## 3.5 AIR QUALITY

This section analyzes the potential air quality impacts of the construction and operations and maintenance activities associated with the proposed action. It starts with a description of the basic methodology used for the analysis (see section 3.5.1) and then provides an overview of the common air quality impacts expected at all of the sites (see section 3.5.2). Sections 3.5.3 through 3.5.9 then describe the affected environment and anticipated impacts at each of the proposed sites in turn, focusing on those impacts of greatest potential concern identified in the common impacts discussion. Finally, the air quality impacts of the no-action alternative are discussed in section 3.5.10. The air quality appendix to this EIS (appendix A) provides greater detail on the specific methodology used to develop the emission estimates.

### 3.5.1 Methodology

DOE's analysis of air quality impacts for this EIS can be broken down into an analysis of construction impacts and operations and maintenance impacts. DOE also specifically examined greenhouse gas emissions—which are expected to be primarily from construction activities but may also come from operations and maintenance activities—to evaluate potential climate change impacts.

#### 3.5.1.1 Construction Impacts

The analysis of construction impacts focuses on four main sources of direct emissions: site preparation (e.g., cut-and-fill operations); facility and road construction; cavern development; and pipeline construction. With the exception of cavern development activities, which are assumed to be 24-hour-per-day operations, construction activities are assumed to occur during 8-hour workdays, 5 days a week, 250 workdays per year. DOE estimates emissions associated with these four types of construction activities using the following methods:

- Fugitive **particulate matter** (PM) emissions from cut-and-fill operations are estimated based on the methodologies outlined in the Western Regional Air Partnership's Fugitive Dust Handbook (WRAP 2004). The methods in this Handbook are identical to EPA's AP–42 emission factor methodology except where WRAP developed more refined methods (EPA 2003a). Because these methodologies were developed for use in generally drier regions of the country, the analysis makes adjustments to account for standard dust suppression practices and added moisture associated with precipitation in the southeast, as described in more detail in appendix A.

- Air emissions from construction equipment powered by internal combustion engines are estimated using the emissions factor method from EPA's NONROAD model (EPA 2002, 2004a, 2004b).

- Air emissions from crew trucks needed in the construction of new or expanded sites are estimated using EPA's MOBILE6.2 model (EPA 2003b).

In addition to the direct emissions listed above, this EIS examines indirect emissions associated with the use of motor vehicles by employees to commute to the worksites.

The analysis focuses on five pollutants that are expected to be emitted in greatest quantities from such construction sources: carbon monoxide (CO), nitrogen oxides ($NO_x$), PM with a mean aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), PM with a mean aerodynamic diameter of 10 micrometers or less ($PM_{10}$), and non-methane hydrocarbons (NMHC). Because of increasingly stringent limits on both gasoline and diesel fuel sulfur content, sulfur dioxide ($SO_2$) was not included in the analysis, since these emissions from internal combustion engines are now negligible. Similarly, fuel no longer contains lead and DOE does not anticipate any lead emissions.

DOE predicts maximum annual emissions of these pollutants during the construction phase and compares those emissions to threshold triggers for new source review (NSR) requirements under the Clean Air Act (CAA). This comparison serves as a basis for evaluating whether the predicted emissions are likely to exceed the National Ambient Air Quality Standard (NAAQS) defined in EPA regulations (40 CFR Part 50), which are presented in table 3.5.1-1. Texas, Louisiana, and Mississippi are required to meet these standards.

**Table 3.5.1-1: National Ambient Air Quality Standards**

| | Primary Standard (To Protect Public Health) | | | Secondary Standard (To Protect Public Welfare) | | |
|---|---|---|---|---|---|---|
| **Pollutant** | **Level** | **Averaging Time** | **Form of the Standard** | **Level** | **Averaging Time** | **Form** |
| Ozone[a] | 80 ppb | 8-hour | 3-year average of annual fourth highest daily maximum | Same as primary standard | | |
| Particulate matter 10 microns or smaller ($PM_{10}$)[b] | 150 $\mu g/m^3$ | 24-hour | 3-year average of the number of exceedences must be less than one | Same as primary standard | | |
| | Revoked[3] | Annual | Not to be exceeded | | | |
| Particulate matter 2.5 microns or smaller ($PM_{2.5}$)[b] | 35 $\mu g/m^3$ | 24-hour | 3-year average of 24-hour average 98[th] percentile | Same as primary standard | | |
| | 15 $\mu g/m^3$ | Annual | 3-year spatial average of annual averages | | | |
| Carbon monoxide | 35,000 ppb | 1-hour | Not to be exceeded more than once per year | No secondary standard | | |
| | 9,000 ppb | 8-hour | Not to be exceeded more than once per year | | | |
| Sulfur dioxide | 140 ppb | 24-hour | Not more than once per year | 550 ppb | 3-hour | Not more than once per year |
| | 30 ppb | Annual | Not to be exceeded | | | |
| Nitrogen dioxide | 53 ppb | Annual | Not to be exceeded | Same as primary standard | | |

Notes:

[a] As of 2005, the 1-hour standard for ozone had been phased out. Attainment of ozone standards now depends only on meeting the 8-hour standard.

[b] New standards for particulate matter were published in the Federal Register on October 17, 2006. The new standards lower the 24-hour $PM_{2.5}$ standard from 65 to 35 $\mu g/m^3$ and revoke the annual $PM_{10}$ standard of 50 $\mu g/m^3$. This final rule is to be effective on December 18, 2006.

ppb = parts per billion; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

Source: 40 CFR Part 50

To further analyze potential impacts associated with $PM_{2.5}$ emissions, DOE also uses EPA's air quality screening model SCREEN3 (EPA 1995) to predict maximum ambient air concentrations of $PM_{2.5}$ resulting from the proposed construction activities. These predicted concentrations are then added to known background concentrations of $PM_{2.5}$ and the total resulting concentration is compared to the NAAQS. DOE focuses this analysis on $PM_{2.5}$ rather than $PM_{10}$ because, as described in the affected environment sections for each site, baseline $PM_{2.5}$ concentrations are much closer to the NAAQS and incremental $PM_{2.5}$ emissions from the proposed action are a greater potential concern than $PM_{10}$ emissions.

Finally, the CAA establishes geographic areas of attainment or nonattainment of the NAAQS for CO, PM, nitrogen dioxide ($NO_2$), and ozone based on the severity of each air pollutant. Therefore, the attainment or nonattainment status and severity are discussed separately in the affected environment sections for each of the proposed SPR storage sites and associated facilities. It is important to note that ozone is not directly emitted from sources; rather, it forms as a result of NMHC and $NO_x$ from vehicle and industrial emissions reacting with sunlight in the atmosphere.

#### 3.5.1.2 Operations and Maintenance Impacts

The analysis of operations and maintenance impacts focuses on three categories of emissions:

- CO, $NO_x$, $PM_{2.5}$, $PM_{10}$, and NMHC emissions from backup diesel generators that may be used for power sources in the event of electric power grid failures;
- Hydrogen sulfide emissions during drawdown; and
- NMHC emissions associated with well "workovers," fugitive emissions from brine ponds and storage tanks, as well as other maintenance activities.

Emissions from backup diesel generators are estimated and compared to threshold triggers for NSR and conformity review if located in nonattainment areas. Ambient air concentrations of hydrogen sulfide are estimated and analyzed for odor effects. Historical recorded emissions from well "workovers," brine ponds, and storage tanks and other maintenance activities at existing SPR sites are evaluated and compared to each state's permitted limits.

#### 3.5.1.3 Greenhouse Gas Emissions and Climate Change Impacts

Over the long term, atmospheric greenhouse gases affect global temperatures, wind and rainfall patterns, and other aspects of the global climate system by altering the ability of the Earth to reflect and absorb solar radiation. Some gases have become more concentrated in the atmosphere as a direct result of human activities and are known to affect the global equilibrium by absorbing infrared radiation that would otherwise be emitted into space and converting it into heat. The most important of these greenhouse gases are carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$).

The most significant source of greenhouse gas emissions for the SPR expansion are $CO_2$ emissions associated with combustion sources (construction equipment and motor vehicles) and $CH_4$ during cavern leaching. All combustion engines, including gasoline and diesel-fueled engines, emit large quantities of $CO_2$. Emissions of $N_2O$ and $CH_4$ from gasoline and diesel engines are much smaller, so only $CO_2$ needs to be considered from these sources. Solution mining of salt from cavern development emits trapped $CH_4$ in addition to NMHC. The brine pumped from the caverns also contains some $CO_2$. However, $CO_2$ is soluble in water, and the concentrations of $CO_2$ in the brine are well below equilibrium concentrations found in sea water, so only the $CH_4$ emissions from cavern leaching are considered in this EIS.

For both off-road and on-road internal combustion engines, a mass balance method was used to estimate $CO_2$ emissions. This method is based on fuel consumption, assuming that all the carbon in the fuel that is not emitted directly as hydrocarbons is converted to $CO_2$. The method used to estimate $CH_4$ emissions from cavern leaching is fundamentally the same as that used to estimate NMHC emissions based on measurements of hydrocarbons in the brine solution (DOE 1981). Both the method for estimating $CO_2$ from fuel combustion and estimating $CH_4$ from cavern leaching are described in greater detail in the Air Quality Appendix to this EIS (see appendix A). Estimated emissions of $CH_4$ are converted to $CO_2$

equivalent global warming potentials by applying a factor of 23, as was used in the Intergovernmental Panel on Climate Change Third Assessment Report (IPCC 2001).

### 3.5.2 Impacts Common to Multiple Sites

Section 3.5.2.1 reviews the major types of emission sources and pollutants that would be associated with construction of all of the proposed sites and related infrastructure.  Because the magnitude of these emissions is dependent on the nature and extent of the proposed construction activities, which vary substantially across the different sites, the construction impacts are evaluated in more detail on a site-specific basis in sections 3.5.3 through 3.5.9.

Sections 3.5.2.2 reviews the common types of emissions from the proposed operations and maintenance activities and section 3.5.2.3 reviews the common sources of greenhouse gas emissions and resulting climate change impacts.  Because the nature and magnitude of these emissions are similar and can be evaluated together across the different sites, they are evaluated only in these common impact discussions and are not addressed in the site-specific sections that follow.

#### 3.5.2.1 Construction Impacts

SPR site preparation, facility and road construction, cavern development, pipeline construction, and oil storage tank construction and use would generate air emissions.  The greatest potential air quality impacts are expected to be associated with large-scale cut-and-fill operations, which emit fugitive PM.  In addition, construction equipment is generally powered by internal combustion engines that emit additional air pollutants, including $NO_x$, PM, CO, $CO_2$, and NMHC.

Site preparation can be divided into four sequential phases:  clearing and grubbing, rough grading, soil stabilization, and embankment placement and compaction.  The emissions associated with these activities depend upon the facility size, existing vegetation, local terrain, and the extent to which affected areas are wetlands.

Facility construction also has four phases:  foundation pouring, building construction, electrical installation, and pipe installation.  Road construction includes laying road surfaces.  These activities generate both fugitive dust and fuel combustion-related emissions.  The emissions associated with these activities depend upon the existing infrastructure and size of the facility and road development.

Cavern development involves the use of diesel-powered boring drills working 24 hours per day.  DOE expects all initial holes for new cavern development to be drilled during facility construction.  Cavern development also involves dissolving the underground salt with fresh water and pumping out saturated brine, as described in Chapter 2.  Because the salt is soluble in water but not in oil, oil is pumped into the cavern to protect the cavern ceiling and later to fill the cavern as it is formed.  A small portion of the oil at the interface between the organic and aqueous phases mixes with the solution mining water and is pumped out with the brine during the cavern solution mining process.  DOE assumes for this air quality analysis that oil that is mixed with the aqueous phase is pumped out and is released to the atmosphere as hydrocarbon vapors (including NMHC) from either the oil/brine separator or the brine ponds (DOE, 1981).  For each new or expansion site, except for West Hackberry, NMHC emissions associated with cavern development are estimated based on the maximum expected increase in cavern capacity and the maximum brine production rate.  The West Hackberry expansion would not involve any cavern development and would therefore not be expected to emit any NMHC.

