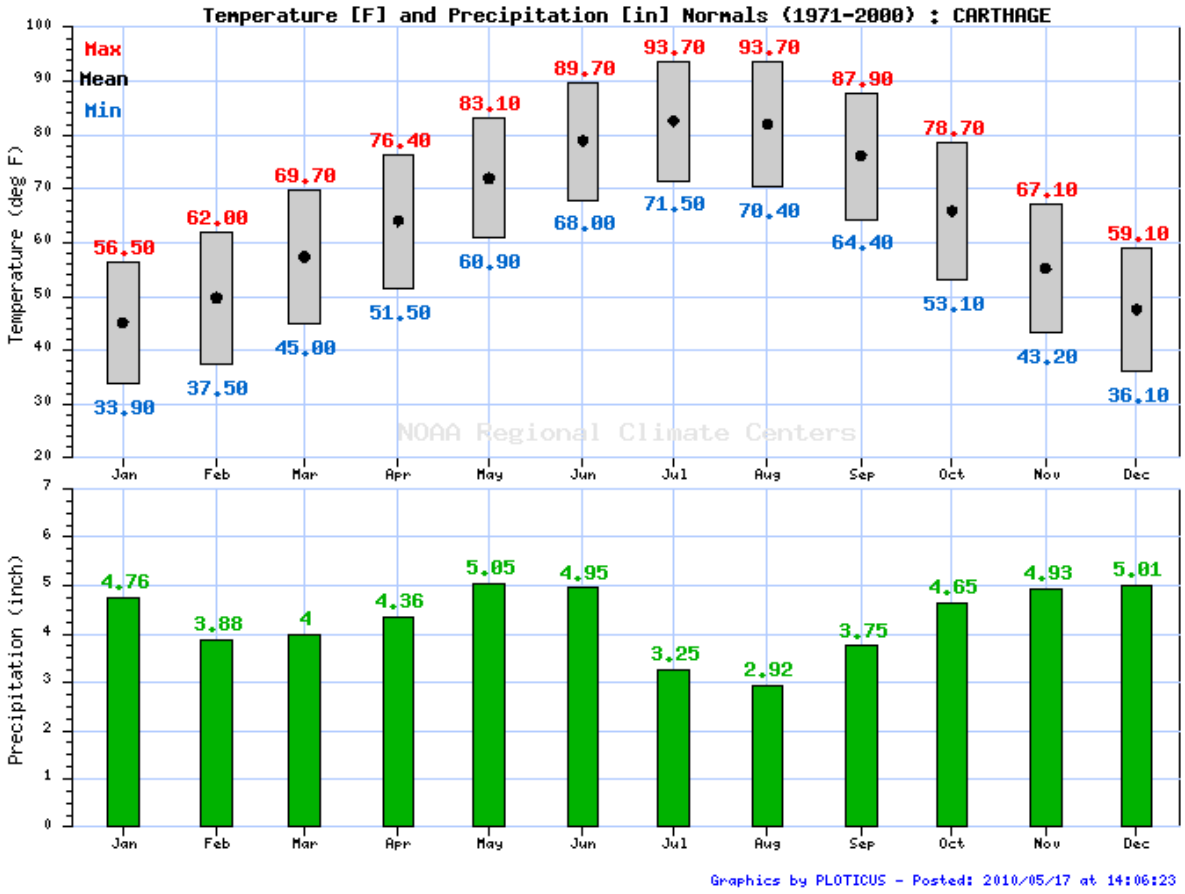
Meteorological conditions conducive to high levels of ozone include clear skies, light winds, and possibly a low-level temperature inversion. Sunlight is strongest in June and July; however, due to the strength of the Bermuda High during early summer, high levels of ozone are most likely in August and September when winds are generally lighter. Along the coast, the sea breeze strongly affects both stagnation and transport. The highest levels of ozone are expected when winds are light from the southeast or southwest during the afternoon.

Particulate matter includes a variety of small suspended particles or aerosols. Mineral dust from soil is picked up by strong winds and spreads as dust storms. Most of the wind-generated dust in the region originates in the High Plains or eastern New Mexico. Some dust also reaches Texas during the summertime from the Sahara Desert (TCEQ 2007). Elevated levels of soot (particulates from smoke) occur in El Paso, Texas, and its companion city across the Rio Grande River, Juarez, Mexico. On rare occasions during the spring, smoke from agricultural fires in Mexico and Central America reaches Texas and reduces visibility.

East-central Texas experiences warm, humid summers and generally mild, humid winters. Hot spells with maximum temperatures above 90ºF for several consecutive days occur most summers; however, heat waves with maximum temperatures of 95ºF to 100ºF or more for several days are infrequent. While mild conditions generally prevail in the winter, temperatures can drop to near 0ºF; however, such cold spells

rarely are lengthy. Spring and fall seasons feature moderate but changeable weather as part of the annual transition from summer to winter and back to summer.

For some weather stations, 30-year climate averages are calculated and updated every 10 years. The nearest weather office where temperature and precipitation data are available for the normal climate record is located in Carthage, Texas, approximately 15 miles southeast of the study area. Monthly average maximum, average mean, and average minimum temperatures and monthly precipitation at the Carthage location are presented in **Figure 3.8-1** for the 30-year climate period (1971-2000).



Source: National Oceanographic and Atmospheric Administration Southern Region Climate Center 2010.

Figure 3.8-1 Temperature and Precipitation for Carthage, Texas, 1971-2000

Evaporation

Gross lake surface evaporation data for the region were compiled from the TWDB gross monthly evaporation files (TWDB 2005). Gross lake surface evaporation is independent of rainfall. The TWDB evaporation data are based on evaporation rates using a pan coefficient based on 1-degree quadrangles. The evaporation data presented are from quadrangle 513; the area is located between 94 and 95 degrees west and 32 and 33 degrees north. The gross annual lake evaporation for quadrangle 513 is 48.85 inches (Sabine 2009a).

3.8.1.2 Local Winds and Atmospheric Dispersion

Three important meteorological factors influence the dispersion of pollutants in the atmosphere: winds, mixing height, and stability. Seasonal prevailing wind direction and average speeds are shown in the wind roses for Lufkin, Texas (**Figure 3.8-2** through **3.8-5**). Lufkin is located approximately 70 miles south of the Rusk Permit Area.

Prevailing surface winds in the project vicinity generally are from the south throughout much of the year, although strong cold fronts, common from November through March, generate periods of northwest to north winds across the region. These north winds quickly veer back around to the south after a few days, causing the influence of cold, arctic air masses to be relatively short-lived. Sustained wind speeds associated with the passing cold fronts also are the strongest during the late fall, winter, and spring (November through May). Wind speeds generally are lightest during the summer months.

Prevailing south winds provide a steady supply of warm, moist air to the region. The Gulf moisture carried by these winds is responsible for severe thunderstorms during the fall, winter, and spring. Warm air transported northward keeps minimum temperatures higher at night, especially if winds do not subside, or if cloud cover develops (HDR 2010e).

