4.0 ENVIRONMENTAL ANALYSIS

The environmental consequences of constructing and operating the proposed Project would vary in duration and significance. Four levels of impact duration were considered: temporary, short term, long term, and permanent. Temporary impacts generally occur during construction with the resource returning to preconstruction condition almost immediately afterward. Short-term impacts could continue for up to 3 years following construction. An impact was considered long term if the resource would require more than 3 years to recover. Permanent impacts could occur as a result of any activity that modifies a resource to the extent that it would not return to preconstruction conditions during the life of the Project, such as the construction of a compressor station. We considered an impact to be significant if it would result in a substantial adverse change in the physical environment.

In this section, we describe the affected environments, general construction and operational impacts, and proposed mitigations for each resource. Texas Gas, as part of its proposal, agreed to implement certain measures to reduce impacts. We evaluated Texas Gas's proposed mitigation to determine whether additional measures would be necessary to reduce impact. These additional measures appear as bulleted, boldfaced paragraphs in the text. We will recommend that these measures be included as specific conditions to authorizations that the Commission may issue to Texas Gas.

Conclusions in this Draft EIS are based on our analysis of the environmental impacts and the following assumptions:

- Texas Gas would comply with all applicable laws and regulations;
- the proposed facilities would be constructed as described in section 2.0 of this document; and
- Texas Gas would implement the mitigation measures included in the application and supplemental documents filed with the FERC.

4.1 GEOLOGIC RESOURCES

This section describes geologic resources associated with the proposed Project and potential geologic hazards that may be encountered as a result of implementing the Project.

4.1.1 Geologic Setting

The Project would cross two physiographic provinces: the Arkansas Valley section of the Ouachita physiographic province and the Mississippi Alluvial Plain and the East Gulf Coastal Plain sections of the Coastal Plains physiographic province. The contact between these provinces is delineated by the Fall Line, which is crossed by the proposed Fayetteville Lateral in White County, Arkansas, near MP 63.0. The Fall Line delineates the western extent of the Mississippi River alluvial deposits and the eastern extent of the Ouachita province.

The proposed Fayetteville Lateral west of MP 63.3 (in Conway, Faulkner, and Cleburne Counties and the western portion of White County, Arkansas) would be within the Ouachita physiographic province. Between MP 63.3 and MP 166.2 (in eastern White County and Woodruff, St. Francis, Lee, and Phillips Counties, Arkansas and Coahoma County, Mississippi) the Fayetteville Lateral would be within the Coastal Plains physiographic province. The bedrock beneath the Arkansas Valley section of the Ouachita Province consists of Pennsylvanian-age (323 to 290 million years old) sedimentary deposits comprised primarily of thick shale and sandstone deposits. The Mississippi Alluvial Plain of the Coastal Plains

physiographic province contains unconsolidated and semi-consolidated Holocene-age alluvial deposits of the ancestral Mississippi River (Renken, 1998).

The proposed Greenville Lateral portion of the Project is mapped within the Mississippi Alluvial Plain and East Gulf Coastal Plain sections of the Coastal Plains physiographic province. The proposed Greenville Lateral would begin near Greenville, Mississippi, and would traverses generally east-southeast across the Mississippi Alluvial Plain to about MP 62.5 (in Washington, Sunflower, and Humphreys Counties and the western portion of Holmes County, Mississippi). where From MP 62.5 to MP 95 (in the eastern portion of Holmes County and Attala County, Mississippi), the proposed Greenville Lateral would cross the East Gulf Coast section. The Mississippi Alluvial Plain is underlain by unconsolidated and semi-consolidated Holocene-age alluvial deposits of the ancestral Mississippi River (Renken, 1998). The sediments underlying the East Gulf Coast section are described as primarily marine sedimentary deposits that dip gently toward the Gulf of Mexico (Renken, 1998).

Elevations along the proposed pipeline route range from 100 to 880 feet above mean sea level. Topography in the Project area ranges from flat to very steep, with slopes ranging from 0 to 40 percent along the pipeline route (USDA/NRCS, 2003; USDA/NRCS, 2005a).

4.1.2 Mineral Resources

Oil and gas well information was obtained from the AOGC and the Mississippi State Oil and Gas Board (MSOGB). About 250 oil and gas wells are within the counties that would be crossed by the proposed Fayetteville Lateral, and about 50 oil and gas wells are within the counties crossed by the proposed Greenville Lateral (AOGC, 2007; MSOGB, 2007). Ten oil and gas wells would be within 0.5 mile of the Project. Several of these gas wells are currently being developed (drilled) or were recently developed and would provide much of the gas supply transported in the Texas Gas pipeline, if approved.

About 55 miles of the westernmost portion of the proposed Fayetteville Lateral would cross Southwestern's Fayetteville Shale gas production area. Five of the six active oil and gas wells currently identified in state databases as being within 0.5 mile of the Fayetteville Lateral route were mapped in Conway County along a 6-mile-long stretch between MPs 0.9 and 6.9. Active well drilling and gathering line installation was observed during our site visits to this area. Thus, additional wells may be within 0.5 mile of the proposed Fayetteville Lateral in the future. Texas Gas has consulted with Southwestern to develop a pipeline route through the gas production area to minimize conflicts with ongoing development of this resource and to plan locations for M&R stations to interconnect with Southwestern's gathering pipelines.

Four oil and gas wells would be within about 0.5 mile of the proposed Greenville Lateral. Two of these wells would be between MP 80.9 and MP 87.6 in Attala County, Mississippi, and the remaining two wells would be between MP 45.5 and MP 46.0 in Humphreys County, Mississippi. All four wells were reported as abandoned (MSOGB, 2007).

The proposed pipeline route would not cross any sources of sand, gravel, or consolidated rock. Sand and gravel are the predominant mineral resources found in the Project area in Arkansas. This resource is developed as crushed stone from mined consolidated rock, or it is mined from unconsolidated sand and gravel deposits. The extraction of these mineral deposits is generally limited to larger cities or strategic sites with access to major transportation routes (Arkansas Geological Commission [AGC], 2001). The closest resource site is about 500 feet north of MP 56.5 along the proposed Fayetteville Lateral. Only one stone quarry, located about 0.8 mile north of MP 23.6 of the Fayetteville Lateral, would be near the Project (USGS, 2005a).

In Mississippi, no mineral recovery or processing sites were reported within 1 mile of the proposed Greenville Lateral (USGS, 2005a). According to the MDEQ, the Greenville Lateral does not cross any other economically significant mineral resources (MDEQ, 2004).

Given that few mineral resources would be in the immediate vicinity of the propose Project, and that known sites would be avoided, we believe that no significant impact on mineral resources would occur due to construction and operation of the Project.

4.1.3 Geologic Hazards

4.1.3.1 Seismic Hazards

Seismic hazards are characterized in terms of magnitude and intensity. Magnitude measures the energy released at the source of the earthquake and is determined by measurements recorded by seismographs. Earthquake magnitude is measured using the Richter Magnitude (RM) scale. RM is a logarithmic measure of ground shaking based on data collected by seismometers. The RM scale is based on ground motion and does not take into account distance from source and structural stability of the subsurface. RM is, therefore, not a representative measure of the intensity of the seismic event at a given location.