New and expansion SPR sites could require extensive pipeline construction for oil, brine, and raw water transport.  These pipes would range in diameter from 16 to 48 inches (0.4 to 1.2 meters) and would be buried. The miles of pipeline construction vary among each proposed site, as described in Chapter 2. Emissions-generating activities include both fugitive dust from the soil disturbance and fuel combustion from the off-road construction equipment. Because the majority of pipeline construction would be away from the storage sites themselves, pipeline construction can begin at the start of storage site preparation and can continue for up to three years, depending upon the site.

For several of the new site options (Bruinsburg, Richton, and Stratton Ridge), new above-ground oil storage tanks would also be installed and would potentially be active during the cavern solution mining process. Each of these facilities would have up to four 0.4 MMB storage tanks. Emissions of NMHC from these tanks would be associated with standing (rim seal, deck seams and fittings) storage losses and working (during movement of crude through tanks) losses.

All of these construction-related emissions and impacts are evaluated on a site-specific basis in sections 3.5.3 through 3.5.9. This approach allows for a full discussion of the different factors contributing to the emissions and impacts at each site.

#### 3.5.2.2 Operations and Maintenance Impacts

The main operations- and maintenance-related emissions and impacts are summarized below; these include emissions from backup diesel generators, above-ground storage tank losses, brine pond losses, and frac tank emission losses associated with cavern "workovers." These emissions and impacts can be generalized across the proposed sites and do not warrant more detailed site-specific discussions in subsequent sections.

***Backup Diesel Generator Emissions***

Regional electric grids, rather than onsite internal combustion engines, will power most onsite equipment during operations and maintenance. Accordingly, routine operation of the new and expanded SPR sites is anticipated to have low air emissions.

In emergencies when the electric power grid fails, DOE may use backup diesel generators. Air emission permits are generally not required for emergency backup generators if used less than 500 hours per year, which is the expected maximum use from routine maintenance testing and emergency operations. Each of the new expansion or existing sites would be equipped with two standby diesel engine electrical generators: one for the main site rated at 1,200 horsepower (900 kilowatt) and the other for the RWI rated at 340 horsepower (250 kilowatt). Table 3.5.2-1 gives the combined emissions from a 1,200-horsepower diesel generator and a 340-horsepower diesel generator operating at the same time.

**Table 3.5.2-1: Combined Emissions from a 1,200-Horsepower Diesel Generator and a 340-Horsepower Diesel Generator Operating 500 Hours per Year (tons per year)**

| CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|
| 2.22 | 9.84 | 0.40 | 0.40 | 0.40 |

Notes:

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

Source: EPA, 1996; Table 3.5-1 and Table 3.3-1

In addition, the Richton site may need to use three 2,000-horsepower (1,500-kilowatt) diesel-fired engines as pumping units at the midpoint (58 miles [93 kilometers]) of the oil distribution pipeline from Richton to Liberty Terminal during drawdown events. Table 3.5.2-2 gives the total estimated emission rate from three 2,000- horsepower diesel generators.

**Table 3.5.2-2: Emissions from Three 2,000-Horsepower Diesel Generators Operating 500 Hours per Year (tons per year)**

| CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|
| 8.25 | 36.00 | 1.05 | 1.05 | 0.96 |

Notes:

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

Source: EPA, 1996; Table 3.5-1

These estimated maximum air emissions from backup diesel generators would be small, sporadic, and inconsequential in terms of air quality impacts. Considered by themselves, the estimated emissions are well below 250 tons per year (230 metric tons per year), the threshold trigger for NSR. They also are below conformity emission threshold levels of 100 tons per year for either $NO_x$ or VOCs and, as a result, the provisions of the conformity rule would no longer apply. The section below on workover and other maintenance emissions addresses backup diesel generator emissions further by evaluating actual generator emissions from the Big Hill site together with other sources of emissions during operation and maintenance activities.

***Hydrogen Sulfide Emissions***

Crude oil can have significant sulfur content, so emissions of gaseous hydrogen sulfide during drawdown could pose a local odor nuisance or a health risk to sensitive individuals. The extent of these emissions would depend upon the gas-to-oil ratio, vapor phase of hydrogen sulfide fraction, sulfur content of the oil, drawdown rate, and local meteorological conditions.

To address this issue, DOE estimated ambient concentrations of hydrogen sulfide every 328 feet (100 meters) from release sources out to a distance of 5 miles (8 kilometers). The analysis relied on the results of a previous DOE study (Lee et al. 2000) and used the following assumptions:

- The maximum drawdown rate at each facility;
- All crude oil stored at the facility had a high sulfur content, 0.06 standard cubic feet of hydrogen sulfide per barrel;
- Stagnant air conditions (1.0 meters per second) and a mixing height of 0.25 miles (0.40 kilometers);
- Typical 400,000 barrel storage tank; and
- The potential occurrence of all atmospheric stability classes (Stability Class C was found to yield the highest estimated concentrations).

With these conservative assumptions, the estimated maximum ambient levels of hydrogen sulfide would vary by facility from 17 to 43 parts per million (1-hour average), depending upon each facility's maximum drawdown rate. DOE estimates the maximum concentration out to a distance of 0.12 miles (0.19 kilometers) from the source. These levels are high enough that people within that distance would be able to detect hydrogen sulfide odors (rotten egg smell) and would experience coughing and throat irritation when conducting moderate exercise in the area (OEHHA 2000, p. 6). The occurrence of these events, however, would be expected to be very rare as drawdown events are infrequent (only a few times in the past 20 years) and would need to be coupled with both the storage of high sulfur content crude oil (about half to two-thirds of the current crude oil storage) and the stagnant meteorological conditions assumed above.

DOE has a specific plan in place to minimize the impacts of hydrogen sulfide odors in the event of full drawdown. That plan is to inject a hydrogen scavenger (if needed, based on the oil's sulfur content) into the crude oil as it leaves the SPR, with the proper concentration to reduce the hydrogen sulfide to non-objectionable levels for worker exposures at the terminal receiving the oil. DOE has basic ordering agreements in place with several vendors to supply the large quantities of scavenger that might be required for a full drawdown. With these measures in place, DOE does not expect significant impacts associated with hydrogen sulfide emissions.

***Other Operations and Maintenance Emissions***

Historically, emissions from operations and maintenance of the SPR facilities include the following:

(1) VOCs evaporating from small quantities of oil in the brine ponds (as discussed above, the brine picks up small quantities of hydrocarbons when it comes into contact with oil during fill and drawdown activities);

(2) VOCs escaping from small leaks in pipe joints and pumping equipment (such as valves, flanges, and pump seals);

(3) CO, $NO_x$, PM, and VOC emitted from backup diesel generators and pumps used to supply diesel fuel to those generators, as discussed above;

(4) VOCs evaporating from various tanks and other equipment used to store or move oil or other fluids containing volatile compounds, such as "slop oil" tanks (used to store oil discharged as a result of equipment maintenance or contaminated stormwater), crude oil storage tanks, "sump" tanks (which accept crude oil that might be spilled during maintenance activities), diesel fuel storage tanks, gasoline storage tanks, other assorted equipment (such as an "air eliminator" and "solvent recycler"), and "frac" tanks (used to receive crude oil from a cavern that is being worked on to reduce cavern pressure); and

(5) CO, $NO_x$, PM, and VOCs emitted from vehicles used by workers commuting to and from the sites.

For the purpose of this EIS, historical emissions from the 161 MMB Big Hill facility can be used to estimate emissions from the proposed new or expanded SPR facilities. The current permit limits for emissions from operations and maintenance at Big Hill are shown in table 3.5.2-3. These include permit limits for backup diesel generators, which are well below the maximum estimated emissions presented above. Actual emissions have been below the total permitted levels shown in the bottom row of this table, so these values are conservative for the purpose of estimating emissions at other sites.

Although not the subject of a permit limit in Texas, there are also occasional frac tank emissions of VOCs, depending on the need for cavern maintenance activities. Recorded frac tank emissions of VOCs have been highly variable from year to year, since the same extent of cavern maintenance is not needed every year. In particular, VOC emissions from frac tanks at Big Hill were: 62.5 tons in 1998; 7 tons in 1999; 0.5 tons in 2000; 53.9 tons in 2001; 10.7 tons in 2002; 16.6 tons in 2003; and 17.4 tons in 2004.

**Table 3.5.2-3: Permit Limits for Emissions from Operations and Maintenance of Current Big Hill Facility (tons per year)**

| Emission Source | CO | $NO_x$ | $PM_{10}/PM_{2.5}$[a] | VOC |
|---|---|---|---|---|
| Brine pond | — | — | — | 3.15 |
| Fugitive emissions from piping | — | — | — | 9.34 |
| 6-kilowatt generator | 0.01 | 0.03 | 0.01 | 0.01 |
| 900-kilowatt generator | 0.43 | 2 | 0.03 | 0.06 |
| 80-kilowatt generator | 0.03 | 0.14 | 0.01 | 0.01 |
| Diesel pump | 0.1 | 0.45 | 0.03 | 0.04 |
| Slop oil tank | — | — | — | 0.18 |
| Crude oil tank | — | — | — | 1.37 |
| Sump tank | — | — | — | 0.06 |
| Diesel fuel tanks (4) | — | — | — | 0.04 |
| Gasoline tank | — | — | — | 0.24 |
| Air eliminator | — | — | — | 1.5 |
| Solvent recycler | — | — | — | 0.06 |
| Total permit limit for all sources | 0.57 | 2.62 | 0.08 | 16.1 |

[a] Permit limits are the same for $PM_{10}$ and $PM_{2.5}$ emissions

Adding the recent maximum frac tank emissions of VOCs (62.5 tons per year) to the total permitted VOC emissions from other onsite sources reported in table 3.5.2-3 (16.1 tons per year) yields a maximum estimate of 78.6 tons per year of VOCs emitted from Big Hill operation and maintenance activities.

DOE expects that operation and maintenance emissions at the proposed expansion sites would be similar to those at Big Hill, but the emissions are likely to vary in proportion to the storage capacity of the different facilities. Therefore, for this EIS, DOE took the maximum Big Hill emissions discussed above and scaled them up or down to reflect the storage capacity of the site relative to the Big Hill storage capacity. To these scaled results, DOE then added estimated emissions associated with worker vehicles commuting to the sites. The estimated results are summarized in table 3.5.2-4.

**Table 3.5.2-4: Estimated Maximum Emissions During the Operations and Maintenance at Proposed Expansion and New Sites (tons per year)**

| Proposed Sites | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | VOC |
|---|---|---|---|---|---|
| **Expansion Sites** | | | | | |
| Big Hill | 12.0 | 2.3 | 0.075 | 0.075 | 47.7 |
| Bayou Choctaw | 7.1 | 0.92 | 0.031 | 0.031 | 6.8 |
| West Hackberry | 16.3 | 1.3 | 0.046 | 0.046 | 3.1 |
| **New Sites** | | | | | |
| Richton | 15.7 | 3.5 | 0.12 | 0.12 | 79.0 |
| Chacahoula | 12.8 | 3.4 | 0.11 | 0.11 | 79.3 |
| Stratton Ridge | 36.4 | 4.8 | 0.16 | 0.16 | 78.1 |
| Bruinsburg | 33.1 | 4.6 | 0.16 | 0.16 | 79.2 |

Source: Estimated as described in preceding text

The maximum estimated emissions in table 3.5.2-4 are well below 250 tons per year (230 metric tons per year), the threshold trigger for NSR. They also are below conformity emission threshold levels of 100 tons per year for either $NO_x$ or VOC and, as a result, the provisions of the conformity rule would no longer apply. Based on this analysis, DOE expects the proposed operations and maintenance activities to have an insignificant impact on air quality. [1]

#### 3.5.2.3 Greenhouse Gas Emissions and Climate Change Impacts

The emissions of greenhouse gases associated with construction and expansion of the SPR sites during maximum activity are shown for each site in table 3.5.2-5. Maximum total greenhouse gas emissions associated with the proposed action (0.22 million tons of $CO_2$ equivalents per year for the expansion alternative involving Bruinsburg and the three expansion sites) would be less than 0.004 percent of the annual total greenhouse gas emissions for the United States in 2000 (7,140 million tons of $CO_2$ equivalents per year). This amount may also be compared with the estimated green house gas emissions associated with the construction of three 11 MMB salt dome caverns for the proposed US Coast Guard Main pass Energy Hub to be located off the coast of Louisiana (US Coast Guard, 2006). That analysis showed that during the 27-month construction period the greenhouse gas annual emission rate would be 0.070 million tons of $CO_2$ equivalent. Thus, the greenhouse gas emissions under the proposed action for SPR expansion would be 3.1 times larger than the greenhouse gas emissions for the Main Pass Energy Hub. Once cavern development is complete, emissions would be limited to only indirect impacts associated with emissions from commuter vehicles (as high as 0.019 million tons of $CO_2$ equivalent per year, depending upon which combination of sites are developed), which would be about a third of the construction impacts. Therefore, the incremental emissions and climate change impacts of the proposed SPR site development are considered very small.