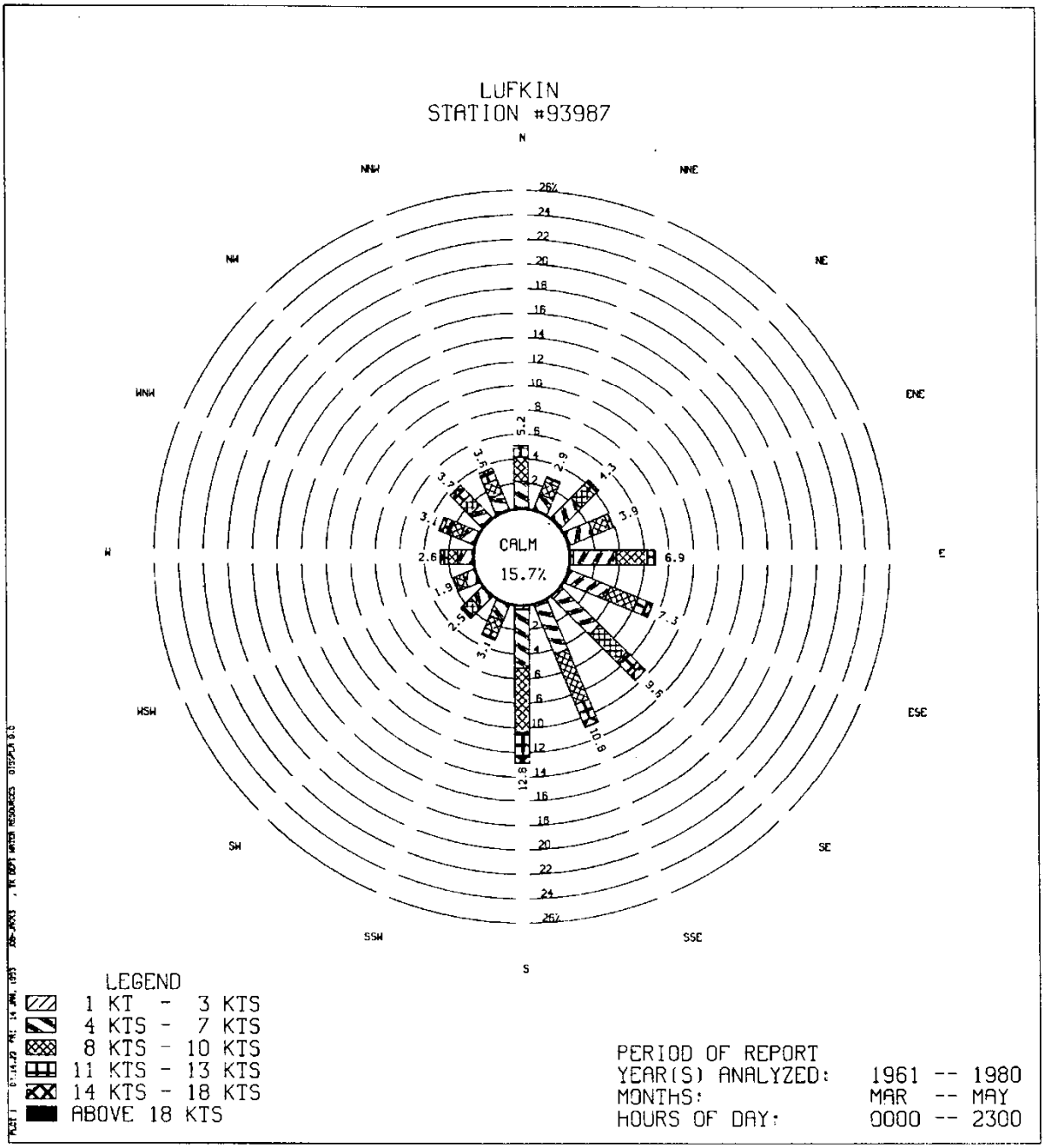
Mixing height is the thickness of the layer of air above ground level within which rising air from the surface mixes by convection and turbulence. Local atmospheric conditions such as wind, temperature and stability, terrain, and source location determine the degree to which pollutants are diluted in this mixed layer. Mixing heights vary diurnally, with local weather systems and with season. For the project vicinity, mean morning and afternoon mixing heights for each season are shown in **Table 3.8-1**. The mean annual morning mixing height is estimated to be approximately 1,600 feet above ground surface, and the mean annual afternoon mixing height is approximately 4,800 feet above ground surface (Holzworth 1972).

Table 3.8-1 Mean Morning and Afternoon Mixing Heights in the Study Area Vicinity[1]

Morning/Afternoon	Winter	Spring	Summer	Fall	Annual
Morning	1,667	1,857	1,581	1,411	1,631
Afternoon	3,570	4,869	5,981	4,639	4,764

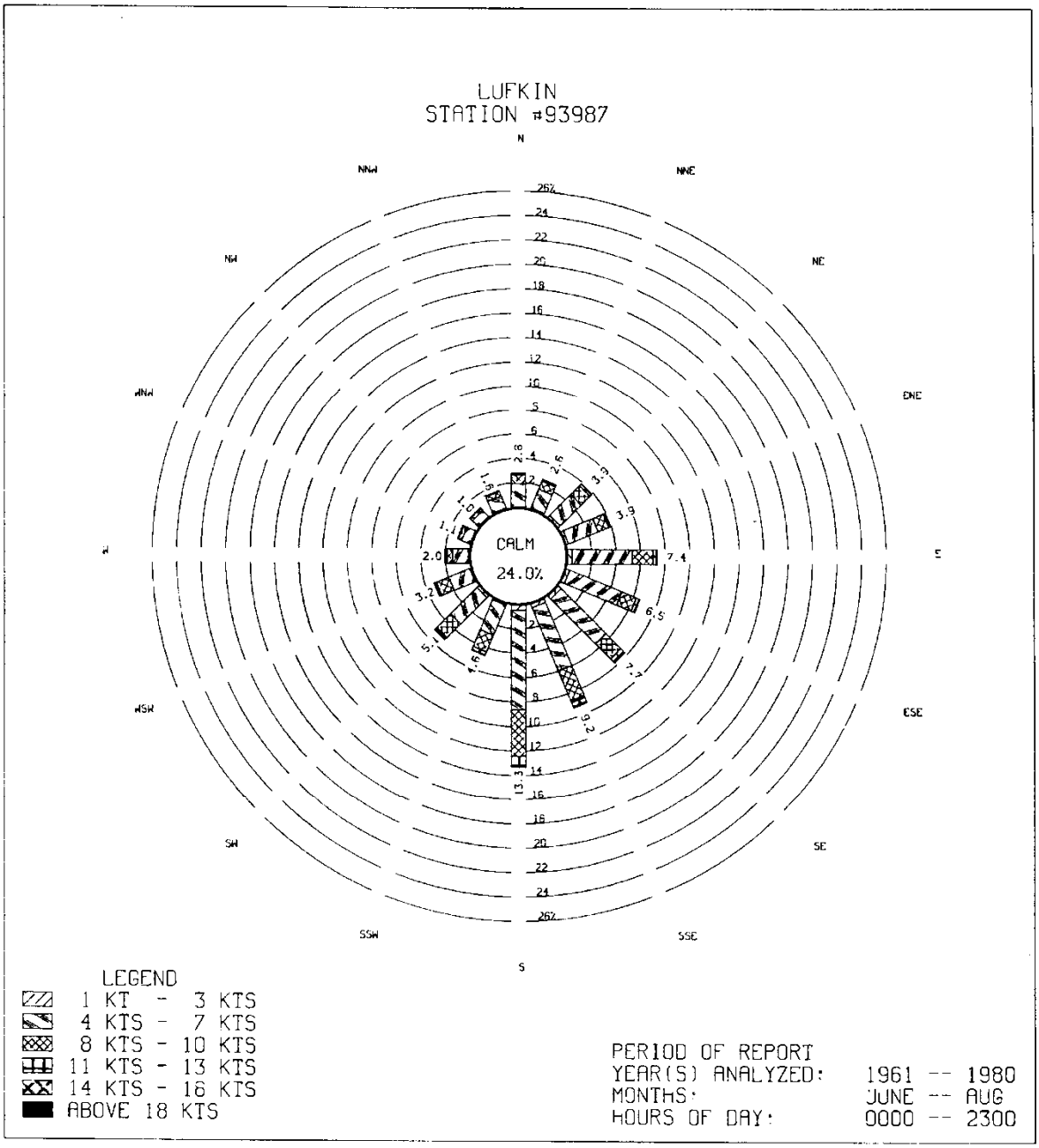
[1] Heights presented as feet above ground level.