Intensity measures the strength of shaking produced by an earthquake at a specific location. Intensity is determined from effects on people, man-made structures, and the natural environment. The intensity of a seismic event is measured using the Modified Mercalli Intensity (MMI) scale. MMI provides a measure of the intensity of ground movement felt in a given area based on damage assessments and eyewitness reports. The MMI scale ranges from an earthquake intensity value of I, in which the earthquake is not felt, to an intensity value of XII, in which damage is total, large rock masses are displaced, and objects are thrown into the air. Table 4.1.3-1 describes a range of earthquake intensities and their potential effects. Figures 4.1.3-1 and 4.1.3-2 identify the locations of seismic source zones and known earthquake epicenters within the surrounding region. Figures 4.1.3-3 and 4.1.3-4 depict the peak ground acceleration with a 10 percent probability of exceedance over a 50-year period, while figure 4.1.3-5 depicts the seismic risk zone for the Project area.

Seismic activity in the region surrounding the proposed pipeline route is closely linked to the New Madrid fault system. The New Madrid seismic zone lies within the central Mississippi Valley, extending from northeast Arkansas through southeast Missouri, western Tennessee, and western Kentucky and into southern Illinois. The center of the New Madrid seismic zone (or area in which the probability of a seismic event is greatest) is located about 90 miles generally northeast of the Project area, along the adjoining boundaries of Missouri, Arkansas, and Tennessee. Historically, that area has been the site of some of the largest earthquakes in North America. Between December 1811 and February 1812, three of the most powerful earthquakes in United States history originated in the New Madrid seismic zone. Of the three major shocks that occurred within the series, historical evidence indicates that none of the shocks originated in Arkansas or Mississippi (USGS, 2005b). Since that time, numerous intensity MMI V or greater earthquakes have been reported in Arkansas and Mississippi. The majority of these events is associated with the New Madrid fault system and did not occur in the vicinity of the proposed Fayetteville or Greenville Laterals.

TABLE 4.1.3-1

Range of Earthquake Intensities

Intensity (MMI)		RM Scale Equivalent
I	Not felt except by a very few under especially favorable conditions.	1.0 – 3.0
II	Felt by only a few persons at rest, especially on the upper floors of buildings.	3.0 – 3.9
III	Felt quite noticeably by persons indoors, especially on the upper floors of buildings. Many people do not recognize it as an earthquake. Standing automobiles may rock slightly. Vibrations are similar to the passing of a truck. Duration is estimated.	3.0 – 3.9
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sounds. Sensation like heavy truck striking building. Automobiles rocked noticeably.	4.0 – 4.9
V	Felt by nearly everyone; many awakened. Some dishes and windows are broken. Unstable objects are overturned. Pendulum clocks may stop.	4.0 – 4.9
VI	Felt by all, many frightened. Some heavy furniture is moved; a few instances of fallen plaster. Damage is slight.	5.0 – 5.9
VII	Damage is negligible in buildings of good design and construction, and slight to moderate in well-built ordinary structures. Considerable damage in poorly built or badly designed structures. Some chimneys are broken.	5.0 – 5.9
VIII	Damage is slight in specially designed structures; considerable damage in ordinary substantial buildings, with partial collapse. Damage is great in poorly built structures. Chimneys, factory stacks, columns, monuments, and walls fall. Heavy furniture is overturned.	6.0 – 6.9
IX	Damage is considerable in specially designed structures; well-designed frame structures are damaged. Damage is great in substantial buildings, with partial collapse. Buildings are shifted off foundations.	6.0 - 6.9
X	Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed along with their foundations. Rails are bent.	7.0 and higher
XI	Few, if any, (masonry) structures remain standing. Bridges are destroyed. Rails are bent greatly.	7.0 and higher
XII	Damage is total. Lines of sight and level are distorted. Objects are thrown into the air.	7.0 and higher

Source: USGS, 2006a.

Five significant seismic events having epicenters within a 35-mile radius of the Project have been recorded since 1568 (USGS, 2005b). The intensities of these seismic events ranged from MMI III to V, or roughly equivalent to 3.8 to 5 RM. The intensities of these events and their locations relative to the nearest Project MP are summarized in table 4.1.3-2. The three most recent seismic events were reported south of the Fayetteville Lateral route between MP 0.0 and MP 23.0 and had intensities of MMI III to IV. The strongest seismic event (MMI V) was reported in 1878, with its epicenter located about 34 miles northeast of MP 83.0 of the Fayetteville Lateral. Figures 4.1.3-3 and 4.1.3-4 present the USGS seismic hazard estimate for the Fayetteville Lateral route and Greenville Lateral route, respectively. The hazard information provided by the USGS confirms that the greatest risk for significant seismic activity is associated with the New Madrid fault centered northeast of the Fayetteville Lateral route (USGS, 1997).

4.1.3.2 Active Faults

The Fayetteville Lateral and the Greenville Lateral would not cross any identified Quaternary-age faults (Haller et al., 2005). However, several fault zones are mapped within 100 miles of the Fayetteville Lateral. The fault zones are listed in table 4.1.3-3.