**Table 3.5.2-5: Annual Average Emissions of Greenhouse Gases Associated with Site Construction and Expansion (million tons of $CO_2$ equivalents)**

| Site | Construction Impacts | Leaching Impacts | Indirect Impacts[a] | Total |
|---|---|---|---|---|
| Bruinsburg | 0.071 | 0.065 | 0.011 | 0.147 |
| Chacahoula | 0.024 | 0.065 | 0.004 | 0.093 |
| Richton | 0.025 | 0.065 | 0.005 | 0.095 |
| Stratton Ridge | 0.024 | 0.065 | 0.011 | 0.100 |
| Bayou Choctaw | 0.005 | 0.008 | 0.002 | 0.015 |
| Big Hill | 0.031 | 0.039 | 0.004 | 0.054 |
| West Hackberry | Negligible | N/A | 0.002 | 0.002 |

[a] Indirect impacts would be associated with emissions from worker vehicles

N/A = not available

### 3.5.3 Bruinsburg Storage Site

#### 3.5.3.1 Affected Environment

A **design value** is a pollutant concentration, based on ambient measurement, which describes the air quality status of a given area. Areas in which the design value exceeds the NAAQS may result in a nonattainment designation for the area.

Currently, all of Mississippi is in attainment for all criteria pollutants. The ozone monitors closest to the proposed Bruinsburg SPR storage site have 8-hour **design values** between 69 and 74 parts per billion and the nearest $PM_{2.5}$ monitors have 3-year annual average concentrations between 11.9 and 13.3 micrograms per cubic meter and a 24-hour average concentration

[1] If the emissions from the operation and maintenance (including the backup generators) are included in a permit, these emissions may be excluded from the general conformity applicability analysis.

between 27 and 30 micrograms per cubic meter (see table 3.5.3-1). These upper-end values correspond to 93 percent of the NAAQS for 8-hour ozone (80 parts per billion) and 89 percent of the NAAQS for annual $PM_{2.5}$ (15 micrograms per cubic meter). Other NAAQS, such as for 1-hour and 8-hour CO, 24-hour and annual $PM_{10}$, and 24-hour average for $PM_{2.5}$ (65 micrograms per cubic meter) are met by much greater margins. Thus, the pollutants of primary concern are 8-hour ozone and annual $PM_{2.5}$.

**Table 3.5.3-1: Design Values for 8-Hour Ozone, Annual, and 24-Hour $PM_{2.5}$ at Monitoring Sites Near Bruinsburg Storage Site**

| Monitoring Site | County | Pollutant | 2001–2003 Design Value | 2002–2004 Design Value |
|---|---|---|---|---|
| Jackson | Hinds | 8-hr ozone | 73 ppb | 69 ppb |
| Highway 22 | Madison | 8-hr ozone | 74 ppb | 73 ppb |
| Vicksburg | Warren | 8-hr ozone | 74 ppb | N/A |
| Northeast Jackson | Hinds | Annual $PM_{2.5}$ | 13.0 $\mu g/m^3$ | 12.9 $\mu g/m^3$ |
| Downtown Jackson | Hinds | Annual $PM_{2.5}$ | 13.3 $\mu g/m^3$ | 13.1 $\mu g/m^3$ |
| Vicksburg | Warren | Annual $PM_{2.5}$ | 12.2 $\mu g/m^3$ | 11.9 $\mu g/m^3$ |
| Northeast Jackson | Hinds | 24-hr $PM_{2.5}$ | 30 $\mu g/m^3$ | 30 $\mu g/m^3$ |
| Downtown Jackson | Hinds | 24-hr $PM_{2.5}$ | 29 $\mu g/m^3$ | 28 $\mu g/m^3$ |
| Vicksburg | Warren | 24-hr $PM_{2.5}$ | 30 $\mu g/m^3$ | 27 $\mu g/m^3$ |

Notes:

ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; N/A = not applicable; PM = particulate matter; hr = hour

Sources: MDEQ, 2003; MDEQ, 2004

#### 3.5.3.2 Construction Impacts

As a proposed new SPR facility, about 270 acres (110 hectares) of the Bruinsburg site would need to be cleared and prepared. DOE estimates that this would require approximately 31 working days for clearing and grubbing, 10 working days for rough grading, 124 working days for soil stabilization with lime, and 57 working days for embankment compaction and stabilization. In addition, a marine terminal would be developed in Anchorage, LA, to support the Bruinsburg SPR site operation.

Constructing buildings and roads at the Bruinsburg site would require approximately 60 days for foundation pouring, 60 days for building construction, 250 days for electrical installation, 60 days for local pipe installation, and 60 days for road building.

Cavern solution mining would occur after other facility construction is complete and would result only in evaporative hydrocarbon emissions from oil extracted from the brine solution. Up to half of the 16 10-MMB-capacity caverns would be developed simultaneously, after which the other 8 would be developed.

In addition to the above onsite sources, emissions would be associated with pipeline ROW development and pipeline installation, as follows:

- A 14-mile (22-kilometer) brine disposal pipeline to injection wells located along the proposed Baton Rouge crude oil pipeline ROW along with a 15-mile (24-kilometer) maintenance road;
- A 39-mile (63-kilometer) crude oil pipeline connecting the facility to the Peetsville Pump Station in Lincoln County, MS;

- A 109-mile (176-kilometer) crude oil pipeline to connect the storage facility to the Anchorage, LA, Terminal area; and

- A 4.1-mile (6.6-kilometer) pipeline for RWI from the Mississippi River.

Pipeline construction would begin at the start of site preparation and continue for about 27 months using 2 pipeline construction crews.

Of the proposed new sites, Bruinsburg is unique in proposing underground injection as the method of brine disposal. DOE would space 60 brine disposal wells at approximately 1,000-foot (300-meter) distances along the brine disposal and crude oil pipelines ROW. Brine disposal wells would be drilled to a depth of 2,000 to 3,000 feet (600 to 900 meters) through rock into underlying porous media. DOE estimates that nine 500-horsepower drills similar to those used for storage cavern development could drill these wells in about 3 years.

DOE would clear an area of about 230 feet by 230 feet (70 meters by 70 meters) around each well. Overall, DOE would conduct clearing, grubbing, and rough grading activities similar to those for the SPR storage site for about 73 acres (30 hectares). The emissions would be about 59 percent of the emissions for the storage facility, based on the ratio of 73 acres to 120 acres (30 to 49 hectares). Despite the smaller area for the injection wells, the well construction schedule would be similar to the storage site schedule because of the increased effort needed for the dispersed location of the wells.

As noted above, an 11-mile (18-kilometer) aggregate surface access road would be built along the brine disposal pipeline. Emissions associated with construction of the access road are estimated by including an additional backhoe and two tractor trailers to the pipeline crew and doubling grader activity.

During the period when clearing, grubbing, and rough grading activities take place, DOE assumed that an average of 20 vehicles per day would travel the full length of the 11-mile (18 kilometer) gravel road and back. At other times, DOE assumed that an average of eight vehicles per day would travel the full length of the gravel road and back.

A summary of estimated direct air emissions and durations for different construction activities is given in table 3.5.3-2. Emissions are totals for all activities that last for less than one year. For activities lasting more than one year, such as pipeline construction and cavern development, emissions are given as maximum rates for those activities in any one year. The maximum annual emissions rate in the final row includes all the emissions during the 12-month period of greatest emissions. This is the first year for all pollutants except NMHC, which peaks during the solution mining/fill period.

**Table 3.5.3-2: Maximum Direct Emissions during Construction of Proposed Bruinsburg Site (emissions are in total tons except those lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Clearing and grubbing | 54 | 18.52 | 0.38 | 31.25 | 3.59 | 3.26 |
| Rough grading | 10 | 0.07 | 0.26 | 2.47 | 0.26 | 0.02 |
| Soil stabilization | 124 | 4.62 | 2.63 | 9.38 | 1.23 | 0.83 |
| Embankment compacting | 57 | 5.60 | 0.63 | 15.71 | 1.75 | 0.96 |
| Foundation pouring | 60 | 0.75 | 1.56 | 0.14 | 0.14 | 0.10 |
| Building construction | 60 | 0.38 | 0.45 | 0.07 | 0.07 | 0.05 |
| Electrical installation | 250 | 0.39 | 0.83 | 0.09 | 0.09 | 0.09 |
| Pipe installation | 60 | 0.11 | 0.38 | 0.03 | 0.03 | 0.02 |

**Table 3.5.3-2: Maximum Direct Emissions during Construction of Proposed Bruinsburg Site (emissions are in total tons except those lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Road construction | 60 | 0.30 | 0.57 | 3.58 | 0.42 | 0.05 |
| Pipeline construction[a] | 560 | 2.01 | 2.68 | 35.72 | 3.85 | 0.35 |
| Cavern drilling | 730 | 11.12 | 47.51 | 2.27 | 2.27 | 1.57 |
| Solution mining[b] | 425 | 0.00 | 0.00 | 0.00 | 0.00 | 23.9 |
| Solution mining/fill[b] | 359 | 0.00 | 0.00 | 0.00 | 0.00 | 93.8 |
| Final fill | 160 | 0.00 | 0.00 | 0.00 | 0.00 | 21.0 |
| Brine disposal site prep[c] | 43 | 6.87 | 0.28 | 21.84 | 4.73 | 1.13 |
| Brine disposal well drilling[c] | 1095 | 25.0 | 107 | 5.11 | 5.11 | 3.54 |
| Gravel road travel[d] | N/A | 0.48 | 0.10 | 24.86 | 5.27 | 0.00 |
| Maximum annual emissions | — | 72.10 | 162.04 | 123.82 | 13.69 | 98.82 |

Notes:

[a] The emissions associated with the pipeline construction are distributed over some 166 miles (267 kilometers)
[b] Based on simultaneous development of eight caverns; these activities would proceed sequentially
[c] The emissions associated with brine disposal wells and aggregate road travel are distributed over 11 miles (18 kilometer) of the proposed brine disposal pipeline
[d] After initial period of clearing, grubbing, and rough grading

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons; N/A = not available

In addition, motor vehicles used by workers to commute to the worksite would also indirectly emit pollutants to the atmosphere. The combined total annual emission rate includes all co-located sources of emissions that could occur in the same year and within the same airshed. Table 3.5.3-3 summarizes these emissions. CO emissions would be the largest, but since these emissions would be dispersed over miles of roadway, the effect is likely to be small.

**Table 3.5.3-3: Indirect Emissions (tons per year) from Worker Commutes Associated with Construction Activities at the Proposed Bruinsburg Site**

| Year | Workers | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| One | 211 | 54.90 | 3.52 | 0.13 | 0.13 | 4.15 |
| Two | 323 | 84.05 | 5.24 | 0.20 | 0.20 | 6.35 |
| Three | 388 | 100.96 | 6.29 | 0.24 | 0.24 | 7.63 |
| Four | 137 | 35.65 | 2.22 | 0.08 | 0.08 | 2.70 |

Notes:

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

Construction of the proposed Bruinsburg storage facility would be accompanied by an upgrade of the existing Placid Refinery dock to receive oil tankers. Because it is not necessary to either dredge a channel or construct a new dock at Anchorage, emissions associated with this construction are expected to be minor. Also, at the Anchorage location and at the Peetsville pumping station, four 0.4 MMB above-ground floating storage tanks would be constructed and operated during the solution mining activities. Application of EPA's TANKS 4.0 model finds that standing losses–those associated with a tank simply storing oil-from four well–maintained floating roof tanks of this size (400 MB) are much less than 1.1 tons (1 metric ton) of NMHC per year. Working losses-those associated with oil moving through a tank during active solution mining-are estimated at 11 tons (10 metric tons) of NMHC per year across all four tanks. These small emissions are not expected to exceed the NAAQS at this offsite location.