Source: Holzworth 1972.



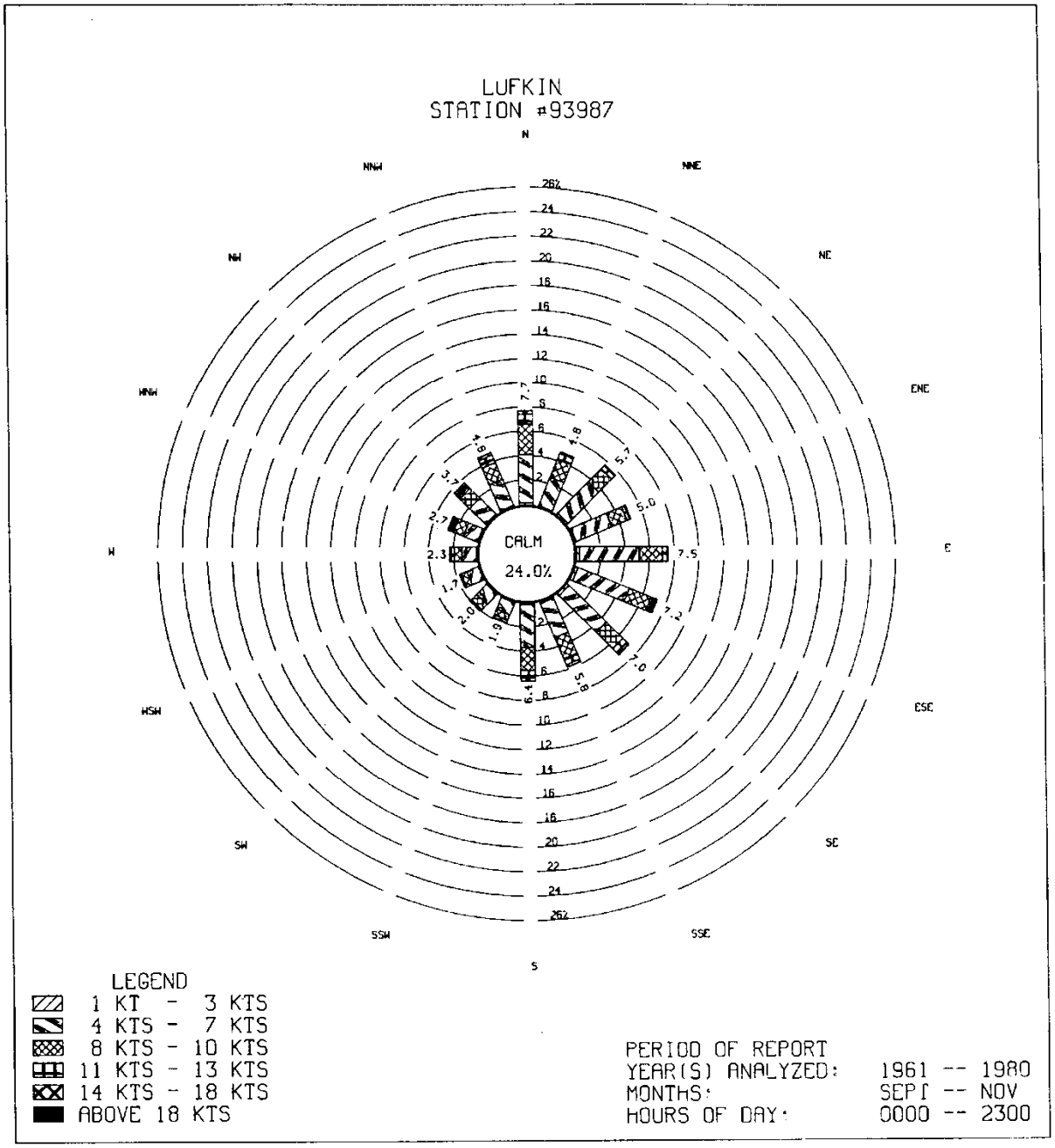
Source: Sabine 2009a.

Figure 3.8-2 Wind Rose for Lufkin, Texas, March to May



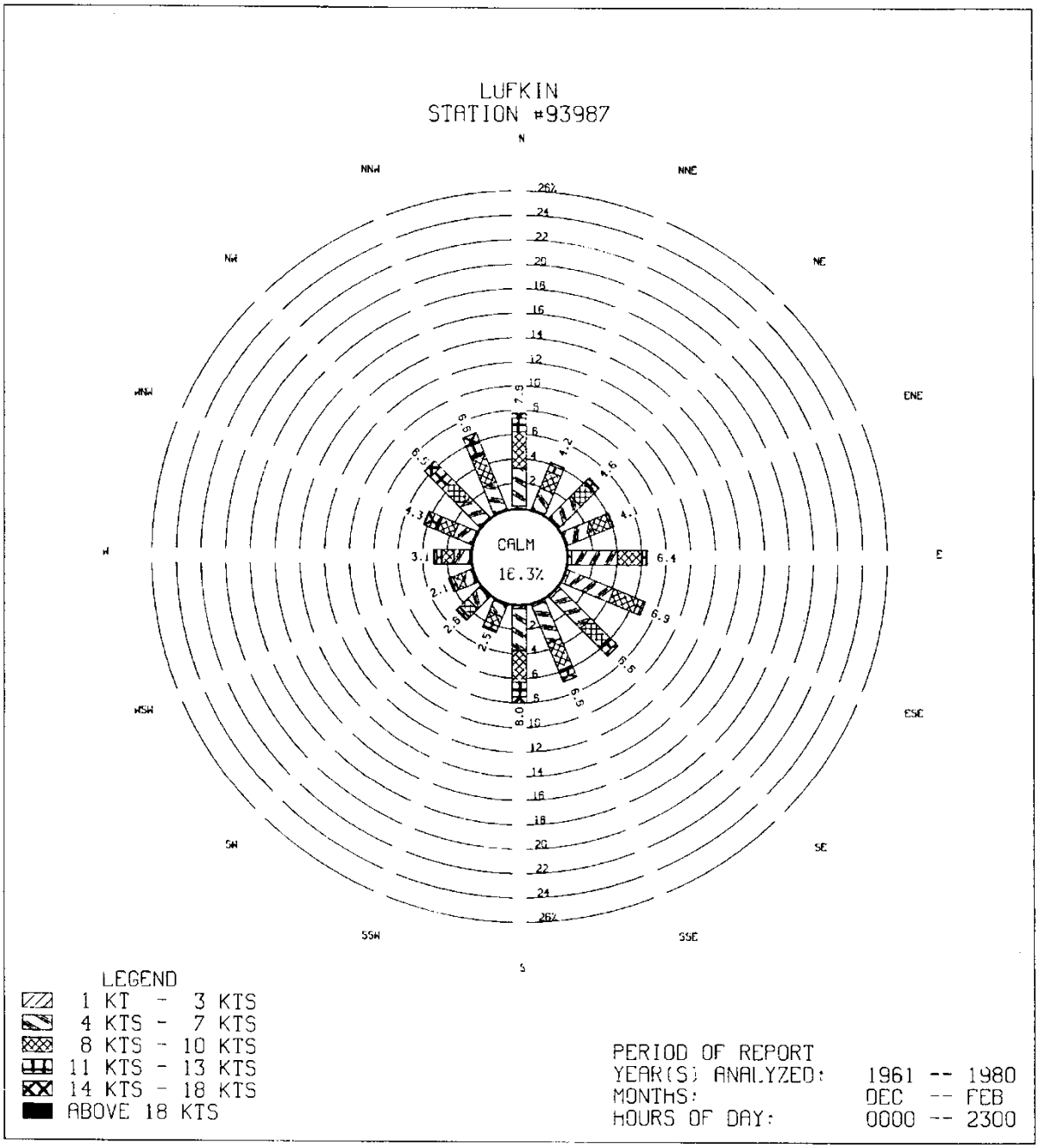
Source: Sabine 2009a.