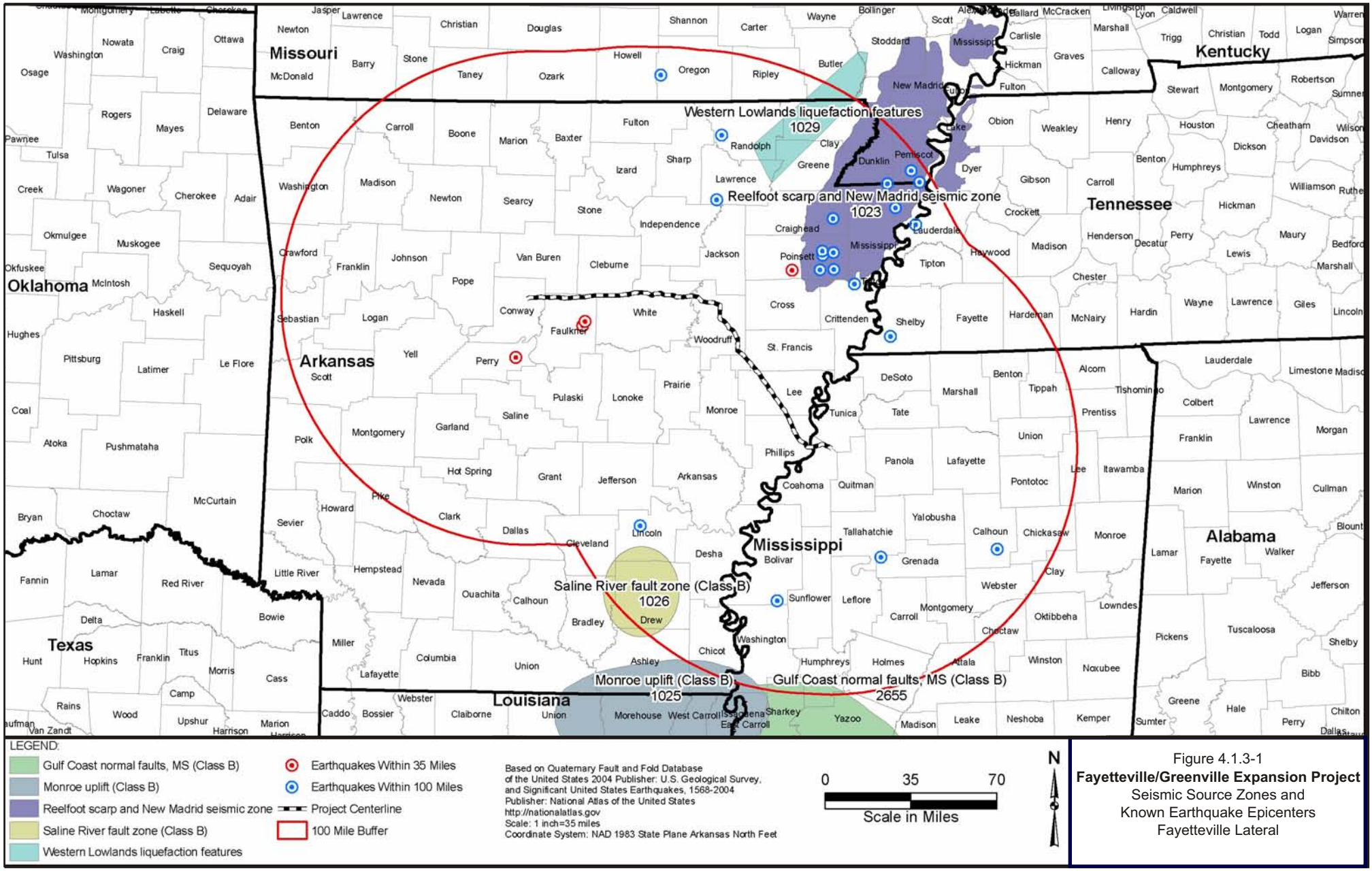


Figure 4.1.3-1
Fayetteville/Greenville Expansion Project
Seismic Source Zones and
Known Earthquake Epicenters
Fayetteville Lateral

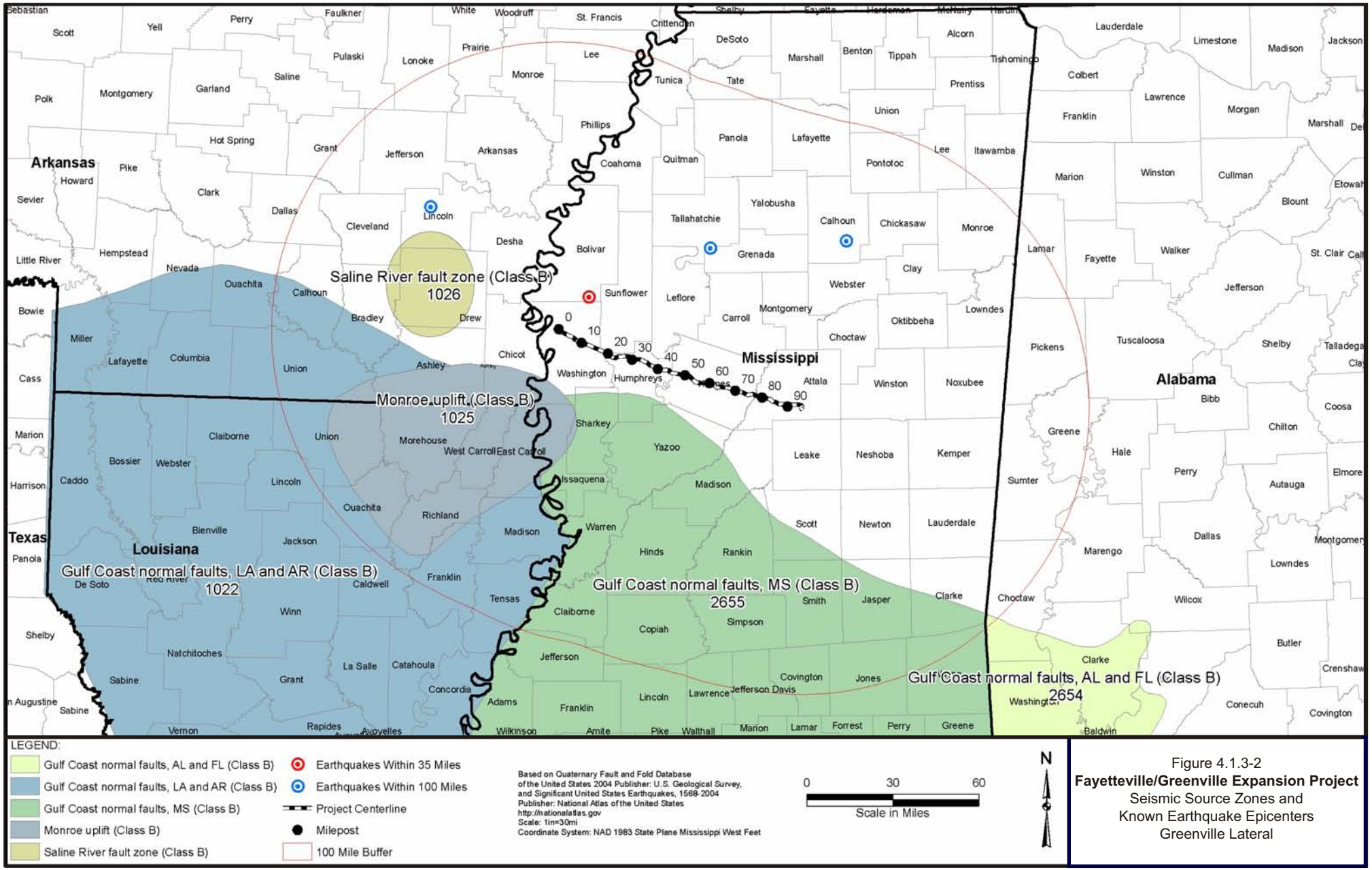


Figure 4.1.3-2
Fayetteville/Greenville Expansion Project
Seismic Source Zones and
Known Earthquake Epicenters
Greenville Lateral