Tables 3.5.3-2 and 3.5.3-3 and the above-described storage tank emissions conservatively estimate the total impact from the construction of the Bruinsburg storage facility and associated infrastructure. In no case are emissions of any single pollutant anticipated to exceed 250 tons per year (230 metric tons per year), the threshold trigger for NSR under the CAA. The purpose of this review is to ensure that air quality is not significantly degraded from the addition of new sources of air pollution, and in areas meeting the NAAQS, NSR assures that new emissions do not significantly worsen air quality. Accordingly, sources that are below the NSR permit requirement triggers are unlikely to significantly worsen ozone air quality. This analysis indicates that emissions from construction of the new Bruinsburg storage facility are below the threshold triggers and are therefore unlikely to cause an exceedance of the ozone NAAQS.

To further assess the potential impact of $PM_{2.5}$ emissions, DOE used EPA's air quality screening model, SCREEN3 (EPA 1995) to conservatively estimate the maximum $PM_{2.5}$ concentration during construction of the proposed Bruinsburg facility. Maximum annual average $PM_{2.5}$ emissions were used in the modeling (this includes both material resuspended from earth movement activities as well as exhaust emissions from motor vehicles and construction equipment), with emissions evenly distributed over the land cleared and prepared for development. SCREEN3 conservatively estimates 1-hour concentrations using these input data. Annual and 24-hour concentrations are then estimated from the 1-hour concentration using EPA screening factors (EPA 1992) of 0.4 and 0.1, respectively. These estimated concentrations are added to the maximum 24-hour and annual averages from nearby monitors (in this case the Vicksburg monitor) and the sums can be compared to the 24-hour and annual average NAAQS, which are 35 and 15 micrograms per cubic meter, respectively. The results are shown in table 3.5.3-4 for the near fence-line concentration. This screening model shows that during the construction period, the peak 24-hour and annual concentrations will not exceed the NAAQS for $PM_{2.5}$. These results are conservative because maximum estimated emissions and maximum monitored concentrations were used together with a simplified screening model that tends to overestimate actual concentrations.

**Table 3.5.3-4: Modeled SCREEN3 $PM_{2.5}$ Concentrations and Local Monitored Concentrations at the Proposed Bruinsburg Site**

| Averaging Period | Modeled Concentration ($\mu g/m^3$) | Monitored Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) |
|---|---|---|---|
| 24-hour | 5 | 30 | 35[a] |
| Annual | 1.3 | 12.2 | 13.5 |

[a] These results are for the maximum (100th percentile) 24-hour $PM_{2.5}$ concentration while the NAAQS for $PM_{2.5}$ is for the 98th percentile so that no exceedance of the NAAQS is anticipated.

$\mu g/m^3$ = micrograms per cubic meter

### 3.5.4 Chacahoula Storage Site

#### 3.5.4.1 Affected Environment

The proposed Chacahoula storage site is located in the Houma-Bayou Cane-Thibodaux **Metropolitan Statistical Area** (MSA), which is currently in attainment for all NAAQS, including 8-hour ozone, annual average $PM_{2.5}$ and $PM_{10}$, 24-hour average $PM_{2.5}$ and $PM_{10}$, and 1-hour and 8-hour CO.

Ozone design values for the 8-hour ozone standard at the Thibodaux monitoring station in Lafourche Parish were determined by averaging the fourth highest values for each 3-year period from the EPA AirData Web site (EPA 2004c), as shown in table 3.5.4-1. Similarly, annual and 24-hour $PM_{2.5}$ design values were also calculated using values from the EPA AirData Web site for neighboring Terrebonne Parish and also appear in table 3.5.4-1. The 8-hour ozone design value is below, but near the NAAQS of 80 parts per billion. The only other pollutant close to the NAAQS is the annual $PM_{2.5}$ concentration, which is at 70 percent of the standard. Other pollutants such as nitrogen dioxide, $PM_{10}$, and CO are met by much greater margins. Thus, the pollutants of primary concern in this EIS are ozone and $PM_{2.5}$.

**Table 3.5.4-1: Design Values for 8-hour Ozone in Lafourche Parish and Annual and 24-Hour $PM_{2.5}$ in Terrebonne Parish**

| Site | Parish | Pollutant | 2001–2003 Design Value | 2002–2004 Design Value |
|---|---|---|---|---|
| Thibodeaux | Lafourche | 8-hr ozone | 79 ppb | 77 ppb |
| Highway 24 | Terrebonne | Annual $PM_{2.5}$ | 10.4 $\mu g/m^3$ | 10.0 $\mu g/m^3$ |
| Highway 24 | Terrebonne | 24-hr $PM_{2.5}$ | 23 $\mu g/m^3$ | 23 $\mu g/m^3$ |

Notes:

ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; hr = hour

Source: EPA, 2004c

### 3.5.4.2 Construction Impacts

DOE modeled construction activities at Chacahoula based on the cost estimate for the Chacahoula site (DOE, 2004c), the cost estimate for the Stratton Ridge site (DOE 2004e), and Chapter 2 of the 1992 draft EIS for the expansion of the SPR (DOE 1992b).

As a proposed new facility, DOE expects that about 240 acres (96 hectares) of the Chacahoula site would be prepared for construction. However, since the site is largely underwater, grading, soil stabilization, and compacting would not be needed. Nonetheless, grubbing of large trees may be needed to improve the line of site for security purposes and filling would be required for pads and facility construction. The work would require approximately 60 days for foundation pouring, 60 days for building construction, 250 days for electrical installation, 60 days for local pipe installation, and 60 days for road building.

The storage caverns at Chacahoula would be developed following the same process as at Bruinsburg, up to eight at a time, as described in section 3.5.3.2, except that the maximum solution mining rate would be 1.2 MMBD. This maximum rate effects the time period for the solution mining and fill operations.

In addition to onsite emissions, emissions would be associated with the development of four pipelines:

- A 58-mile (93-kilometer) brine pipeline into the Gulf of Mexico (40 miles [65 kilometers] onshore, 18 miles [19 kilometers] offshore);
- A 54-mile (87-kilometer) crude oil pipeline to the LOOP terminal at Clovelly;
- A 21-mile (34-kilometer) crude oil pipeline to the St. James Terminal, LA; and
- A 13-mile (21-kilometer) RWI pipeline to the ICW.

Pipeline construction is expected to begin at the start of site preparation and continue for approximately 22 months using two pipeline construction crews working an average of 250 days per year.

Table 3.5.4-2 summarizes the estimated direct emissions and durations for each construction activity for the Chacahoula storage facility. The table gives total emissions for activities that last for less than one year. For activities lasting more than one year, such as pipeline construction and cavern development, emissions are given as maximum rates for activities in any one year. The maximum annual emission rates in the final row include all the emissions occurring during the 12-month period of greatest emissions. This is the first year for all pollutants except NMHC, which peaks during the solution mining/fill period.

**Table 3.5.4-2: Maximum Direct Emissions during Construction of Proposed Chacahoula Site (total tons except emissions lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Clearing | 35 | 10.87 | 0.25 | 0.33 | 0.33 | 2.11 |
| Rough grading | N/A | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Soil stabilization | N/A | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Embankment compacting | N/A | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Foundation pouring | 60 | 0.75 | 1.56 | 0.14 | 0.14 | 0.10 |
| Building construction | 60 | 0.38 | 0.45 | 0.07 | 0.07 | 0.05 |
| Electrical installation | 250 | 0.39 | 0.83 | 0.09 | 0.09 | 0.09 |
| Pipe installation | 60 | 0.11 | 0.38 | 0.03 | 0.03 | 0.02 |
| Road construction | 60 | 0.30 | 0.57 | 3.5 | 0.42 | 0.05 |
| Pipeline construction[a] | 460 | 1.67 | 1.85 | 35.17 | 3.79 | 0.28 |
| Cavern drilling | 730 | 11.12 | 47.51 | 2.27 | 2.27 | 1.57 |
| Solution mining | 510 | 0.00 | 0.00 | 0.00 | 0.00 | 23.9 |
| Solution mining/fill | 431 | 0.00 | 0.00 | 0.00 | 0.00 | 93.8 |
| Final fill | 160 | 0.00 | 0.00 | 0.00 | 0.00 | 21.0 |
| Maximum annual emissions | — | 25.23 | 52.51 | 41.60 | 7.14 | 94.08 |

Notes:

[a] The emissions associated with onshore pipeline construction are distributed over 125 miles (201 kilometers). Emissions from offshore construction are assumed to be negligible relative to the onshore pipeline.

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons; N/A = not available

In addition, motor vehicles used by workers to commute to the worksite would also indirectly emit pollutants to the atmosphere. Table 3.5.4-3 summarizes these emissions. These emissions would be small and distributed over miles of roadway.

Tables 3.5.4-2 and 3.5.4-3 conservatively estimate the total emissions from the construction of the Chacahoula storage facility and associated infrastructure. The combined total annual emission rate includes all co-located sources of emissions that could occur in the same year and within the same airshed. In no case are emissions of any single pollutant anticipated to exceed 250 tons per year (230 metric tons per year), the threshold trigger for NSR under the CAA. Thus, the potential impact from the construction of the new Chacahoula storage facility on ozone air quality is unlikely to cause an exceedance of any of the NAAQS.

**Table 3.5.4-3: Indirect Emissions (tons per year) from Worker Commutes Associated with Construction Activities at Proposed Chacahoula Site**

| Year | Number of Workers | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| One | 186 | 18.18 | 1.13 | 0.04 | 0.04 | 1.37 |
| Two | 298 | 29.13 | 1.82 | 0.07 | 0.07 | 2.20 |
| Three | 363 | 35.49 | 2.21 | 0.08 | 0.08 | 2.68 |
| Four | 112 | 10.95 | 0.68 | 0.03 | 0.03 | 0.83 |

Notes:

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

To further assess the potential impact of $PM_{2.5}$ emissions, DOE used EPA's air quality screening model, SCREEN3 (EPA 1995) to conservatively estimate the maximum $PM_{2.5}$ concentration during construction of the proposed Chacahoula facility. Maximum annual average $PM_{2.5}$ emissions were used in the modeling (this includes both material resuspended from earth movement activities as well as exhaust emissions from motor vehicles and construction equipment), with emissions evenly distributed over the land cleared and prepared for development. SCREEN3 conservatively estimates 1-hour concentrations using these input data. Annual and 24-hour concentrations are then estimated from the 1-hour concentration using EPA screening factors (EPA 1992) of 0.4 and 0.1, respectively. These estimated concentrations are added to the maximum 24-hour and annual averages from nearby monitors and the sums can be compared to the 24-hour and annual average NAAQS, which are 35 and 15 micrograms per cubic meter, respectively. The results are shown in table 3.5.4-4 for the near fence-line concentration. This screening model shows that during the construction period, the peak 24-hour and annual concentrations will not exceed the NAAQS for $PM_{2.5}$. These results are conservative because maximum estimated emissions and maximum monitored concentrations were used together with a simplified screening model that tends to overestimate actual concentrations.