Figure 3.8-3 Wind Rose for Lufkin, Texas, June to August



Source: Sabine 2009a.

Figure 3.8-4 Wind Rose for Lufkin, Texas, September to November



Source: Sabine 2009a.

Figure 3.8-5 Wind Rose for Lufkin, Texas, December to February

3.8.1.3 Air Quality

Air quality is defined by the concentration of various pollutants and their interaction in the atmosphere. Pollution effects on receptors have been used to establish a definition of air quality. Measurement of pollutants in the atmosphere is expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Both long-term climatic factors and short-term weather fluctuations are considered part of the air quality resource, because they control dispersion and affect concentrations. Physical effects of air quality depend on the characteristics of the receptors and the type, amount, and duration of exposure. Under the federal Clean Air Act (CAA) and Texas CAA, the USEPA and TCEQ establish acceptable air quality standards and upper limits of pollutant concentrations and duration of exposure. Air pollutant concentrations below the standards generally are not considered to be detrimental to public health and welfare.

The U.S. Congress established the framework for air quality regulations through passage of the CAA of 1970. The CAA requires the administrator of the USEPA to establish National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for air contaminants for which emissions, in the judgment of the USEPA, cause or contribute to air pollution that reasonably may be anticipated to endanger public health or welfare (USEPA 2004). The presence of emissions in the ambient air results from numerous and diverse mobile and stationary sources as well as natural sources.

National Ambient Air Quality Standards

The criteria for impacts to air quality are the lowest concentrations at which adverse human health or ecological effects from exposure to air pollution are known or suspected to occur. For criteria pollutants, these levels have been established through the national and state Ambient Air Quality Standards (AAQS). The AAQS are concentrations established by law to protect public health and welfare from air pollutants.

The primary NAAQS set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. The secondary NAAQS set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (USEPA 2004). For the most part, Texas has adopted the NAAQS set by the USEPA Office of Air Quality Planning and Standards for the following criteria pollutants (see **Table 3.8-2**).

Table 3.8-2 State and National Ambient Air Quality Standards

Pollutant[1]	Averaging Time	Ambient Air Quality Standards	
		Primary	Secondary
CO	8-hour (2)	9 ppm	None
		(10 mg/m^3)	
	1-hour (2)	35 ppm	None
		(40 mg/m^3)	
Lead	Rolling 3-month Average	0.15 $\mu g/m^3$ (2)	Same as Primary
	Quarterly average	1.5 $\mu g/m^3$	Same as Primary
NO_2	Annual (arithmetic mean)	0.053 ppm (100 $\mu g/m^3$)	Same as Primary
	1-hour (4)	0.100 ppm (189 $\mu g/m^3$)	Same as Primary
PM_{10}	24-hour (5)	150 $\mu g/m^3$	Same as Primary

Table 3.8-2 State and National Ambient Air Quality Standards

Pollutant[1]	Averaging Time	Ambient Air Quality Standards	
		Primary	Secondary
$PM_{2.5}$	Annual (6) (arithmetic mean)	15.0 µg/m^3	Same as Primary
	24-hour (7)	35 µg/m^3	Same as Primary
Ozone	8-hour (8) (2008 std)	0.075 ppm	Same as Primary
	8-hour (9) (1997 std)	0.08 ppm	Same as Primary
	1-hour (10)	0.12 ppm	Same as Primary
SO_2	3-hour (2)	None	0.5 ppm (1,300 µg/m^3)
	1-hour(11)	0.075 ppm	None
	30-minute(12)	0.040 ppm	None

1 CO = carbon monoxide.
NO_2 = nitrogen dioxide.
SO_2 = sulfur dioxide.
PM = particulate matter.
PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less

2 Not to be exceeded more than once per year.

3 Final rule signed October 15, 2008.

4 To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

5 Not to be exceeded more than once per year on average over 3 years.

6 To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

7 To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006).

8 To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008). This standard is being reconsidered by USEPA, which has proposed to set it somewhere between 0.06 and 0.07 ppm.

9 (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard, and the implementation rules for that standard, will remain in place for implementation purposes as the USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) USEPA is in the process of reconsidering these standards (set in March 2008).

10 (a) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

11 Effective August 23, 2010.

12 Texas AAQS; not to be exceeded.

Source: USEPA 2010.

The main health-based standards applicable for mining operations are the federal PM_{10} and $PM_{2.5}$ standards. In addition to the NAAQS, Texas imposes additional restrictions on SO_2 concentrations. "No person in the State of Texas may cause, suffer, allow, or permit emissions of SO_2 from a source or sources operated on a property or multiple sources operated on contiguous properties to exceed a net ground-level concentration of 0.4 part per million by volume (ppmv) averaged over any 30-minute period" (TAC 2010c).

The counties in which the Rusk Permit Area is located currently are designated as attainment/unclassified with respect to NAAQS for all criteria air pollutants. The Governor of Texas recommended in a March 10, 2009, letter to USEPA that Rusk County be designated nonattainment with respect to the current ozone NAAQS of 75 parts per billion (ppb), with Harrison and Panola counties to remain in attainment; a decision is pending from the USEPA. However, Harrison and Panola counties also could become nonattainment for ozone if USEPA further tightens the ozone NAAQS, as planned, to somewhere in the range of 60 to 70 ppb. If a nonattainment designation is made, the emissions of VOC and NO_X could be subject to the 100 tpy General Conformity de minimis emission threshold.

Following a nonattainment designation, there is a 1-year grace period. If a project is authorized during the grace period, no additional air quality regulatory requirements are imposed. Alternately, if a project is authorized following the nonattainment designation grace period, then the new project must comply with General Conformity requirements under 40 CFR 93, Subpart B. The General Conformity requirements specify that changes in direct and indirect emissions within a nonattainment area, due to a proposed federal action (e.g., approval of an EIS), must be estimated and compared to the de minimis emissions thresholds in 40 CFR 93, Subpart B. If the emissions are over the de minimis threshold for any affected pollutant, then the proponent must obtain emissions offsets (reductions) from other sources to obtain federal approval. Given the recommended nonattainment re-designation of Rusk County as a "moderate" ozone nonattainment area (see Section 3.8.1.4), the applicable emissions thresholds under General Conformity rules would be 100 tons per year each for NO_X and volatile organic compound (VOC) emissions.