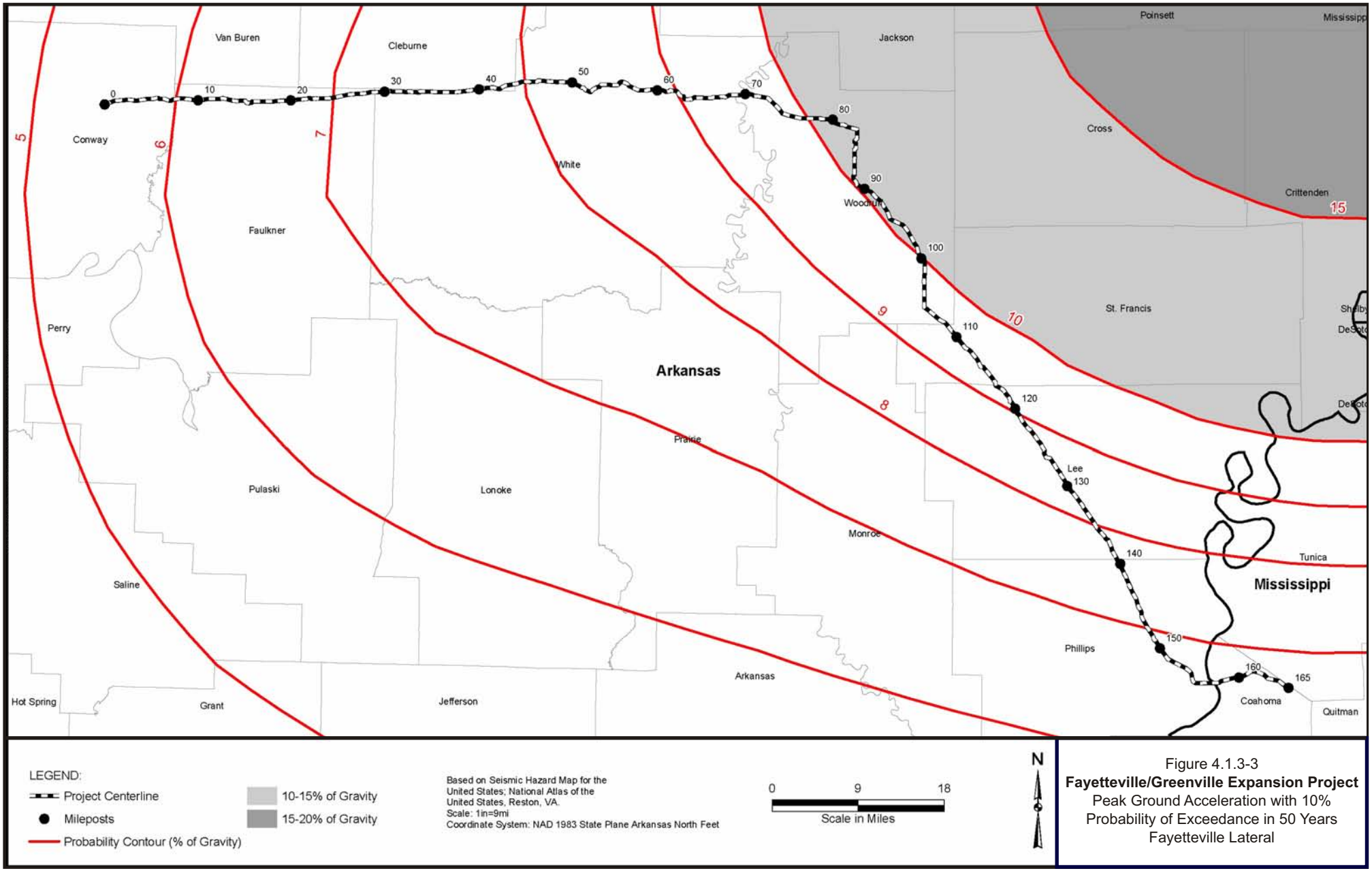


Figure 4.1.3-3
Fayetteville/Greenville Expansion Project
Peak Ground Acceleration with 10% Probability of Exceedance in 50 Years
Fayetteville Lateral

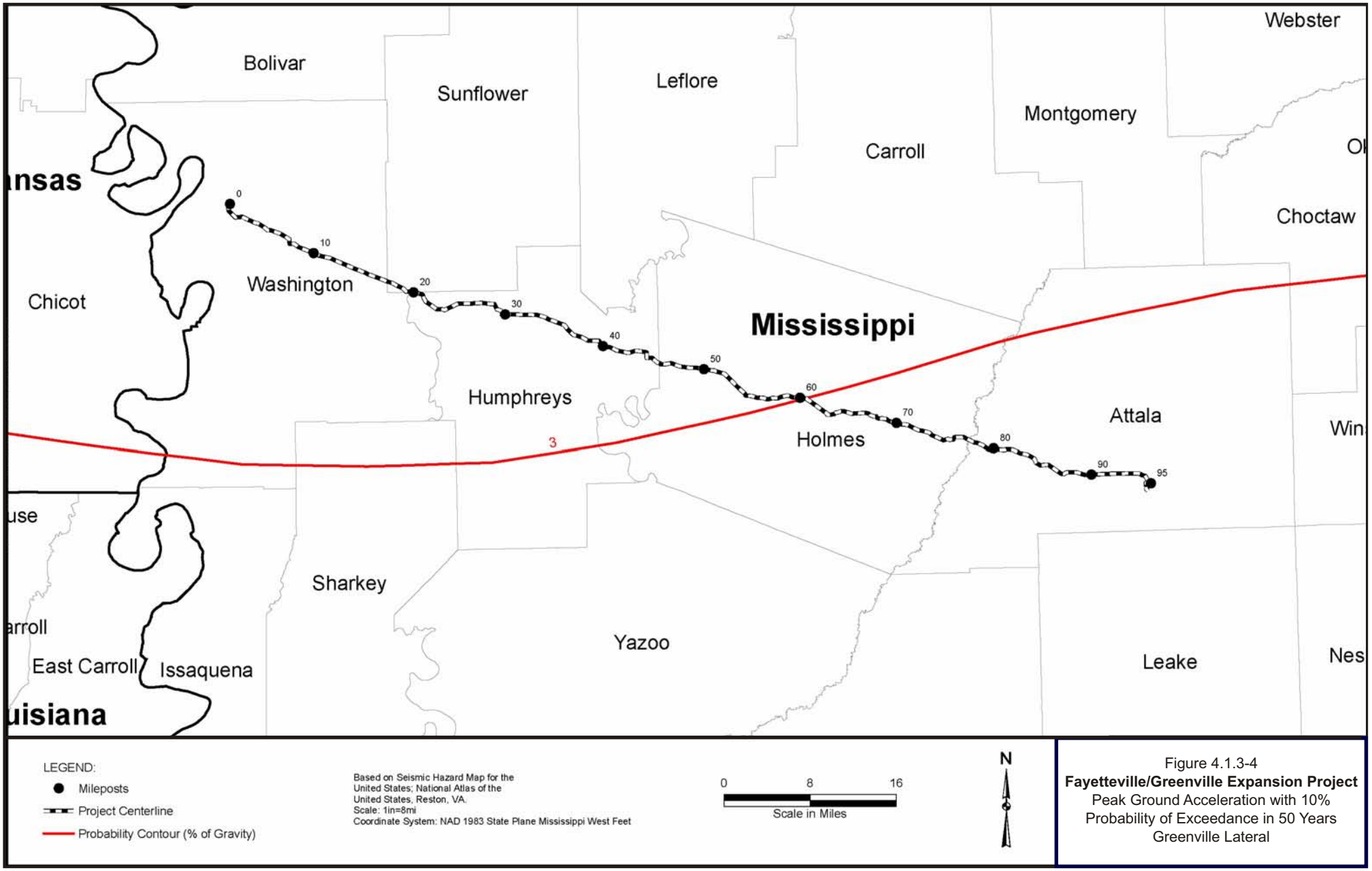
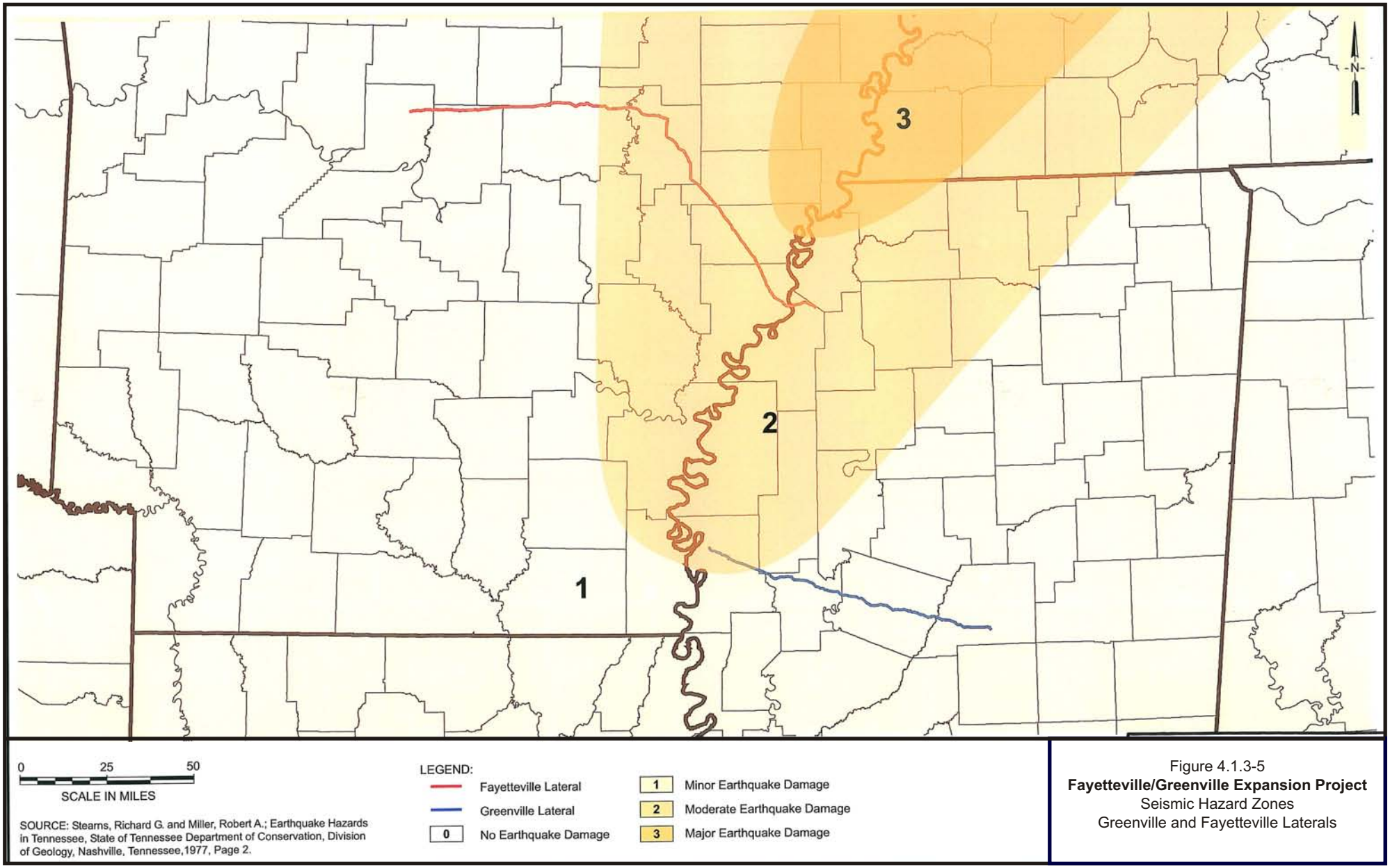