**Table 3.5.4-4: Modeled $PM_{2.5}$ SCREEN3 Concentrations and Local Monitored Concentrations for the Proposed Chacahoula Site**

| Averaging Period | Modeled Concentration ($\mu g/m^3$) | Monitored Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) |
|---|---|---|---|
| 24-hour | 2 | 23 | 25 |
| Annual | 0.5 | 10.4 | 10.9 |

μg/m3 = micrograms per cubic meter

### 3.5.5 Richton Storage Site

#### 3.5.5.1 Affected Environment

Design values for 8-hour ozone and annual and 24-hour average $PM_{2.5}$ at monitoring sites near the proposed Richton facility are given in table 3.5.5-1. Currently, all of Mississippi is in attainment for all criteria pollutants. In the vicinity of the proposed Richton site, the nearest ozone monitors have 8-hour design values between 73 and 77 parts per billion. The nearest $PM_{2.5}$ monitors have 3-year annual average concentrations between 13 and 14 micrograms per cubic meter. These upper-end values correspond to 96 percent of the NAAQS for 8-hour ozone (80 parts per billion) and 93 percent of the

NAAQS for annual $PM_{2.5}$ (15 micrograms per cubic meter). Other NAAQS for 1-hour and 8-hour CO, $NO_2$, 24-hour and annual average $PM_{10}$, and 24-hour average $PM_{2.5}$ (65 micrograms for cubic meter) are

**Table 3.5.5-1: Design Values for 8-Hour Ozone, Annual, and 24-Hour $PM_{2.5}$ at Monitoring Sites Near Richton, MS**

| Monitoring Site | County | Pollutant | 2001–2003 Design Value | 2002–2004 Design Value |
|---|---|---|---|---|
| Stennis Air | Hancock | 8-hr ozone | 76 ppb | 77 ppb |
| Saucier | Harrison | 8-hr ozone | 75 ppb | 73 ppb |
| Vancleave | Jackson | 8-hr ozone | 73 ppb | 75 ppb |
| Hattiesburg | Forrest | Annual $PM_{2.5}$ | 13.1 $\mu g/m^3$ | 13.3 $\mu g/m^3$ |
| Laurel | Jones | Annual $PM_{2.5}$ | 14.3 $\mu g/m^3$ | 14.4 $\mu g/m^3$ |
| Hattiesburg | Forrest | 24-hr $PM_{2.5}$ | 29 $\mu g/m^3$ | 30 $\mu g/m^3$ |
| Laurel | Jones | 24-hr $PM_{2.5}$ | 32 $\mu g/m^3$ | 31 $\mu g/m^3$ |

Notes:
ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; hr = hour
Sources: MDEQ 2003; MDEQ 2004

met by much greater margins. Thus, the pollutants of primary concern in this EIS are ozone and annual $PM_{2.5}$.

#### 3.5.5.2 Construction Impacts

For this EIS, DOE has estimated equipment needs and construction schedules based on the equipment and time schedule presented in the 1992 conceptual design of the Richton site (DOE 1992a), the cost estimate for the Stratton Ridge site (DOE 2004e), and Chapter 2 of the 1992 draft EIS for the expansion of the SPR (DOE 1992b).

As a proposed new SPR site, DOE estimates that about 240 acres (96 hectares) of the Richton site would need to be cleared and prepared. DOE estimates that this would require approximately 33 working days for clearing and grubbing, 10 working days for rough grading, 130 working days for soil stabilization with lime, and 60 working days for embankment compaction and stabilization. In addition, an oil terminal would be built in Pascagoula, MS and in Liberty, MS to support the Richton SPR site operation.

Building the new buildings and roads would require approximately 60 days for foundation pouring, 60 days for building construction, 250 days for electrical installation, 60 days for local pipe installation, and 60 days for road building.

Cavern solution mining would occur after other facility construction is complete and would result only in NMHC emissions from oil extracted from the brine solution. The caverns would be solution mined and filled in the same manner as described in section 3.5.3.2 for Bruinsburg, that is, eight at a time. The maximum solution mining rate is 1.2 MMBD.

In addition to the above onsite sources, emissions would be associated with the following pipeline ROW development and pipeline installation:

- A 100-mile (161-kilometer) pipeline for brine disposal to the Gulf of Mexico and crude oil distribution to the Pascagoula terminal and a parallel multi-purpose pipeline of 88 miles (142 kilometers) for raw water from the Gulf, brine disposal to the Gulf, and oil distribution. A greater width is used in estimating emissions from these parallel pipelines;

- A 116-mile (186-kilometer) crude oil pipeline also connecting the storage facility to the Capline Interstate Pipeline Injection Station at Liberty, MS;

- A mid-point pump station along the pipeline to Capline, which would use three 2,000-horsepower diesel fired engines pumping units; however, these pumps would only operate during drawdown conditions; and

- A 10-mile (16-kilometer) RWI pipeline from Leaf River.

Pipeline construction would begin at the start of site preparation and continue for nearly three years using three pipeline construction crews working an average of 250 days per year.

A summary of estimated direct air emissions and durations for different construction activities is given in table 3.5.5-2. This table estimates total emissions for activities that last for less than one year. For activities lasting more than one year, such as pipeline construction and cavern development, emissions are given as maximum rates for those activities in any one year. The maximum annual emissions rate in the final row of the table includes all the emissions during the 12-month period of greatest emissions. This is the first year for all pollutants except NMHC, which peaks during the solution mining/fill period.

In addition, motor vehicles used by workers to commute to the worksite would also indirectly emit pollutants to the atmosphere. Table 3.5.5-3 summarizes these emissions. These emissions would be small and distributed over miles of roadway.

Tables 3.5.5-2 and 3.5.5-3 and the above-described storage tank emissions conservatively estimate the total impact from construction of the Richton storage facility and associated infrastructure. The combined total annual emission rate includes all co-located sources of emissions that could occur in the same year and within the same airshed. In no case are emissions of any single pollutant anticipated to exceed 250 tons per year (230 metric tons per year), the threshold trigger for NSR. Thus, the potential impact from the construction of the new Richton storage facility on air quality is unlikely to cause an exceedance of the NAAQS for ozone.

To further assess the potential impact of $PM_{2.5}$ emissions, DOE used EPA's air quality screening model, SCREEN3 (EPA 1995) to conservatively estimate the maximum $PM_{2.5}$ concentration during construction of the proposed Richton facility. Maximum annual average $PM_{2.5}$ emissions were used in the modeling (this includes both material resuspended from earth-movement activities as well as exhaust emissions from motor vehicles and construction equipment), with emissions evenly distributed over the land cleared and prepared for development. SCREEN3 conservatively estimates 1-hour concentrations using these input data. Annual and 24-hour concentrations are then estimated from the 1-hour concentration using EPA screening factors (EPA 1992) of 0.4 and 0.1, respectively. These estimated concentrations are added to the maximum 24-hour and annual averages from nearby monitors (in this case the nearest monitor is in Hattiesburg) and the sums can be compared to the 24-hour and annual average NAAQS, which are 65 and 15 micrograms per cubic meter, respectively. The results are shown in table 3.5.5-4 for the near fence-line concentration. This screening model shows that during the construction period, the peak 24-hour and annual concentrations will not exceed the NAAQS for $PM_{2.5}$. These results are conservative because maximum estimated emissions and maximum monitored concentrations were used together with a simplified screening model that tends to overestimate actual concentrations.

**Table 3.5.5-2: Maximum Direct Emissions during Construction of Proposed Richton Site (Emissions are in total tons except those lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Clearing and grubbing | 52 | 18.02 | 0.36 | 26.25 | 3.07 | 3.14 |
| Rough grading | 10 | 0.07 | 0.26 | 2.77 | 0.30 | 0.02 |
| Soil stabilization | 130 | 4.84 | 2.75 | 9.92 | 1.30 | 0.87 |
| Embankment compacting | 60 | 5.90 | 0.66 | 16.69 | 1.86 | 1.01 |
| Foundation pouring | 60 | 0.75 | 1.56 | 0.14 | 0.14 | 0.10 |
| Building construction | 60 | 0.38 | 0.45 | 0.07 | 0.07 | 0.05 |
| Electrical installation | 250 | 0.39 | 0.83 | 0.09 | 0.09 | 0.09 |
| Pipe installation | 60 | 0.11 | 0.38 | 0.03 | 0.03 | 0.02 |
| Road construction | 60 | 0.30 | 0.57 | 3.58 | 0.42 | 0.05 |
| Pipeline construction[a] | 700 | 2.50 | 2.78 | 53.58 | 5.77 | 0.42 |
| Cavern drilling | 730 | 11.12 | 47.51 | 2.27 | 2.27 | 1.57 |
| Solution mining | 425 | 0.00 | 0.00 | 0.00 | 0.00 | 23.9 |
| Solution mining/fill | 359 | 0.00 | 0.00 | 0.00 | 0.00 | 93.8 |
| Final fill | 160 | 0.00 | 0.00 | 0.00 | 0.00 | 21.0 |
| Maximum annual emissions | — | 42.65 | 54.77 | 111.52 | 14.61 | 94.22 |

Notes:

[a] Emissions associated with building the pipelines are distributed over their 302-mile (486-kilometer) length, but with 88 miles (9.6 kilometers) of crude oil pipeline collocated with the single purpose brine line

CO = carbon monoxide; NOx = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

**Table 3.5.5-3: Indirect Emissions (tons per year) from Worker Commutes Associated with Construction Activities at Proposed Richton Site**

| Year | Workers | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| One | 186 | 22.52 | 1.40 | 0.05 | 0.05 | 1.70 |
| Two | 298 | 36.09 | 2.25 | 0.09 | 0.09 | 2.73 |
| Three | 363 | 43.96 | 2.74 | 0.10 | 0.10 | 3.32 |
| Four | 112 | 13.56 | 0.85 | 0.03 | 0.03 | 1.03 |

Notes:

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

**Table 3.5.5-4: Modeled SCREEN3 $PM_{2.5}$ Concentrations and Locally Monitored Concentrations for Proposed Richton Site**

| Averaging Period | Modeled Concentration ($\mu g/m^3$) | Monitored Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) |
|---|---|---|---|
| 24-hour | 5.0 | 30 | 35.0[a] |
| Annual | 1.2 | 13.3 | 14.5 |

[a] These results are for the maximum (100$^{th}$ percentile) 24-hour $PM_{2.5}$ concentration while the NAAQS for $PM_{2.5}$ is for the 98$^{th}$ percentile so that no exceedance of the NAAQS is anticipated.

μg/m3 = micrograms per cubic meter

### 3.5.6 Stratton Ridge Storage Site

#### 3.5.6.1 Affected Environment

The proposed Stratton Ridge site is located in Brazoria County in the Houston MSA. According to the U.S. EPA Green Book (EPA 2005), this is currently a nonattainment area for 8-hour ozone (moderate), but in attainment for all other NAAQS, including annual average $PM_{2.5}$, 24-hour average $PM_{2.5}$, $PM_{10}$, and CO.

During the period of 2001-2004, two monitors in Brazoria County monitored ozone and one monitored $PM_{2.5}$. Eight-hour ozone design values for these two monitors were determined by averaging the fourth highest values for each 3-year period from the EPA AirData Web site and are shown in table 3.5.6-1. Annual and 24-hour average $PM_{2.5}$ design values for the Clute monitor were also calculated using data from the AirData Web site and also appear in table 3.5.6-1. Both monitoring sites show that the 8-hour NAAQS for ozone (80 ppb) is exceeded.

**Table 3.5.6-1: Design Values for 8-hour Ozone and Annual and 24-Hour $PM_{2.5}$ in Brazoria County**

| Site | Pollutant | 2001–2003 Design Value | 2002–2004 Design Value |
|---|---|---|---|
| Clute | 8-hr $O_3$ | 87 ppb | N/A |
| Manvel | 8-hr $O_3$ | 92 ppb | 97 ppb |
| Clute | Annual $PM_{2.5}$ | 9.5 $\mu g/m^3$ | N/A |
| Clute | 24-hr $PM_{2.5}$ | 21 $\mu g/m^3$ | N/A |

Notes:

ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; hr = hour; N/A = not applicable; $PM_{2.5}$ = particulate matter 2.5 microns or smaller

Source: EPA 2004c

#### 3.5.6.2 Construction Impacts

DOE has projected the construction activities for the Stratton Ridge storage facility based on the equipment and time schedule documented in the cost estimate for the Stratton Ridge site (DOE, 2004e) and Chapter 2 of the 1992 draft EIS for the expansion of the SPR (DOE 1992b, pages 2-17 through 2-19 and pages 2-23 through 2-26).

As a proposed new SPR site, DOE expects that about 270 acres (110 hectares) of the Stratton Ridge site would need to be cleared and prepared. This would require approximately 22 working days for clearing and grubbing, 7 working days for rough grading, 87 working days for soil stabilization with lime, and 40 working days for embankment compaction and stabilization.

Constructing the new buildings and roads would require approximately 60 days for foundation pouring, 60 days for building construction, 250 days for electrical installation, 60 days for local pipe installation, and 60 days for road building.

Cavern solution mining and filling would follow the plan for Bruinsburg, as described in section 3.5.2.2, that is, eight at a time. The maximum solution mining rate is 1.2 MMBD.