Prevention of Significant Deterioration

For areas that have attained the NAAQS, the CAA provides for a new source review program to ensure that no significant deterioration of the existing air quality would result from the construction and operation of new emission sources or from the modification of existing emission sources. Pursuant to the CAA, the USEPA has promulgated Prevention of Significant Deterioration (PSD) regulations that provide for a pre-construction review by the state air quality agency of "major" emission sources of air pollutants that are regulated under the CAA. For 28 designated types of sources of air contaminants, a major stationary source is defined as a stationary source that has the potential to emit 100 or more tpy of any of the pollutants regulated under the CAA, including any fugitive emissions (non-stationary source). Other stationary sources of pollutants are defined as major if the proposed emissions of any pollutant regulated by the CAA are 250 or more tpy., Fugitive emissions are included in the "major source" determination only for sources subject to the 100–tpy threshold and for sources being regulated by a new source performance standard (NSPS) (40 CFR 60) as of August 7, 1980. Lignite mining operations are not one of the 28 designated types of sources that are considered major at 100 tpy; however, they potentially could be a major source if point sources emit more than 250 tpy of a regulated pollutant. In the case of the proposed lignite mining operation, PM_{10} associated with fugitive dust emissions is the only pollutant regulated by the CAA that would be emitted in significant quantities. Since the lignite mining operation would not be one of the 28 major source types, and there are only non-stationary and minor stationary sources associated with the proposed operation, the PSD regulations do not apply to the proposed operation.

The project area is designated as a Class II area under the PSD regulations. The Class II designation allows for moderate growth or some degradation of air quality within certain limits above baseline air quality. These limits include the NAAQS and Texas AAQS discussed above and identified in **Table 3.8-2** as well as other incremental limits set by the USEPA and TCEQ that are not to be exceeded. Under the PSD provisions, Congress established a land classification scheme for those areas of the country with air

quality better than the NAAQS. Class I allows very little deterioration of air quality; Class II allows moderate deterioration, as discussed above; and Class III allows more deterioration. However, in all cases, the pollution concentrations shall not violate any of the NAAQS or other federal or state limits. Congress designated certain existing areas as mandatory Class I, which precludes re-designation to a less restrictive class, in order to acknowledge the value of maintaining these areas in relatively pristine condition. These mandatory Class I areas include international parks, national wilderness areas, national memorial parks in excess of 5,000 acres, and national parks in excess of 6,000 acres existing as of August 7, 1977. No PSD Class I areas are within Air Quality Control Region (AQCR) 15, which includes the area of the Proposed Action. The nearest Class I area to the proposed project is Caney Creek National Wilderness Area in Arkansas, more than 140 miles to the northeast.

New Source Performance Standards

The CAA requires the USEPA to publish a list of categories of stationary sources that, in its judgment, cause or contribute to air pollution that reasonably may be anticipated to endanger public health or welfare. The USEPA then is required to establish NSPS within each category that reflect the degree of emission limitation and the percent reduction achievable through application of the best technological system of continuous emission reduction. The USEPA must determine whether the emission reduction technology has been adequately demonstrated, taking into consideration the costs of achieving the emission reductions, any air quality health and environment impacts, and energy requirements. Thus far, the USEPA has promulgated performance standards for over 60 source categories for air pollutants; however, there are no NSPS for mining operations. However, if a mining operation also has a coal drying, cleaning, screening, or crushing operation that is new, modified, or reconstructed, then such operations are subject to NSPS requirements under 40 CFR 60, Subpart Y, Standards of Performance for Coal Preparation Plants. Crushing, screening, and conveying equipment located at a mine face are not considered to be part of a coal preparation and processing plant that might otherwise be subject to the NSPS.

National Emission Standards for Hazardous Air Pollutants

Prior to the 1990 Clean Air Act Amendment (CAAA), the CAA required the USEPA to publish a list of hazardous air pollutants (HAPs), which are defined as those pollutants for which no ambient air quality standard is applicable and, which in the judgment of the USEPA, cause or contribute to air pollution that may reasonably be anticipated to result in an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness. The USEPA then was required to establish standards for those HAPs that, in its judgment, provide an ample margin of safety to protect public health. The initial national emission standards for HAPs were promulgated under 40 CFR 61 for specific types of processes and operations. However, none of the promulgated national emission standards for HAPs are applicable to lignite mining operations.

As part of the 1990 CAAA, the list of HAPs was increased to 189 contaminants (currently reduced to 187 contaminants), and a list of additional emission source categories, for which new emission standards were to be written, was promulgated by the USEPA. The new standards are being proposed and promulgated by the USEPA under 40 CFR 63 and are known as Maximum Achievable Control Technology (MACT) standards. None of the MACT standards proposed or promulgated to date apply to lignite mining operations.

State Implementation Plan

The CAA requires each state to submit a plan that provides for implementation, maintenance, and enforcement of the primary and secondary standards in each air quality control region in the state. Development of the State Implementation Plan (SIP) consists of a lengthy rulemaking process, including public notice, in which the state adopts regulations intended to meet minimally acceptable federal criteria in the manner most consistent with the state's air quality goals. Once a SIP is approved by the USEPA, the primary authority for enforcement of the SIP is delegated to the state. If a state fails to submit an adequate SIP, the CAA requires the USEPA to prepare and promulgate a federal implementation plan setting forth any necessary regulations.

Control of Air Pollution Episodes

TCEQ Regulation 118 provides for control of air pollution episodes. It defines a Level 1 air pollution episode for PM_{10} as 24-hour average concentrations equal to or greater than 420 µg/m^3. A Level 2 air pollution episode for PM_{10} is defined as a 24-hour average concentration equal to or greater than 500 µg/m^3. A Level 1 air pollution episode exists if the following criteria are met: 1) the concentration of any of the air contaminants is equal to or greater than the levels specified for Level 1; and 2) in the case of all air contaminants except ozone, meteorological conditions conducive to high levels of air contamination are predicted to continue for at least 12 hours. (For ozone, the criteria include meteorological conditions that would be conducive to the likely recurrence of high ozone levels within the next 24 hours.) A Level 2 air pollution episode exists if the commission determines that emergency reductions of emissions must be initiated to prevent ambient concentrations specified for Level 2. The requirements of Regulation 118 do not apply to episodes caused by naturally occurring dust storms (TCEQ 2009d).

3.8.1.4 Existing Air Quality

The following discussion includes a summary of the attainment status of the Rusk Permit Area for each of the criteria pollutants and a summary of the monitoring data for these pollutants for the years 2005 through 2007. There is one monitoring station (in Harrison County) in the study area, which is used in part to determine attainment status for the criteria pollutants included in **Table 3.8-2**. Recent data from this site are summarized in the following subsections (HDR 2010e).

Ozone

Ozone is a photochemical oxidant and the major component of smog. While ozone in the upper atmosphere is beneficial to life by shielding the earth from harmful ultraviolet radiation from the sun, high concentrations of ozone at ground level are a major health and environmental concern. Ozone generally is not emitted directly into the air but is formed through complex chemical reactions between precursor emissions of VOCs and NO_X in the presence of sunlight. These reactions are stimulated by sunlight and temperature so that peak ozone levels typically occur during the warmer times of the year. Both VOCs and NO_X are emitted by transportation and industrial sources. VOCs are emitted from sources as diverse as autos, chemical manufacturing, dry cleaners, paint shops, and other sources using solvents (USEPA 2009a).