Figure 4.1.3-4
Fayetteville/Greenville Expansion Project
Peak Ground Acceleration with 10% Probability of Exceedance in 50 Years
Greenville Lateral



SOURCE: Stearns, Richard G. and Miller, Robert A.; Earthquake Hazards in Tennessee, State of Tennessee Department of Conservation, Division of Geology, Nashville, Tennessee,1977, Page 2.

Figure 4.1.3-5
Fayetteville/Greenville Expansion Project
Seismic Hazard Zones
Greenville and Fayetteville Laterals

TABLE 4.1.3-2

Earthquake Epicenters within 35 Miles of the Fayetteville Lateral and Greenville Lateral Routes

Date	Depth (km)	Magnitude/ Intensity (RM/MMI)	Distance from Route (miles)	Nearest MP	Epicenter Location Relative to Route
Fayetteville Lateral					
May 4, 2001	10	4.5/VI	9.8	23	South
January 21, 1982	3	4.5/VI	11.4	21	South
January 1, 1969	7	4.5/VI	27.2	0	South-southeast
November 19, 1878	No Data	4.9/VI	33.7	76	Northeast
Greenville Lateral					
June 4, 1967	6	4.5/VI	15.1	0	Northeast

Source: USGS, 2005b.

RM – Richter magnitude scale uses the area in which the event was felt coupled with the amplitude of the shaking to determine and assign intensity.

MMI – Modified Mercalli Intensity Scale estimates the relative intensity from I to XII of an event in a given area during an event based on physical damage and eyewitness reports of ground movement.

km = kilometer

Hazards associated with seismicity and faulting include ground-shaking, surface rupture of faults, and offsets along normal, reverse, or strike slip faults. Faulting can be especially hazardous to rigid, linear structures (e.g., pipelines) along which the ground is not moving the same distance or the in the same direction. However, well-maintained pipelines constructed using modern arc welding techniques have performed well in seismically active areas of the United States. Only large, abrupt ground displacements have caused serious impacts on such facilities. Based on the historical record and magnitude of earthquakes near the proposed Project's corridor, we believe the potential for seismicity and faulting does not represent a significant risk to the stability or safety of the proposed Project.

4.1.3.3 Soil Liquefaction

Liquefaction occurs in saturated soils (i.e., soils in which the space between individual particles is completely filled with water). This interstitial water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. When liquefaction occurs, the strength of the soil decreases and, its ability to support foundations for buildings and bridges is reduced. Because liquefaction occurs only in saturated soil, its effects are most commonly observed in low-lying areas near bodies of water such as rivers, lakes, bays, and oceans.

TABLE 4.1.3-3

Fault Zones within 100 Miles of the Fayetteville Lateral and Greenville Lateral Routes

Fault Zone	Distance and Direction from Proposed Route (miles)	Nearest MP	Age (ybp)	Maximum Movement Rate (mm/year)
Fayetteville Lateral				
Reelfoot Scarp and New Madrid Seizmic Zone No. 1023	34/NE	83	< 15,000	No Data
Western Lowlands Liquefaction Features No. 1029	54/NE	79	<15,000	Insufficient Data
Saline River Fault Zone No. 1026	72/SW	152	<15, 000	<0.2
Monroe Uplift No. 1025	95/SW	155	<15, 000	<0.2
Gulf Coast Normal Faults, MS (Class B) No. 2655	95/S	166.2	<1,600, 000	<0.2
Greenville Lateral				
Gulf Coast Normal Faults, MS No. 2655	10.3	41	<1,600, 000	<0.2
Monroe Uplift No. 1025	17.4	9	<15, 000	<0.2
Saline River Fault Zone No. 1026	31.8	0	<15,000	<0.2
Gulf Coast Normal Faults Class LA and AR No. 1022	39.7	1	<1,600, 000	<0.2

_____

Source: Haller et al., 2005.

ybp = years before present.

mm/year = millimeters per year.

Areas with the potential for soil liquefaction include locations:

- underlain by Holocene deposits that are likely to be non-cohesive, such as alluvial, lacustrine, and shoreline deposits; and
- where the water table occurs at 10 feet or less below the surface, and where the USGS Open File Report 82-1033 (Algermissen et al., 1982) indicates a 10 percent probability that horizontal ground accelerations of 10 percent of gravity or greater would be exceeded in 50 years (referred to as the "seismic threshold").

In the vicinity of the proposed Fayetteville Lateral route, the floodplains of the Mississippi River and other rivers and major waterbodies that would be crossed are potentially underlain by Holocene deposits (Haley, 1993; Moore, 1969). In addition, the water table below portions of the Project area likely occurs at 10 feet or less below the land surface within the floodplain of the Mississippi River and other rivers within the Mississippi Alluvial Plain east of MP 63.3. The seismic threshold (horizontal ground accelerations of 10 percent or more with 10 percent probability of exceedance in 50 years) is exceeded along the Fayetteville Lateral between MP 77 and MP 99 in Woodruff County, Arkansas (USGS, 1997).