In addition to the above onsite emissions, offsite emissions would be associated with pipeline development. A 37-mile (60-kilometer) pipeline would be required for oil distribution to Texas City, TX, and additional 3 miles (4.8 kilometers) to connect the tank farm to the BP refinery. In addition, 6.2 miles (10 kilometers) of RWI pipeline and 10 miles (16 kilometers) of brine disposal pipeline would be needed. The RWI pipeline would be constructed in the same ROW as the land portion of the brine pipeline. Pipeline construction would begin at the start of site preparation and continue for about 18 months using one pipeline construction crew.

A summary of all estimated direct emissions and durations for different construction activities is given in table 3.5.6-2. The table provides total emissions for activities that last for less than one year. For activities lasting more than one year, such as pipeline construction and cavern development, emissions are given as maximum rates for those activities in any one year. The maximum annual emissions rate in the final row of the table includes all the emissions (both onsite and offsite) during the 12-month period of greatest emissions. This would be for the first year for all pollutants except NMHC, which peaks during the solution mining/fill period.

**Table 3.5.6-2: Maximum Direct Emissions during Construction of Stratton Ridge Site (emissions are in total tons except those lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Clearing and grubbing | 47 | 15.84 | 0.33 | 30.73 | 3.48 | 2.84 |
| Rough grading | 7 | 0.05 | 0.18 | 1.86 | 0.20 | 0.01 |
| Soil stabilization | 87 | 3.24 | 1.84 | 6.74 | 0.88 | 0.58 |
| Embankment compacting | 40 | 3.93 | 0.44 | 10.66 | 1.19 | 0.68 |
| Foundation pouring | 60 | 0.75 | 1.56 | 0.14 | 0.14 | 0.10 |
| Building construction | 60 | 0.38 | 0.45 | 0.07 | 0.07 | 0.05 |
| Electrical installation | 250 | 0.39 | 0.83 | 0.09 | 0.09 | 0.09 |
| Pipe installation | 60 | 0.11 | 0.38 | 0.03 | 0.03 | 0.02 |
| Road construction | 60 | 0.30 | 0.57 | 3.63 | 0.42 | 0.05 |
| Pipeline construction[a] | 380 | 0.83 | 0.93 | 18.14 | 1.95 | 0.14 |
| Cavern drilling | 730 | 11.12 | 47.51 | 2.27 | 2.27 | 1.57 |
| Cavern solution mining | 425 | 0.00 | 0.00 | 0.00 | 0.00 | 23.9 |
| Solution mining/fill | 359 | 0.00 | 0.00 | 0.00 | 0.00 | 93.8 |
| Final fill | 160 | 0.00 | 0.00 | 0.00 | 0.00 | 21.0 |
| Maximum annual emissions | — | 35.18 | 51.60 | 70.42 | 10.00 | 93.94 |

Notes:

[a] The emissions associated with pipeline construction are distributed over some 56 miles (90 kilometers) of pipelines

CO = carbon monoxide; NOx = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

In addition, motor vehicles used by workers to commute to the worksite would also indirectly emit pollutants to the atmosphere. Table 3.5.6-3 summarizes these emissions. These emissions would be small and distributed over miles of roadway.

If one of the Stratton Ridge alternatives is selected, DOE would also build four 0.4 MMB above-ground floating roof storage tanks at Texas City, TX. These tanks could potentially be operated during the solution mining activities to supply crude oil for cavern development. Application of EPA's TANKS 4.0 model finds that standing losses—those associated with a tank simply storing oil—from four

**Table 3.5.6-3: Indirect Emissions (tons per year) from Worker Commutes Associated with Construction Activities at Proposed Stratton Ridge Site**

| Year | Workers | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| One | 186 | 53.34 | 3.32 | 0.13 | 0.13 | 4.03 |
| Two | 298 | 85.45 | 5.33 | 0.20 | 0.20 | 6.46 |
| Three | 363 | 104.09 | 6.49 | 0.25 | 0.25 | 7.87 |
| Four | 112 | 32.12 | 2.00 | 0.08 | 0.08 | 2.43 |

Notes:

CO = carbon monoxide; NOx = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

well-maintained floating roof tanks of this size (400 MB) are much less than 1.1 tons (1.0 metric ton) of NMHC per year. Working losses of NMHC—those associated with oil moving through a tank during active solution mining activities—are estimated at 11 tons (9.5 metric tons) per year across all four above-ground storage tanks. In any given year, there may be both standing and working losses, and to be conservative, the total emissions from the tanks can be estimated to be the sum of these two emissions, or less than 12.1 tons (11 metric tons).

Tables 3.5.6-2 and 3.5.6-3 and the above-described storage tank emissions conservatively estimate the total impact from the construction of the Stratton Ridge storage facility and associated infrastructure. The combined total annual emission rate includes all co-located sources of emissions that could occur in the same year and within the same airshed. In no case are emissions of any single pollutant anticipated to exceed 250 tons per year (230 metric tons per year), the threshold trigger for NSR. Thus, the potential impact from the construction of the new Stratton Ridge storage facility on air quality is unlikely to cause an exceedance of the NAAQS for ozone.

Section 176(c) of the Clean Air Act Amendments of 1990 (CAAA) requires that Federal actions conform to the State Implementation Plan for locations that lie within a nonattainment area. The conformity rule establishes the conformity criteria that a nonattainment area must comply with to demonstrate that the proposed action will conform to the State Implementation Plan for achieving attainment of the NAAQS. EPA has delegated implementation of the CAA to the State of Texas, which in turn relies on the Texas Commission on Environmental Quality to administer and enforce the CAA requirements. The state regulation for implementation of the General Conformity Rule is found in the Texas Administrative Code, Title 30, Part 1, Chapter 101, Subchapter A, Section 101.30. As described in section 3.5.6.1, Stratton Ridge is located in an area with a designation of moderate ozone nonattainment. Thus, this site must comply with the provisions of the conformity rule for ozone precursor emissions of NOx, and VOC. However, if the proposed action's total of direct and indirect emissions are below specified emission levels (40 CFR 93.153(b)), which for a moderate ozone nonattainment area are less than 100 tons (91 metric tons) per year for either $NO_x$ or VOC, the provisions of the conformity rule no longer apply.

For $NO_x$, DOE estimates that Stratton Ridge construction activities would result in maximum direct emissions of 51.60 tons per year (see table 3.5.6-2) and maximum indirect emissions of 6.49 tons per year (see table 3.5.6-3). That sums to a maximum NOx emission of 58.09 tons per year, which is less than the 100-ton per year threshold for the conformity rule to continue to apply.

To compare VOC emissions to the conformity rule threshold, the above estimates of direct NMHC emissions need to be adjusted to account for the ethane component (this is not an issue for indirect emissions because ethane is not a significant component of gasoline or diesel combustion emissions). VOC emissions exclude both methane and ethane, since they have very little ozone forming potential. Direct NMHC emissions, however, include emissions of ethane. SPR solution mining measurements have shown that ethane ranges from 6 percent to 39 percent of the total NMHC emissions (DOE 1981). Applying the mean fraction of 20 percent to the direct NMHC emissions estimated above, the total maximum VOC emissions can be estimated as follows:

- A maximum of 93.94 tons per year of direct NMHC emissions from construction (see table 3.5.6-2) minus 20 percent equals 75.15 tons per year of VOC emissions; plus
- A maximum of 7.87 tons per year of indirect NMHC emissions from worker commutes (see table 3.5.6-3), which equates to 7.87 tons per year of VOC emissions; plus
- A maximum of 12.1 tons per year of direct NMHC emissions from tank losses (see above text) minus 20 percent equals 9.7 tons per year of VOC emissions; equals
- A total maximum of 92.72 tons per year of VOC emissions from all construction activities.

This estimated maximum VOC emissions put the proposed action below the conformity rule threshold of 100 tons per year. As a result, the provisions of the conformity rule would no longer apply.

The conformity rule also has a provision that requires a conformity analysis be performed if the emissions of concern are above 10 percent of the area's total emissions (40 CFR 93.153(i)). This type of action would be considered a "regionally significant action" subject to full conformity analysis if the emissions exceed the 10 percent threshold. The State Implementation Plan totals for Brazoria County are approximately 16,000 tons per year for VOC and 54,000 tons (49,000 metric tons) per year for $NO_x$ (EPA 2004c). The estimated maximum VOC emissions of less than 100 tons (91 metric tons) per year is considerably less than 10 percent of the respective regional emissions. Therefore, the provisions of the conformity rule would no longer apply to the proposed action at Stratton Ridge, and the potential air quality impact from the SPR expansion at Stratton Ridge would be unlikely to cause an exceedance of the NAAQS for ozone.

DOE recognizes that the preliminary conformity review conducted for this EIS estimates maximum VOC emissions that, at 92.72 tons per year, are close to the 100 tons-per-year threshold that triggers a full conformity determination in the affected nonattainment area. In the event that one of the Stratton Ridge alternatives is selected, a comprehensive additional conformity review would be conducted taking into account any other sources, factors, or activities that may have not been considered in this EIS to determine if the current estimate is sufficiently conservative and could be exceeded. If necessary, a full conformity determination to demonstrate compliance with the State Implementation Plan would also be undertaken at that time. In the event that the result of this conformity determination is such that conformity could not be demonstrated, the proposed action at Stratton Ridge would be terminated and an alternative site selected.

To further assess the potential impact of $PM_{2.5}$ emissions, DOE used EPA's air quality screening model, SCREEN3 (EPA 1995) to conservatively estimate the maximum $PM_{2.5}$ concentration during construction of the proposed Stratton Ridge facility. Maximum annual average $PM_{2.5}$ emissions were used in the modeling (this includes both material resuspended from earth-movement activities as well as exhaust emissions from motor vehicles and construction equipment), with emissions evenly distributed over the land cleared and prepared for development. SCREEN3 conservatively estimates 1-hour concentrations using these input data. Annual and 24-hour concentrations are then estimated from the 1-hour concentration using EPA screening factors (EPA 1992) of 0.4 and 0.1, respectively. These estimated concentrations are added to the maximum 24-hour and annual averages from nearby monitors and the sums can be compared to the 24-hour and annual average NAAQS, which are 65 and 15 micrograms per cubic meter, respectively. The results are shown in table 3.5.6-4 for the near fence-line concentration.

**Table 3.5.6-4: Modeled SCREEN3 $PM_{2.5}$ Concentrations and Local Monitored Concentrations for Proposed Stratton Ridge Site**

| Averaging Period | Modeled Concentration ($\mu g/m^3$) | Monitored Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) |
|---|---|---|---|
| 24-hour | 5.0 | 21 | 26.0 |
| Annual | 1.1 | 9.5 | 10.6 |

μg/m3 = micrograms per cubic meter

This screening model shows that during the construction period, the peak 24-hour and annual concentrations will not exceed the NAAQS for $PM_{2.5}$. These results are conservative because maximum estimated emissions and maximum monitored concentrations were used together with a simplified screening model that tends to overestimate actual concentrations.

### 3.5.7 Bayou Choctaw Expansion Site

#### 3.5.7.1 Affected Environment

The Bayou Choctaw site is located in Iberville Parish in the Baton Rouge MSA. According to the U.S. EPA Green Book (EPA, 2005), the Baton Rouge MSA is currently a nonattainment area for 8-hour ozone. The Area is in attainment for all other NAAQS, including $PM_{2.5}$, $PM_{10}$, and CO.

There are no ozone monitors in Iberville Parish, but neighboring Ascension and West Baton Rouge Parishes have one monitor each. Eight-hour ozone design values for these two monitors were determined by averaging the fourth highest values for each 3-year period from the EPA AirData Web site and are shown in table 3.5.7-1. There are two $PM_{2.5}$ monitors in Iberville Parish and annual and 24-hour average $PM_{2.5}$ design values were calculated and appear in table 3.5.7-1.

**Table 3.5.7-1: Design Values for 8-hour Ozone and Annual and 24-Hour $PM_{2.5}$ Near Bayou Choctaw**

| Site | Parish | Pollutant | 2001–2003 Design Value | 2002–2004 Design Value |
|---|---|---|---|---|
| King Road | Ascension | 8-hr ozone | 77 ppb | 80 ppb |
| Port Allen | W. Baton Rouge | 8-hr ozone | 84 ppb | 84 ppb |
| Iberville | Iberville | Annual $PM_{2.5}$ | 10.8 $\mu g/m^3$ | 10.2 $\mu g/m^3$ |
| St. Gabriel | Iberville | Annual $PM_{2.5}$ | 12.4 $\mu g/m^3$ | 12.3 $\mu g/m^3$ |
| Iberville | Iberville | 24-hour $PM_{2.5}$ | 25 $\mu g/m^3$ | 25 $\mu g/m^3$ |
| St. Gabriel | Iberville | 24-hour $PM_{2.5}$ | 28 $\mu g/m^3$ | 28 $\mu g/m^3$ |

Notes:

ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns or smaller.