On March 10, 2009, the State of Texas sent to USEPA recommendations made by the TCEQ regarding attainment designations relating to the 2008 8-hour ozone standard. Relative to the study area, it was recommended that Harrison and Panola counties be given attainment designations and Rusk County be given a nonattainment designation. These recommendations were made considering the 2008 8-hour standard and based on 2005-2007 eligible monitoring data, as well as 2008 monitoring data, which were still in the process of being certified.

On September 16, 2009, USEPA announced it would reconsider the 2008 8-hour ozone standard. In January 2010, USEPA proposed revisions to the ozone standard; a final decision is pending. For purposes of attainment designations, the above recommendations were made considering the 2008 standard. After USEPA issues their final designations, states must submit SIPs outlining how attainment status will be achieved for those areas classified as nonattainment. If USEPA makes the designations in August 2011, SIPs will be due by December of 2013.

As seen from this discussion, the actions needed to address the issues associated with attainment of the 8-hour ozone standard are on-going. **Table 3.8-3** shows the monitored ozone levels at the Harrison County air quality monitoring site.

Nitrogen Oxides

The counties in the study area are in attainment or are “unclassifiable” for the NO_2 NAAQS; all counties in Texas are designated attainment or unclassifiable for NO_2. Attainment classifications have not yet been made for the new 1-hour average NAAQS. However, current monitoring data summarized by USEPA as

part of the new NAAQS rulemaking indicate that the only location not meeting this NAAQS is in Cook County, Illinois. The highest monitored annual average NO_2 concentration in the study area for the 2005-2007 period is 0.031 ppm, compared to the NAAQS of 0.053 ppm. NO_X is considered a precursor to ozone and is treated as a nonattainment pollutant for ozone nonattainment areas. **Table 3.8-4** shows the monitored annual NO_X levels at the Harrison County air quality monitoring site.

Table 3.8-3 Monitored Ozone

Year	Fourth Highest 8-hour Concentration (ppm)			Location	County
	Monitored	3-year Average	NAAQS		
2005	0.084	0.078	0.075	Hwy 134 & Spur 449	Harrison County
2006	0.080				
2007	0.069				

Source: USEPA 2009b.

Table 3.8-4 Monitored Oxides of Nitrogen

Year	Annual Concentration (ppm)		Location	County
	Monitored	NAAQS		
2005	0.031	0.053	Hwy 134 & Spur 449	Harrison County
2006	0.030			
2007	0.023			

Source: USEPA 2009b.

Carbon Monoxide

The counties in the study area are in attainment or are “unclassifiable” for all carbon monoxide NAAQS; further, all counties in Texas (except for El Paso County) are designated attainment or “unclassifiable” for carbon monoxide. El Paso County was redesignated from nonattainment to attainment/maintenance in 2008. Carbon monoxide has not been monitored in the study area in the past 10 years.

Sulfur Dioxide

The counties in the study area are in attainment or are “unclassifiable” for all SO_2 NAAQS; further, all counties in Texas are designated attainment or “unclassifiable” for SO_2. USEPA's on-line national database contains no SO_2 monitoring data for the study area counties for the last 10 years. USEPA has not yet made official designations of attainment/nonattainment status with respect to the new 1-hour NAAQS. Data summarized by USEPA as part of the rulemaking include monitoring in several counties in Texas. The only county in Texas currently showing concentrations over the new NAAQS is Jefferson County (Beaumont-Port Arthur area), over 100 miles south of the Rusk Permit Area. However, Gregg County, bordering the project area counties to the northwest, shows concentrations right at the level of new NAAQS of 75 ppb (0.075 ppm). Given the Proposed Action would involve very minor amounts of SO_2 emissions during construction and operations, it is not expected to affect compliance with the new NAAQS.

PM_{10}

The counties in the study area are in attainment or are "unclassifiable" for the PM_{10} NAAQS; further, all counties in Texas, except El Paso County, currently are designated attainment or "unclassifiable" for PM_{10}. The highest, second-highest monitored 24-hour PM_{10} concentration in the study area for the 2005-2007 period is 35 µg/m^3, compared to the NAAQS of 150 µg/m^3. **Table 3.8-5** shows the monitored PM_{10} levels at the Harrison County air quality monitoring site.

Table 3.8-5 Monitored Particulate Matter Under 10 Microns in Diameter

Year	Second-Highest 24-hour Concentration (µg/m^3)		Location	County
	Monitored	NAAQS		
2005	35	150	Hwy 134 & Spur 449	Harrison County
2006	31			
2007	31			

Source: USEPA 2009b.

$PM_{2.5}$

USEPA initially promulgated annual and 24-hour $PM_{2.5}$ NAAQS in July 1996. In September 2006, USEPA revised the standards. The 2006 revisions tightened the 24-hour standard, lowering it from 65 µg/m^3 to 35 µg/m^3 and retained the annual standard at 15.0 µg/m^3. Note that USEPA makes attainment/ nonattainment designations based on an average of concentrations over a 3-year period, and thus, the 2005-2007 average annual $PM_{2.5}$ concentration measured in Harrison County is in compliance with the NAAQS. Area designations for the 2006 24-hour $PM_{2.5}$ standards were issued by USEPA on October 8, 2009. The counties in the study area are in attainment or are "unclassifiable" for the $PM_{2.5}$ NAAQS. Further, all counties in Texas currently are designated attainment or "unclassifiable" for $PM_{2.5}$. The 98th-percentile monitored 24-hour $PM_{2.5}$ concentration in the study area for the 2005-2007 period is 29.7 µg/m^3, compared to the NAAQS of 35 µg/m^3, while the highest monitored annual $PM_{2.5}$ concentration is 15.05 µg/m^3, compared to the NAAQS of 15 µg/m^3. **Tables 3.8-6** and **3.8-7** show the 24-hour and annual monitored particulate levels for $PM_{2.5}$ at the Harrison County site, respectively.

Table 3.8-6 Monitored Particulate Matter Under 2.5 Microns in Diameter (24-hour)

Year	98th-percentile 24-hour Concentration (µg/m^3)		Location	County
	Monitored	NAAQS		
2005	29.7	35	Hwy 134 & Spur 449	Harrison County
2006	25.9			
2007	23.7			

Source: USEPA 2009b.

Table 3.8-7 Monitored Particulate Matter Under 2.5 Microns in Diameter (Annual)

Year	Annual Concentration ($\mu g/m^3$)		Location	County
	Monitored	NAAQS		
2005	15.05	15.0	Hwy 134 & Spur 449	Harrison County
2006	11.32			
2007	11.47			

Source: USEPA 2009b.

3.8.1.5 Greenhouse Gases

Greenhouse gases (GHGs) consist of compounds in the atmosphere that absorb outgoing long-wave radiation emitted from the earth's surface and result in a warming of the atmosphere. Naturally occurring GHGs include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, and ozone. Human activities also result in the release of GHGs including several compounds containing fluorine, chlorine, or bromine that are released, for the most part, from industrial activities. Through a natural carbon cycle, much of the CO_2 released into the atmosphere (from natural and human sources) is absorbed by the oceans and by living biomass through plant photosynthesis, and then recycled through the atmosphere through natural processes. When these processes are in equilibrium, the movement of carbon is roughly balanced. However, as a result primarily of the combustion of fossil fuels, the atmospheric concentration of CO_2 has increased approximately 36 percent since the beginning of the industrial age (Intergovernmental Panel on Climate Change 2007).