Therefore, soil liquefaction is considered a hazard in this area. Areas exceeding the threshold for soil liquefaction are identified in figure 4.1.3-3.

In the vicinity of the proposed Greenville Lateral, the floodplains of the Mississippi River and other rivers and major waterbodies that would be crossed also are potentially underlain by Holocene deposits (Moore, 1969). In addition, the water table below portions of the Project area likely occurs at 10 feet or less below the land surface within the floodplain of the Mississippi River and rivers within the Mississippi Alluvial Plain west of MP 54.5. The seismic threshold, however, is not exceeded in the vicinity of the proposed Greenville Lateral (Rukstales, 2002). Therefore, soil liquefaction does not appear to be a significant hazard in the vicinity of the proposed Greenville Lateral.

Newer pipelines exhibit elastic behavior and are significantly less vulnerable to earthquake effects, including liquefaction, differential settlement, violent shaking, and ground strain, than the older types of pipe installed 50 to 100 years ago. Buoyancy effects are probably of greatest concern in areas such as floodplains and river bottoms, where massive liquefaction could take place during a large earthquake. To minimize the buoyancy effect upon the pipeline due to liquefaction in areas of saturated soils, the pipeline would have concrete coating, concrete weights, or gravel-filled blankets. Today's pipe has greater ability to conform to ground movements resulting from vibration and slippage. Seismic wave propagation generally does not have a serious effect on welded buried pipelines in good condition. Some situations where wave propagation could lead to damage to the pipeline system include transition zones between very stiff and very soft soils, penetration points of pipes into valve boxes, and at branch-connections, pipe fittings, and valves. However, the pipeline and associated facilities would be designed and constructed in accordance with the standards specified in 49 CFR Part 192, *Minimum Federal Safety Standards for the Transportation of Natural Gas and other Gas by Pipeline,* which should adequately address pipeline design where there's potential for soil liquefaction. Given the seismic risk in the area and the methods that would be used to construct the proposed pipeline and associated facilities, we believe that soil liquefaction does not represent a significant risk to the stability or safety of the proposed Project during construction and operation of the Project.

4.1.3.4 Karst Potential/Ground Subsidence

Karst features such as sinkholes, caves, and caverns can form as a result of the long-term action of groundwater on soluble carbonate rocks (e.g., limestone and dolostone). Karst features are formed when rainwater picks up carbon dioxide from the air (forming carbonic acid) and dead plant debris in the soil and then percolates through cracks dissolved in the rock. The bedrock becomes saturated with water at some level, and the rock continues to dissolve as the water moves sideways along bedding planes (horizontal cracks between rock layers) and joints (or fractures) in the rock itself. These conduits enlarge over time and move the water via a combination of gravity and hydraulic pressure, further enlarging the conduits through a combination of solution and abrasion of water on the surrounding rock. Underground mining also poses risks to engineered structures due to the potential of the overlying strata to collapse into the void formed by the extraction of minerals.

Sinkholes are reported to occur at a rate of less than one for every 100 square miles in Conway, Faulkner, Cleburne, and White Counties in Arkansas. These areas represent the highest potential for karst development along the Fayetteville and Greenville Laterals. All of theses areas are mapped west of the Fall Line within the Pennsylvanian bedrock (Renken, 1998).

Ground subsidence can affect pipelines and aboveground facilities by causing loss of support that would result in bending or rupturing of pipeline and weaken the foundation of aboveground facilities. However, the pipeline and associated facilities would be designed and constructed in accordance with the standards specified in 49 CFR Part 192, *Minimum Federal Safety Standards for the Transportation of Natural Gas*

and other Gas by Pipeline, which should ensure the integrity of the Project facilities and minimize the potential for any pipeline failures due to ground subsidence. In addition, Texas Gas would conduct regular patrols of the pipeline right-of-way during operations to identify conditions, including areas of ground subsidence, that might affect safety or the operation of the pipeline. Based on the lack of identified karst features in proximity to the proposed Project corridor, and the specific construction and operational measures that would be adhered to by Texas Gas, we do not believe karst to represent a significant risk to the stability or safety of the proposed Project.

4.1.3.5 Bedrock and Blasting

The pipelines would be installed to allow a minimum cover of 3 feet in areas of shallow bedrock. Therefore, the Project was evaluated for areas where bedrock might be encountered above a depth of 80 inches (conservatively, 3 feet of cover and a 36-inch-diameter pipe).

Figure 4.1.3-6 identifies the approximate areas where shallow bedrock may be encountered along the proposed Fayetteville Lateral; figure 4.1.3-7 presents similar information for the Greenville Lateral. Blasting may be necessary along a limited portion of the Fayetteville Lateral. Location-specific evaluations would be conducted by Texas Gas's construction contractor to identify those locations where alternatives to blasting are not feasible. Texas Gas does not anticipate needing to blast at any location along the Greenville Lateral.

About 25 percent (38.8 miles) of the proposed Fayetteville Lateral would cross areas with reported depths to bedrock of less than 80 inches (based on analysis of the state Soil Survey Geographic [SSURGO] database). The soils with reported depth to bedrock of less than 80 inches would be in Arkansas west of the Fall Line (near MP 63.3) in Conway, Faulkner, Cleburne, and White Counties. The surficial bedrock encountered between MP 0.0 and MP 45.0 is expected to be paralithic (i.e., soft); therefore, blasting should not be required. However, the surficial bedrock crossed by the proposed Fayetteville Lateral between MP 45.0 and the Fall Line at MP 63.3 may require blasting.

All blasting-related operations would comply with federal, state and local regulations and permit conditions and would be conducted by or under the direct supervision of experienced, licensed, and certified personnel. To avoid injury to personnel and damage to structures and other features such as water wells and existing pipelines, Texas Gas stipulates that the blasting contractor must furnish a site-specific blasting plan prior to any proposed blasting-related activity. These plans would identify the distance and orientation to the nearest structure (both aboveground and belowground) and the procedures to be used for storing, handling, transporting, loading, and firing explosives. These site-specific plans would be reviewed by Texas Gas and approved by company representative(s) prior to each blast. Further, if blasting is needed for construction across a waterbody, Texas Gas would a provide us with a schedule identifying when trenching or blasting would occur within each waterbody greater than 10 feet wide, or within any designated coldwater fishery, in a manner consistent with our Procedures.

Blasting for grade or trench excavation would be considered only after all other reasonable means of excavation have been evaluated and determined to be unlikely to achieve the required results. Texas Gas may specify locations (foreign line crossings, nearby structures, etc.) where consolidated rock would be removed by approved mechanical equipment (e.g., rock trenching machines, rock saws, hydraulic rams, and jack hammers) in lieu of blasting.