Source: EPA 2004c

#### 3.5.7.2 Construction Impacts

To expand the Bayou Choctaw site, DOE would develop up to two new 10-MMB caverns and purchase one 10-MMB cavern from Petrologistics Olefins. Because the facility is located in wetlands, clearing and grubbing activities would not be needed, except for a small effort to integrate the site into the existing facility and for security. No new buildings are planned, and only some new firewater pipelines are planned for the expansion. Thus, cavern drilling would be the primary onsite construction activity that would generate air emissions. Offsite, DOE would construct a new 3,000-foot (914-meter) brine disposal pipeline and six new brine injection wells.

Emissions associated with preparing the new caverns were conservatively estimated at 20 percent of the emissions for developing a new 160 MMB capacity site such as Richton. These emissions would be associated with constructing well pads, electrical systems, new accesses roads, and upgrades to existing access roads. Emissions estimates for developing the two new caverns are based on a maximum solution mining rate of 110 MMBD. This rate is much lower than the rate at the other SPR proposed new sites or expansions, resulting in longer time to develop the Bayou Choctaw caverns.

A summary of estimated direct emissions and durations for different construction activities is given in table 3.5.7-2. The table provides total emissions for activities that last for less than one year. For activities lasting more than one year, such as pipeline construction and cavern development, emissions are given as maximum rates for those activities in any one year. The maximum annual emissions rate in the final row of the table includes all the emissions during the 12-month period of greatest emissions. This would be for the first year for all pollutants except NMHC, which peaks during the solution mining/fill period.

**Table 3.5.7-2: Maximum Direct Emissions from Expansion of Existing Bayou Choctaw Site (Emissions are in total tons except those lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Electrical installation | 50 | 0.08 | 0.17 | 0.02 | 0.02 | 0.02 |
| Pipe installation | 12 | 0.02 | 0.08 | 0.01 | 0.01 | 0.00 |
| Road construction | 12 | 0.06 | 0.11 | 1.02 | 0.01 | 0.01 |
| Pipeline construction[a] | 2.0 | 0.01 | 0.01 | 0.13 | 0.014 | 0.001 |
| Brine disposal site preparation | 4 | 0.69 | 0.03 | 2.18 | 0.47 | 0.11 |
| Brine disposal well drilling | 110 | 2.50 | 10.7 | 0.51 | 0.51 | 0.35 |
| Cavern drilling | 365 | 5.56 | 23.75 | 1.14 | 1.14 | 0.79 |
| Cavern solution mining | 1160 | 0.00 | 0.00 | 0.00 | 0.00 | 2.19 |
| Solution mining/fill | 980 | 0.00 | 0.00 | 0.00 | 0.00 | 8.60 |
| Final fill | 40 | 0.00 | 0.00 | 0.00 | 0.00 | 1.31 |
| Maximum annual emissions | — | 8.92 | 34.85 | 5.00 | 2.37 | 9.06 |

Notes:

[a] The emissions associated with pipeline construction are distributed over 3,000 feet (914 meters) of offsite brine disposal pipeline

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

In addition, motor vehicles used by workers to commute to the worksite would also indirectly emit pollutants to the atmosphere. Table 3.5.7-3 summarizes these emissions. The emissions would be small and distributed over miles of roadway.

Tables 3.5.7-2 and 3.5.7-3 conservatively estimate the total impact from the construction of the Bayou Choctaw storage facility and associated infrastructure. The combined total annual emission rate includes all co-located sources of emissions that could occur in the same year and within the same airshed. In no case are the combined emissions of any single pollutant anticipated to exceed 250 tons per year (230 metric tons per year), the threshold trigger for NSR. Thus, the potential impact from the construction

**Table 3.5.7-3: Indirect Emissions (tons per year) from Worker Commutes Associated with Expansion of Bayou Choctaw Site**

| Year | Workers | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| One | 198 | 13.81 | 0.86 | 0.03 | 0.03 | 1.04 |
| Two | 198 | 13.81 | 0.86 | 0.03 | 0.03 | 1.04 |
| Three | 198 | 13.81 | 0.86 | 0.03 | 0.03 | 1.04 |
| Four | 198 | 13.81 | 0.86 | 0.03 | 0.03 | 1.04 |

Notes:

CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

of the expanded Bayou Choctaw storage facility on air quality is unlikely to exceed the NAAQS for ozone.

Section 176(c) of the CAAA requires that Federal actions conform to the State Implementation Plan for locations that lie within a nonattainment area. The conformity rule establishes the conformity criteria that a nonattainment area must comply with in order to demonstrate that the proposed action will conform to the State Implementation Plan for achieving attainment of the NAAQS. EPA has delegated implementation of the CAA to the State of Louisiana, which in turn relies on the Louisiana Department of Environmental Quality (LDEQ) to administer and enforce the CAA requirements. The state regulation for implementation of the General Conformity Rule is found in the Louisiana Administrative Code (LAC), Part III, Chapter 14, Subchapter A, 1401-1415. As described in section 3.5.7.1, Bayou Choctaw is located in a marginal ozone nonattainment area. Thus, this site must comply with the provisions of the conformity rule for ozone precursor emissions, such as NOx and VOC. However, if the proposed action's total of direct and indirect emissions are below specified emission levels (40 CFR 93.153(b)), which for a marginal ozone nonattainment area are less than 100 tons (91 metric tons) per year for either $NO_x$ or VOC, the provisions of the conformity rule no longer apply.

For $NO_x$, DOE estimates that Bayou Choctaw construction activities would result in maximum direct emissions of 34.85 tons per year (see table 3.5.7-2) and maximum indirect emissions of 0.86 tons per year (see table 3.5.7-3). That totals a maximum NOx emission of 35.71 tons per year, which is less than the 100-ton per year threshold for the conformity rule to continue to apply.

To compare VOC emissions to the conformity rule threshold, the above estimates of direct NMHC emissions need to be adjusted to account for the ethane component, as described above in section 3.5.6.2 for Stratton Ridge. Going through the same process outlined in that section, the total maximum VOC emissions from Bayou Choctaw construction can be estimated as follows:

- A maximum of 9.06 tons per year of direct NMHC emissions from construction (see table 3.5.7-2) minus 20 percent equals 7.25 tons per year of VOC emissions; plus

- A maximum of 1.04 tons per year of indirect NMHC emissions from worker commutes (see table 3.5.7-3), which equates to 1.04 tons per year of VOC emissions; equals

- A total maximum of 8.29 tons per year of VOC emissions from all construction activities.

This estimated maximum VOC emission puts the proposed action below the conformity rule threshold of 100 tons per year. As a result, the provisions of the conformity rule would no longer apply.

The conformity rule also has a provision that requires that a conformity analysis be performed if the emissions of concern are above 10 percent of the area's total emissions (40CFR 93.153(i)). This type of action would be considered a "regionally significant action" subject to full conformity analysis if the emissions exceed the 10 percent threshold. The State Implementation Plan totals for Iberville Parish are approximately 6,700 tons (6,100 metric tons) per year for VOC and 39,000 tons (35,000 metric tons) per year for $NO_x$ (USEPA 2004c). The maximum of less than 8.29 tons (7.54 metric tons) per year for VOCs and 35.71 tons (32.51 metric tons) per year for $NO_x$ is considerably less than 10 percent of the respective regional emissions. Thus the proposed action does not need to carry out a conformity determination and the potential impact from the expansion of the existing Bayou Choctaw storage facility on air quality is therefore unlikely to exceed the NAAQS.

To further assess the potential impact of $PM_{2.5}$ emissions, DOE used EPA's air quality screening model, SCREEN3 (EPA, 1995), to conservatively estimate the maximum $PM_{2.5}$ concentration during construction of the proposed Bayou Choctaw facility. Maximum annual average $PM_{2.5}$ emissions were used in the modeling (this includes both material resuspended from earth movement activities as well as exhaust emissions from motor vehicles and construction equipment), with emissions evenly distributed over the land cleared and prepared for development. SCREEN3 conservatively estimates 1-hour concentrations using these input data. Annual and 24-hour concentrations are then estimated from the 1 hour concentration using EPA screening factors (EPA, 1992) of 0.4 and 0.1, respectively. These estimated concentrations are added to the maximum 24-hour and annual averages from nearby monitors and the sums can be compared to the 24-hour and annual average NAAQS, which are 35 and 15 micrograms per cubic meter, respectively. The results are shown in table 3.5.7-4 for the near fence-line concentration. This screening model shows that during the construction period, the peak 24-hour and annual concentrations will not exceed the NAAQS for $PM_{2.5}$. These results are conservative because maximum estimated emissions and maximum monitored concentrations were used together with a simplified screening model that tends to overestimate actual concentrations.

**Table 3.5.7-4: Modeled SCREEN3 $PM_{2.5}$ Concentrations and Local Monitored Concentrations for Proposed Bayou Choctaw Expansion**

| Averaging Period | Modeled Concentration ($\mu g/m^3$) | Monitored Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) |
|---|---|---|---|
| 24-hour | 0.8 | 28 | 28.8 |
| Annual | 0.19 | 12.4 | 12.6 |

µg/m3 = micrograms per cubic meter

### 3.5.8 Big Hill Expansion Site

#### 3.5.8.1 Affected Environment

The Big Hill site is located in Jefferson County in the Beaumont-Port Arthur MSA. According to the U.S. EPA Green Book (EPA 2005), the Beaumont-Port Arthur MSA is currently a nonattainment area for 8-hour ozone. The area is in attainment for all other NAAQS, including $PM_{2.5}$, $PM_{10}$, and CO.

For the period of 2001-2004, five monitors in Jefferson County had complete ozone data. Eight-hour ozone design values for these monitors are determined by calculating the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone. These values are available on EPA's AirData Web site and are shown in table 3.5.8-1 along with annual and 24-hour average $PM_{2.5}$ design values for two $PM_{2.5}$ monitors.

**Table 3.5.8-1: Design Values for 8-hour Ozone, Annual, and 24-Hour $PM_{2.5}$ in Jefferson County**

| Site | Pollutant | 2001–2003 Design Value | 2002–2004 Design Value |
|---|---|---|---|
| Beaumont | 8-hr ozone | 78 ppb | 79 ppb |
| Port Arthur (53rd St) | 8-hr ozone | 79 ppb | 78 ppb |
| Port Arthur (90th St) | 8-hr ozone | 86 ppb | 84 ppb |
| Hamshire Street | 8-hr ozone | 76 ppb | 77 ppb |
| Sabine Pass | 8-hr ozone | 91 ppb | 93 ppb |
| Port Arthur | Annual $PM_{2.5}$ | 11.1 $\mu g/m^3$ | 11.1 $\mu g/m^3$ |
| Hamshire Street | Annual $PM_{2.5}$ | 10.5 $\mu g/m^3$ | 10.6 $\mu g/m^3$ |
| Port Arthur | 24-hr $PM_{2.5}$ | 28 $\mu g/m^3$ | 27 $\mu g/m^3$ |
| Hamshire Street | 24-hr $PM_{2.5}$ | 29 $\mu g/m^3$ | 26 $\mu g/m^3$ |

Notes:

ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; hr = hour; $PM_{2.5}$ = particulate matter 2.5 microns or smaller

Source: EPA 2004c

#### 3.5.8.2 Construction Impacts

DOE has used conservative assumptions to estimate the emissions related to expanding the existing Big Hill storage facility. The amount of new land needed at Big Hill would be 147 acres (60 hectares), which would have about 65 acres (26 hectares) of land clearing and grubbing. The facility capacity may be increased up to 96 MMB. In addition, 23 miles (37 kilometers) of oil distribution pipeline would have to be added to implement the increased drawdown rate. Approximately 1.3 miles (2.1 kilometers) of existing brine disposal pipeline would also need to be upgraded. DOE emissions are expected to be negligible from this pipeline upgrade activity. Cavern development and solution mining are assumed to occur in two equal phases of 48 MMB.