The global warming potential (GWP) of an individual GHG is calculated as the ratio of the estimated contribution to global warming from the emission of one unit of mass of a GHG to the estimated contribution to global warming of one unit of mass of CO_2 over a specified time interval. This ratio then is used to develop a GWP-weighted estimate of GHG emissions measured in tons of CO_2 equivalents. The U.S. released approximately 7.8 billion tons of CO_2 equivalents into the atmosphere in 2006, approximately 20 percent of total global releases. Of the U.S. total, approximately 6.2 billion tons were released as CO_2 from fossil fuel combustion (oil, natural gas, and coal) (USEPA 2008).

GHG emissions are not formally regulated by a governing agency in Texas, although some states are developing requirements to limit such emissions and have their own GHG reporting requirements. Several states are requiring tabulation of GHG emissions, and there has been proposed and evolving federal legislation regarding GHGs emissions debated in the U.S. Congress for several years. Texas currently has no state requirements for GHG reporting or permitting. However, USEPA has developed mandatory GHG reporting requirements and recently issued final rules to require permitting of large GHG sources (see sections below). Texas House Bill (HB) 1796 includes legislation pertaining to offshore geologic storage of CO_2 and GHG reporting requirements.

<u>Offshore Geologic Storage of Carbon Dioxide</u>

Texas HB 1796, which lays the groundwork for Texas to develop an offshore CO_2 storage repository in state-owned submerged land, affects several agencies, including the TCEQ, General Land Office, University of Texas Bureau of Economic Geology, and School Land Board. As an important part of the overall effort, the TCEQ will develop and adopt standards for monitoring, measuring, and verifying the permanent storage status of an offshore repository, ensuring that any standards adopted by the agency comply with USEPA regulations.

Federal Greenhouse Gas Reporting Requirements

USEPA has issued the Mandatory Reporting of GHGs Rule. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S. and is intended to collect accurate and timely emissions data to inform future policy decisions.

Under the rule, certain suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and stationary sources that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the USEPA. The final rule was signed by the Administrator on September 22, 2009. On October 30, 2009, the final rule was published in the *Federal Register* under Docket ID No. EPA-HQ-OAR-2008-0508-2278. The rule became effective December 29, 2009.

Greenhouse Gas Tailoring Rule

On June 3, 2010, USEPA published in the Federal Register the final GHG Tailoring Rule. This rule requires review and permitting of new major stationary sources (greater than 100,000 tpy of CO_2 equivalents [CO_2e]) and major modifications of stationary sources (greater than 75,000 tpy of CO_2e) under the PSD permitting program. The rule is scheduled to become effective on January 2, 2011, for major modifications of GHG sources, and on July 1, 2011, for major new sources of GHG emissions.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

There are no Class I areas within 100 kilometers (km) (approximately 60 miles) of the proposed Rusk Permit Area. Given the relatively low rates of emissions expected due to the Proposed Action, there would be no measurable air quality impacts on Class I areas Construction and operations activities at the proposed Rusk Permit Area would be sources of total suspended particulate (TSP), PM_{10}, and $PM_{2.5}$. Fuel-burning mobile sources would emit low levels of gaseous pollutants (e.g., SO_2, NO_X, CO, and VOCs). Storage tanks for fuels, oil, and chemicals are potential sources of VOCs. Reclamation activities also would result in an increase in fugitive and gaseous emissions in the local area. During construction, operations, and reclamation, vehicle exhaust emissions would be generated; however, these emissions would be small compared to potential fugitive emissions from earth moving, hauling, and other construction or mining activities. Particulate matter concentrations due to construction, operation, and reclamation activities would vary, and impacts would depend on the activity location and the daily wind and weather conditions. However, any such impacts are expected to be localized near mining activities.

Construction would result in temporary air quality impacts due to increases in local fugitive dust levels. Dust generated from these open sources is termed “fugitive” because it is not discharged to the atmosphere in a confined flow stream (e.g., stack, chimney, or vent). The principal sources of fugitive dust would include land clearing, earth moving, scraping, hauling, and materials storage and handling; truck loading operations; and wind erosion from temporary stockpiles.

Lignite would be trucked to the existing lignite stockpiles at the South Hallsville No. 1 Mine or to the proposed temporary lignite stockpiles in the Rusk Permit Area. Fugitive dust emissions from haul roads would be controlled by the application of water sprays, chemical dust suppressants, or slow-curing liquid asphalt as allowed by TCEQ. Other controls would include prompt removal of lignite, rock, or soil from roads; compaction of unpaved roads, as needed; and restriction of travel of unauthorized vehicles on other than established roads. Concentrations of fugitive dust from paved and unpaved roads due to haul trucks would be unlikely to cause a violation of NAAQS with implementation of these control measures to reduce emissions.

Fugitive dust emissions from disturbance areas would be controlled by minimizing the acreage of lignite mining disturbance at any given time, prompt revegetation of regraded lands, and restricting fugitive dust causing activities during periods of air stagnation. Concentrations of fugitive dust from disturbance areas would be unlikely to cause a violation of NAAQS with implementation of the proposed control measures to reduce emissions.

Particulate emissions related to potential spontaneous coal combustion would be minimized by promptly extinguishing areas of burning or smoldering coal and conducting periodic inspections for burning areas whenever the potential for spontaneous combustion is high. With these measures in place, exceedence of applicable air quality standards is not anticipated. Mobile sources and potential areas of burning or smoldering lignite would emit low levels of HAPs that would be unlikely to present a health hazard to the public.

Although emissions inevitably would occur during construction, operations, and reclamation, the impacts would be transitory and limited in duration. Following closure of the mine and after final reclamation is completed, emissions from the mine would cease, and nearby pollutant concentrations would return to background levels.

Air quality impacts due to emissions from mining operations would occur throughout the operational phase of the project. **Table 3.8-8** lists the estimated 2012 operating emissions for the mine.

The primary pollutant would be fugitive dust (TSP and PM_{10}) generated by the draglines, loaders, haul trucks, and temporary stockpiles. Criteria pollutant emission rates from stationary sources (not fugitive sources) would be much less than 250 tons per year (HDR 2010e); therefore, the Rusk Permit Area would not be a "major stationary source" as defined by the USEPA (see PSD under Section 3.8.1.3).

Greenhouse Gas Emissions

The principal potential contribution to global climate change associated with the Proposed Action would be through the emission of CO_2. This analysis considers the estimated annual GHG emissions due to projected fuel use at the proposed Rusk Permit Area. As shown in **Table 3.8-8**, the total annual CO_2 emissions due to the Proposed Action would be approximately 104,000 tons. Nearly all of the CO_2e emissions (more than 99 percent) would be attributed to fuel usage in mobile sources. Emissions of GHGs that are not CO_2 are compared to CO_2 for their potential impact on temperature changes in the atmosphere and are known as CO_2e. CO_2e is a quantity that describes, for a given GHG, the amount of CO_2 that would have the same global warming potential, when measured over a specified timescale.