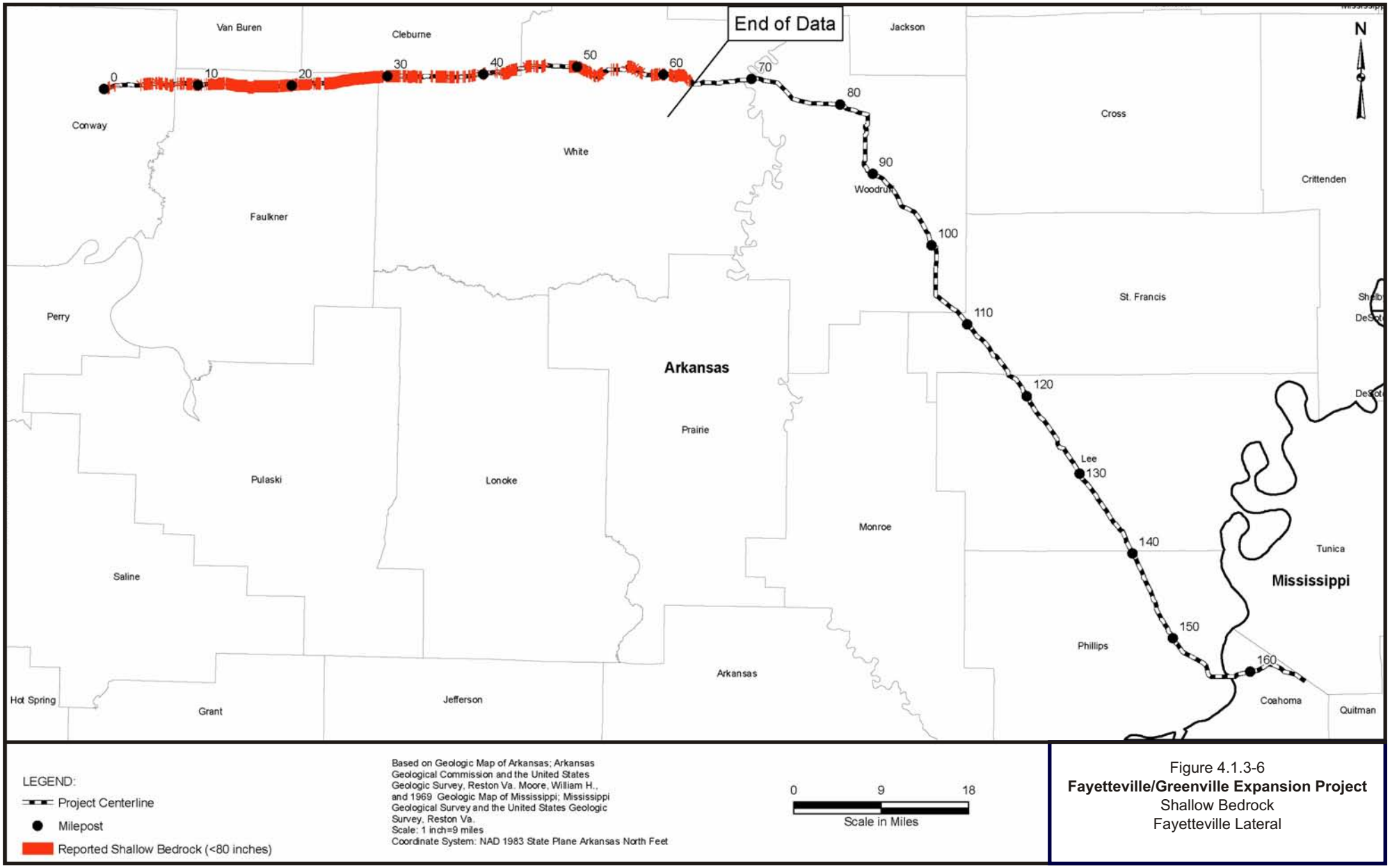


Figure 4.1.3-6
Fayetteville/Greenville Expansion Project
Shallow Bedrock
Fayetteville Lateral

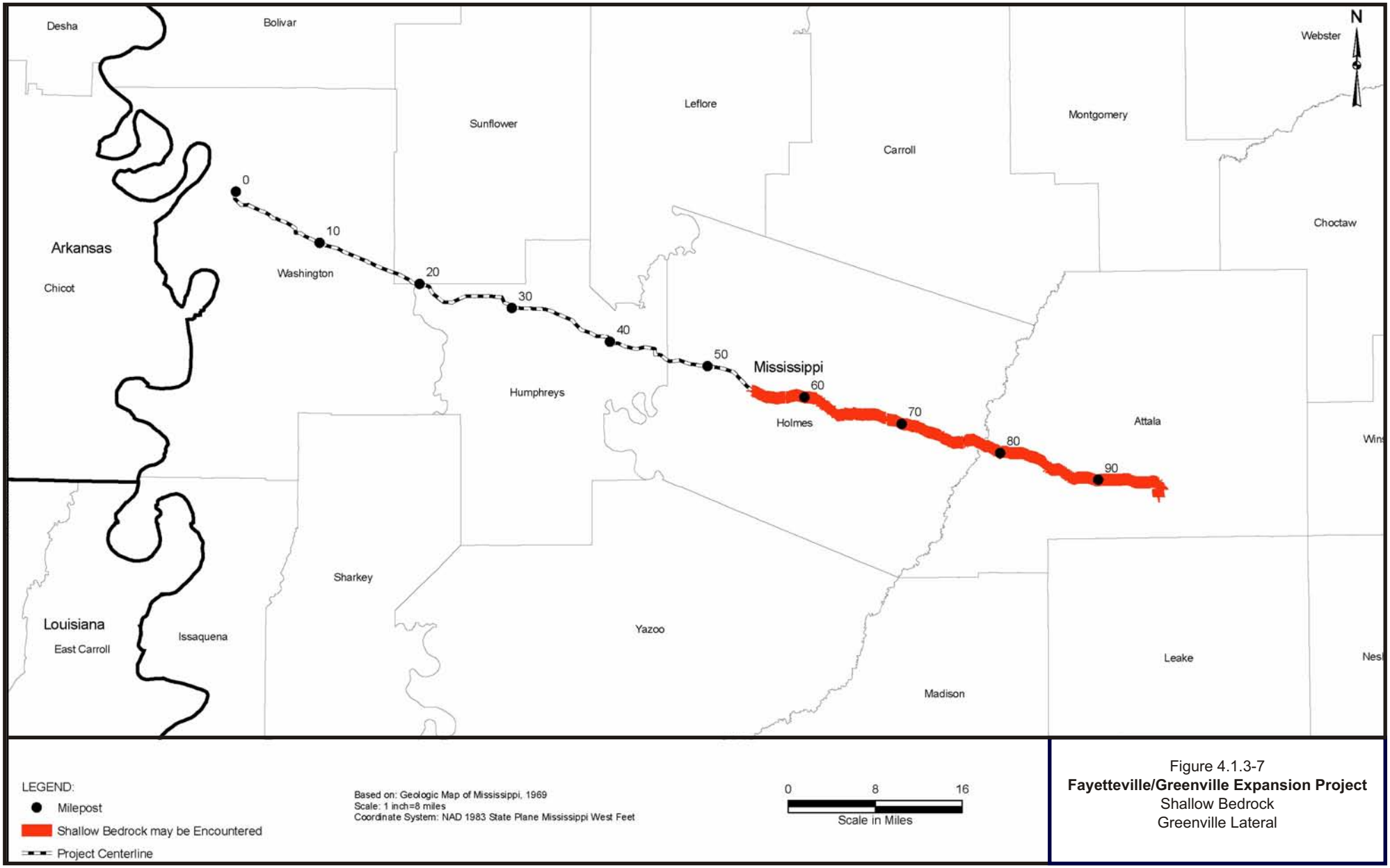


Figure 4.1.3-7
Fayetteville/Greenville Expansion Project
Shallow Bedrock
Greenville Lateral

Pre-construction and post-construction water well surveys would be conducted in any situation where blasting would occur within 150 feet of an existing water supply well, with landowner approval. Water wells would be tested for yield and water quality prior to beginning construction activities, and upon the conclusion of blasting and other activities that may affect well performance. Landowners would be contacted by a Texas Gas representative, and a qualified independent contractor would perform the testing. If the damage is substantiated, Texas Gas would negotiate a settlement with the landowner to have any and all damages repaired or replaced. See additional information about damaged water wells in section 4.3.1.