A summary of estimated direct emissions and durations for different construction activities at Big Hill is given in table 3.5.8-2. Total emissions are provided for activities that last for less than 1 year. For activities lasting more than 1 year, such as cavern development, emissions are given as maximum rates for those activities in any 1 year. The maximum annual emissions rate in the final row of the table includes all the emissions during the 12-month period of greatest emissions. This is the first year for all pollutants except NMHC, which peaks during the solution mining/fill period.

**Table 3.5.8-2: Maximum Direct Emissions from Expansion of Big Hill Site (emissions are in total tons except those lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Clearing and grubbing | 54 | 17.73 | 0.38 | 38.60 | 4.32 | 3.25 |
| Rough grading | 5 | 0.03 | 0.13 | 1.29 | 0.14 | 0.01 |
| Soil stabilization | 65 | 2.42 | 1.38 | 5.05 | 0.66 | 0.43 |
| Embankment compacting | 30 | 2.95 | 0.33 | 7.77 | 0.87 | 0.51 |
| Foundation pouring | 30 | 0.38 | 0.78 | 0.07 | 0.07 | 0.05 |
| Building construction | 30 | 0.19 | 0.23 | 0.04 | 0.04 | 0.03 |
| Electrical installation | 125 | 0.20 | 0.42 | 0.04 | 0.04 | 0.05 |
| Pipe installation | 30 | 0.05 | 0.19 | 0.02 | 0.02 | 0.01 |

**Table 3.5.8-2: Maximum Direct Emissions from Expansion of Big Hill Site (emissions are in total tons except those lasting > 1 year, which are in tons per year)**

| Activity | Days | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| Road construction | 30 | 0.15 | 0.29 | 1.82 | 0.21 | 0.02 |
| Pipeline construction[a] | 210 | 0.70 | 0.78 | 9.98 | 1.07 | 0.12 |
| Cavern drilling | 365 | 11.12 | 47.51 | 2.27 | 2.27 | 1.57 |
| Cavern solution mining | 255 | 0.00 | 0.00 | 0.00 | 0.00 | 16.7 |
| Solution mining/fill | 216 | 0.00 | 0.00 | 0.00 | 0.00 | 55.4 |
| Final fill | 96 | 0.00 | 0.00 | 0.00 | 0.00 | 7.60 |
| Maximum annual emissions | — | 35.63 | 51.76 | 65.09 | 9.46 | 57.67 |

Notes:

[a] The emissions associated with building the pipeline are distributed over its 23-mile (37-kilometer) length

CO = carbon monoxide; NOx = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

Source: EPA 2004c

In addition, motor vehicles used by workers to commute to the worksite would also indirectly emit pollutants to the atmosphere. Table 3.5.8-3 summarizes these emissions. The emissions would be small and distributed over miles of roadway.

Tables 3.5.8-2 and 3.5.8-3 conservatively estimate the total impact from the construction of the Big Hill storage facility expansion and associated infrastructure. The combined total annual emission rate includes all co-located sources of emissions that could occur in the same year and within the same airshed. In no case are emissions of any single pollutant anticipated to exceed 250 tons per year (230 metric tons per year), the threshold trigger for NSR. Thus, the potential impact from the construction of the expanded Big Hill storage facility on air quality is unlikely to cause an exceedance of the NAAQS for ozone.

Section 176(c) of the CAAA requires that Federal actions conform to the State Implementation Plan for locations that lie within a nonattainment area. The conformity rule establishes the conformity criteria that a nonattainment area must comply with in order to demonstrate that the proposed action will conform to the State Implementation Plan for achieving attainment of the NAAQS. EPA has delegated implementation of the CAA to the State of Texas, which in turn relies on the Texas Commission on Environmental Quality to administer and enforce the CAA requirements. The state regulation for implementation of the General Conformity Rule is found in the Texas Administrative Code, Title 30, Part 1, Chapter 101, Subchapter A, Section 101.30. As described in section 3.5.7.1, Big Hill is located in a marginal ozone nonattainment area. Thus, this site must comply with the provisions of the conformity rule for ozone precursor emissions, such as NOx and VOC. However, if the proposed action's total of direct and indirect emissions are below specified emission levels (40 CFR 93.153(b)), which for a marginal ozone nonattainment area are less than 100 tons (91 metric tons) per year for either $NO_x$ or VOC, the provisions of the conformity rule no longer apply.

For $NO_x$, DOE estimates that Big Hill construction activities would result in maximum direct emissions of 51.76 tons per year (see table 3.5.8-2) and maximum indirect emissions of 1.44 tons per year (see table 3.5.8-3). That totals a maximum NOx emission of 53.2 tons per year, which is less than the 100-ton per year threshold for the conformity rule to continue to apply.

**Table 3.5.8-3: Indirect Emissions (tons per year) from Worker Commutes Associated with Expansion of Big Hill Site**

| Year | Workers | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | NMHC |
|---|---|---|---|---|---|---|
| One | 198 | 23.14 | 1.44 | 0.05 | 0.05 | 1.75 |
| Two | 198 | 23.14 | 1.44 | 0.05 | 0.05 | 1.75 |
| Three | 198 | 23.14 | 1.44 | 0.05 | 0.05 | 1.75 |
| Four | 198 | 23.14 | 1.44 | 0.05 | 0.05 | 1.75 |

Notes:

CO = carbon monoxide; NOx = nitrogen oxides; $PM_{10}$ = particulate matter 10 microns or smaller; $PM_{2.5}$ = particulate matter 2.5 microns or smaller; NMHC = non-methane hydrocarbons

Source: EPA 2004c

**Table 3.5.8-4: Modeled SCREEN3 Concentrations and Locally Monitored Concentrations for Proposed Big Hill Expansion**

| Averaging Period | Modeled Concentration ($\mu g/m^3$) | Monitored Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) |
|---|---|---|---|
| 24-hour | 5 | 29 | 34 |
| Annual | 1.2 | 11.1 | 12.3 |

μg/m3 = micrograms per cubic meter

To compare VOC emissions to the conformity rule threshold, the above estimates of direct NMHC emissions need to be adjusted to account for the ethane component, as described above in section 3.5.6.2 for Stratton Ridge. Going through the same process outlined in that section, the total maximum VOC emissions from Big Hill construction can be estimated as follows:

- A maximum of 57.67 tons per year of direct NMHC emissions from construction (see table 3.5.8-2) minus 20 percent equals 46.14 tons per year of VOC emissions; plus
- A maximum of 1.75 tons per year of indirect NMHC emissions from worker commutes (see table 3.5.8-3), which equates to 1.75 tons per year of VOC emissions; equals
- A total maximum of 47.89 tons per year of VOC emissions from all construction activities.

This estimated maximum VOC emission puts the proposed action below the conformity rule threshold of 100 tons per year. As a result, the provisions of the conformity rule would no longer apply.

The conformity rule also has a provision that requires that a conformity analysis be performed if the emissions of concern are above 10 percent of the area's total emissions (40 CFR 93.153(i)). This type of action would be considered a "regionally significant action" subject to full conformity analysis if the emissions exceed the 10 percent threshold. The State Implementation Plan totals for Jefferson County are approximately 25,000 tons per year for VOC and 69,000 tons per year for $NO_x$ (USEPA, 2004c). The maximum of 47.89 tons per year of VOC emissions and 53.2 tons per year of $NO_x$ emissions are considerably less than 10 percent of the respective regional emissions. Thus, the provisions of the conformity rule would no longer apply to the proposed action, and the potential impact from the expansion of the existing Big Hill storage facility on air quality is unlikely to cause an exceedance of the ozone NAAQS.

To further assess the potential impact of $PM_{2.5}$ emissions, DOE used EPA's air quality screening model, SCREEN3 (EPA, 1995) to conservatively estimate the maximum $PM_{2.5}$ concentration during construction of the proposed Big Hill expansion. Maximum annual average $PM_{2.5}$ emissions were used in the modeling (this includes both material resuspended from earth movement activities as well as exhaust emissions from motor vehicles and construction equipment), with emissions evenly distributed over the land cleared and prepared for development. SCREEN3 conservatively estimates 1-hour concentrations using these input data. Annual and 24-hour concentrations are then estimated from the 1-hour concentration using EPA screening factors (EPA, 1992) of 0.4 and 0.1, respectively. These estimated concentrations are added to the maximum 24-hour and annual averages from nearby monitors and the sums can be compared to the 24-hour and annual average NAAQS, which are 35 and 15 micrograms per cubic meter, respectively. The results are shown in table 3.5.8-4 for the near fence-line concentration. This screening model shows that during the construction period, the peak 24-hour and annual concentrations will not exceed the NAAQS for $PM_{2.5}$. These results are conservative because maximum estimated emissions and maximum monitored concentrations were used together with a simplified screening model that tends to overestimate actual concentrations.

## 3.5.9 West Hackberry Expansion Storage Site and Associated Infrastructure

### 3.5.9.1 Affected Environment

The West Hackberry facility is located in Cameron Parish in the Lake Charles MSA. U.S. EPA's Green Book currently lists the Lake Charles MSA as being in attainment for all NAAQS, but the 8-hour ozone measurements are near the 80 ppb NAAQS. All other NAAQS, including $PM_{2.5}$, $PM_{10}$, and 1-hour and 8-hour CO standards are met.

For the period of 2001–2004, three nearest monitors are in Calcasieu Parish and have complete ozone data. Eight-hour ozone design values for these three monitors were obtained from EPA's AirData Web site (2006), which selects the fourth highest values for each 3-year period. Results are shown in table 3.5.9-1 along with annual and 24-hour average $PM_{2.5}$ design values for two $PM_{2.5}$ monitors.

**Table 3.5.9-1: Design Values for 8-Hour Ozone, Annual, and 24-Hour $PM_{2.5}$ in Calcasieu Parish**

| Site | Pollutant | 2001–2003 Design Value | 2002–2004 Design Value |
|---|---|---|---|
| Carlyss | 8-hr ozone | 79 ppb | 80 ppb |
| Westlake | 8-hr ozone | 73 ppb | 70 ppb |
| Vinton | 8-hr ozone | 79 ppb | 76 ppb |
| Vinton | Annual $PM_{2.5}$ | 10.0 $\mu g/m^3$ | 9.7 $\mu g/m^3$ |
| Lake Charles | Annual $PM_{2.5}$ | 11.3 $\mu g/m^3$ | 10.8 $\mu g/m^3$ |
| Vinton | 24-hr $PM_{2.5}$ | 24 $\mu g/m^3$ | 22 $\mu g/m^3$ |
| Lake Charles | 24-hr $PM_{2.5}$ | 31 $\mu g/m^3$ | 29 $\mu g/m^3$ |

Notes:

ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; hr = hour; $PM_{2.5}$ = particulate matter 2.5 microns or smaller

Source: EPA 2004c

### 3.5.9.2 Construction Impacts

To expand the West Hackberry site, DOE would purchase three existing 5-MMB caverns adjacent to the existing SPR facility. No site preparation, building construction, solution mining, drilling, or offsite pipeline construction would be required for the expansion.  At most, only minor onsite construction activities would occur.  Because full construction (not including cavern development) at other sites is unlikely to cause air quality impacts, the impacts from construction at West Hackberry can be considered negligible.

### 3.5.10   No-Action Alternative

The no-action alternative would limit the impacts from SPR construction and operation to those that have already occurred or that will occur at the existing SPR storage sites at Bayou Choctaw, Big Hill, Bryan Mound, and West Hackberry.  The existing environments for the proposed new SPR storage site alternatives would be maintained, and hence any additional environmental impacts from air pollutant emissions would not occur.  The Bruinsburg storage site would likely remain in agricultural use because of the lack of development pressure.  The Chacahoula storage site could remain undeveloped.  However, existing oil and gas activities occur near the proposed Chacahoula storage site could be developed by a commercial entity for oil and gas purposes.  The Richton site would likely remain in use as a pine plantation because of the lack of development pressure.  Dow, British Petroleum, Conoco, and Occidental energy companies have storage facilities on the Stratton Ridge dome and it is possible that the Stratton Ridge storage site could be developed for cavern storage by a commercial entity.

No additional air pollutant emissions would occur in the study areas as a result of the selection of the No-Action alternative.