As described in Section 3.8.1.5, the Mandatory Reporting of Greenhouse Gases Rule (GHG Reporting Rule) requires certain suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and stationary sources that emit 25,000 metric tons or more per year of GHG emissions (as CO_2e) to submit annual reports to the USEPA. Although the proposed Rusk Permit Area would be a supplier of fossil fuels to SWEPCO, the Rusk Permit Area does not meet the definition of a supplier in 40 CFR 98.2(a)(4) that is subject to the GHG Reporting Rule (as of June 15, 2010). Although the Rusk Permit Area is anticipated to emit greater than 25,000 metric tpy of CO_2e emissions, the majority of these emissions would be due to mobile sources (as opposed to stationary sources). Therefore, the GHG Reporting Rule does not apply to the Rusk Permit Area.

As described in Section 3.8.1.5, the GHG Tailoring Rule requires review and permitting of new major stationary sources (greater than 100,000 tpy of CO_2e) and major modifications (greater than 75,000 tpy increase of CO_2e) of stationary sources under the PSD permitting program. The stationary source emissions are anticipated to be 185 tpy of CO_2e emissions from the Rusk Permit Area, and therefore, the Rusk Permit Area emissions would not be sufficient to trigger the PSD review requirements for major stationary sources of GHG.

As a point of reference, the average GHG emissions per person in the U.S. is 20,750 pounds per year (USEPA 2010); the emissions from the mine would be equivalent to the GHG emissions of approximately 10,000 individuals. The total annual CO_2e emissions of 0.1 million metric tons of CO_2e (approximate mine total GHG emissions) also can be compared to total global emissions of approximately 30,000 million metric tons of CO_2e. Over time periods of a year or longer, CO_2e is essentially evenly distributed throughout the atmosphere around the earth. Since the project's projected total emissions of CO_2e would be a tiny fraction of total global CO_2e annual emissions, the Proposed Action's potential contribution to manmade global climate effects would be immeasurably small.

Table 3.8-8 Estimated Total Annual Emissions for 2012 Operations by Source Category[1]

Source Types	PM_{10}	$PM_{2.5}$	CO	NO_X	SO_2	PM	Total Hydrocarbon	CO_2
Mobile Sources								
Off-highway Trucks	24.39	23.65	154.38	526.92	0.57	24.39	29.39	64,764
Tractors/Loaders/Backhoes	1.71	1.66	12.43	21.97	0.02	1.71	1.96	2,642
Excavators	3.07	2.97	20.20	65.29	0.06	3.07	3.87	7,099
Scrapers	0.12	0.12	0.61	1.78	0.00	0.12	0.13	297
Graders	1.39	1.34	7.05	20.25	0.03	1.39	1.54	3,429
Crawler Tractor/Dozers	8.71	8.45	61.38	159.22	0.18	8.71	9.19	20,313
Cranes	0.05	0.05	0.29	1.08	0.00	0.05	0.06	126
Other Construction Equipment	3.43	3.33	24.63	56.39	0.04	3.43	4.19	4,940
Total Mobile Sources	42.86	41.57	280.99	852.91	0.92	42.86	50.33	103,610
Stationary Sources								
Pumps	0.05	0.05	3.34	0.93	0.00	0.05	0.16	143
Hydromulcher	0.02	0.02	0.08	0.32	0.00	0.02	0.02	41
Poly Pipe Fusion machine	0.00	0.00	0.01	0.01	0.00	0.00	0.00	1
Total Stationary Sources	**0.07**	**0.07**	**3.43**	**1.26**	**0.00**	**0.07**	**0.18**	**185**
Total Emissions (all sources)	42.93	41.64	284.42	854.17	0.92	42.93	50.51	103,795

[1] Data presented as tons per year.

Source: HDR 2010e.

3.8.2.2 No Action Alternative

Under the No Action Alternative, the proposed Rusk Permit Area would not be developed, and the associated effects to air quality would not occur. Currently authorized operations at the South Marshall Permit Area of the South Hallsville No. 1 Mine and existing mine-related effects to air quality would continue through the completion of closure and reclamation in approximately 2035.

3.8.3 Cumulative Impacts

The past and present actions and RFFAs are identified in Section 2.7 and are shown in **Figure 2-12**. Cumulative impacts to air quality would include impacts from the proposed Rusk Permit Area emission sources, such as gaseous pollutants and fugitive dust; impacts from nearby existing and proposed lignite mines and power plants; and impacts from background emission sources (e.g., natural background from windblown dust and public traffic on paved and unpaved roads in the region).

The combustion of fuel in vehicles and heavy equipment generates emissions of NO_x, CO, SO_2, and VOCs. However, due to the rural nature of the region around the Rusk Permit Area and the low density of combustion sources (e.g., vehicles and other fuel-fired equipment), levels of gaseous air contaminants associated with the Rusk Permit Area and other past and present actions and RFFAs are anticipated to remain well below the NAAQS (levels determined to be protective of public health and welfare).

The existing Pirkey Power Plant is considered an existing project (see Section 2.7) for the consideration of potential cumulative impacts with the proposed Rusk Permit Area. The cumulative impact assessment considered whether there would be an "…impact to the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…" (CEQ 1997). As discussed in Section 3.8.2, the air quality impacts of the proposed Rusk Permit Area would be primarily particulate emissions from the mining and handling of lignite. There also would be some point source emissions from mining and lignite handling equipment. These emissions are anticipated to be localized within and near the Rusk Permit Area and would be below the NAAQS. Since the two facilities are located approximately 6 miles (10 km) from one another, it is not anticipated that the direct and indirect impacts of the proposed project would overlap with impacts from the existing Pirkey Power Plant resulting in cumulative environmental impacts.

Since the proposed Rusk Permit Area is replacing lignite from the South Marshall Permit Area of the South Hallsville No. 1 Mine in a phased manner with no change in power plant utilization, no cumulative impacts from the two operations areas are expected. The proposed Marshall Lignite Mine would provide lignite to Norit Americas, Inc.'s existing activated carbon plant in Marshall, Texas, replacing the existing lignite supply for this plant. Since there appears to be no strong trend for an overall increase of lignite utilization in the near future with the opening of new mines to provide fuel for new power plants, no cumulative air quality impacts, including GHG impacts, would be expected.

The Pirkey Power Plant consumes approximately 4 million tons of lignite per year and produces approximately 8.4 million tons of CO_2 annually. The proposed Rusk Permit Area would not change power plant utilization, so there would be no cumulative effect from the Proposed Action. For the No Action Alternative, there would be no change in the operation of the Pirkey Power Plant, so there would be no cumulative impacts under this alternative.

3.8.4 Monitoring and Mitigation Measures

The TCEQ has not required air quality monitoring at the Rusk Permit Area to evaluate the effectiveness of the fugitive dust control practices proposed by Sabine. Applicant-committed environmental protection measures are outlined in Section 2.5.4. No additional mitigation measures are being considered for air quality.

3.8.5 Residual Adverse Effects

Some air quality impacts are unavoidable due to the nature of the proposed mine operations. As described in Section 3.8.3, the primary impacts would be from fugitive dust emissions, which would cease once the mine operations end and disturbed areas are reclaimed. Thus, there would be no residual adverse impacts to air quality from the proposed project following closure and final reclamation. Reclamation and revegetation would stabilize exposed soil and control fugitive dust emissions. As vegetation becomes established, particulate levels would return to levels typical for the region. Once the disturbance ceases and wind erodible surfaces are reclaimed, air resources would return to the pre-mining condition.