If blasting is required, Texas Gas would use the minimum explosive charge necessary to fracture bedrock and keep shot-rock from leaving the construction right-of-way. Where necessary, excess rock would be hauled off site, away from the right-of-way or, subject to landowner approval and applicable permit conditions, disposed of on the right-of-way.

Mitigation measures that would be employed to minimize impacts on sensitive resources and potential impacts on residences in proximity to blasting locations would be described by the blasting contractor in a site-specific blasting plan. At a minimum, blasting mats or padding would be used on all shots where necessary to prevent scattering of loose rock and to prevent damage to nearby structures and overhead utilities. The pipeline trench would be excavated by non-blasting, mechanical means where the trench is within 150 feet of a residence. Texas Gas has indicated that blasting would not be allowed within 10 feet of an existing pipeline unless an incident-specific approval is provided by Texas Gas. All existing underground utilities would be staked prior to blasting operations.

Texas Gas would require the contractor to maintain the maximum allowable vibration limit of 4 inches per second of peak particle velocity (ground motion) in the vertical, longitudinal, or horizontal directions as measured on the ground directly above any existing pipeline. For any aboveground structure, the ground motion would not exceed federal, state, or local regulations. If the measured ground motion at an existing pipeline or structure exceeds the allowable limit, blasting would be immediately stopped and Texas Gas would require the contractor to modify the blasting plan to reduce the ground motion before resuming blasting activities.

We believe that impacts due to blasting would be minimized by implementing Texas Gas's blasting specifications. Further, Texas Gas has agreed to repair, replace, or compensate landowners for damage caused by blasting.

4.1.3.6 Slope Failures/Landslides

Landslides are rock, earth, or debris flows on slopes due to gravity. They can occur on any terrain given the right conditions of soil, moisture, and angle of slope. Also known as mud flows, debris flows, earth failures, slope failures, etc., they can be triggered by rains, floods, earthquakes, and other natural causes, as well as human-made causes such as grading, terrain cutting and filling, excessive development, etc. Because the factors affecting landslides can be geophysical or human-made, they can occur in developed areas, undeveloped areas, or any area where the terrain has been altered for roads, houses, utilities, or buildings. They occur in all fifty states with varying frequency, and more than half the states have rates sufficient to be classified as a significant natural hazard. Generally flat areas were selected for the locations of the proposed compressor and M&R sites; therefore, slope failure is not expected at aboveground facility locations. However, slope failures and landslides represent a potential hazard along portions of the proposed pipeline route that would traverse side slopes and rolling terrain. Factors that would increase the potential for slope failures along slopes and rolling terrain include cutting along slopes, the weight of construction equipment, and unusually high amounts of precipitation.

Fayetteville Lateral

The Federal Emergency Management Agency (FEMA) has made one Presidential disaster declaration that was attributed to landslides in Arkansas since 1956 (FEMA, 2006). The Arkansas disaster declaration, which included Woodruff County, was due to a severe storm event on May 7, 2004. Part of the proposed Fayetteville Lateral between MP 63.3 and MP 100.2 would cross the area included in the disaster declaration. Landslide susceptibility data evaluated for the Fayetteville Lateral route indicates high susceptibility to landslides in eastern White County and along both banks of the Mississippi River in eastern Phillips County, Arkansas, and western Coahoma County, Mississippi (Godt, 2001).

The area of potential high susceptibility in White County impacts less than 0.9 mile of the pipeline route. Texas Gas indicates that it would inspect the potentially high susceptibility area prior to construction. Care would be taken during construction to prevent undercutting unstable horizons. Implementing our Plan and Procedures would minimize the potential for slope failure and erosion. Additional mitigation measures could involve burial of the pipeline below the potential landslide depth, if feasible, and/or the use of drainage controls. Drainage control can include, but is not limited to frequent slope and ditch breakers, subsurface gravel or cobble drains, and culverts and drainage ditches to divert water away from the right-of-way.

The banks of the Mississippi River also have been identified as an area of high susceptibility to slope failure. Erosion and undercutting of stream banks and levees may result in unstable deposits that would eventually fail. However, Texas Gas would cross the Mississippi River by HDD, thereby avoiding this hazard.

Rockfalls are a potential hazard below bedrock outcroppings at or near the top of steep slopes associated with the ledge-forming sandstones of the Bloyd Shale and Prairie Grove Member of the Hale formation, which is mapped between MP 43.9 and MP 63.3 (McFarland, 1998). These outcrops may be weathered by wind or rainfall and become loosened, leading to a violent cascade downhill, often triggering a larger landslide. While the landslide potential is high, the incidence is defined as low and often represents less than 1.5 percent of the relevant mapped units (Godt, 2001). Landslides are not expected to be a significant hazard to construction and operation of the Fayetteville Lateral.

Greenville Lateral

The proposed Greenville Lateral would cross two areas considered prone to landslides. The first area would be between MP 0.2 and 0.6. This area is described as highly susceptible to landslides, with a low incidence. The second area is mapped between MP 56.5 and MP 67. This area is described as highly susceptible to landslides, with a moderate incidence.

Construction of the pipeline would be accomplished in accordance with our Plan, which includes measures to control runoff and erosion that would minimize the potential for slope failures. In addition, inspections before, during, and after construction would identify areas of risk, and continued monitoring along slopes would identify any significant landslide hazards before they develop. Based on the characteristics of the proposed Project area and Texas Gas's commitment to installing and monitoring appropriate erosion and sediment controls, we believe the potential impacts from slope failure and landslides would be minimized and would not be a significant hazard to construction and operation of the Greenville Lateral.

4.1.3.7 Paleontological Resources

No areas of special or unusual paleontological resources were identified within the proposed Project construction workspaces or within the footprints of associated aboveground facilities. If significant paleontological resources are identified during construction Texas Gas would report findings to the AGC or the MDEQ. Based on the lack of unusual or significant paleontological resources within the Project area, we believe that construction and operation of the proposed Project would not significantly affect paleontological resources.

4.2 SOILS

4.2.1 Soil Types and Characteristics

Soils types occurring along the proposed pipeline routes are identified by milepost in table C-1 for the Fayetteville Lateral and table C-3 for the Greenville Lateral. Characteristics of soils within the construction right-of-way for the Fayetteville and Greenville laterals are described in tables C-2 and C-4, respectively. These tables are provided in appendix C.

Soil characteristics that could affect Project construction include: hydric soils, compaction potential, erosion potential, revegetation potential, rocks, and soil contamination. In addition, some soils have been designated as Prime Farmland and may be subject to special management considerations.

Soil interpretations at the broadest scale in the United States are based on Major Land Resource Areas (MLRA). MLRAs are geographically associated land resource units, usually encompassing tens of thousands of square miles, and are characterized by a particular pattern of soils, geology, climate, water resources, and land use (USDA/NRCS, 2006a).

Fayetteville Lateral

In Arkansas and Coahoma County, Mississippi, the Fayetteville Lateral would cross three MLRAs recognized by the NRCS: the Arkansas Valley and Ridges, Eastern Part (MLRA 118A); the Southern Mississippi Valley Alluvium (MLRA 131A); and the Southern Mississippi Valley Loess (MLRA 134).

The Arkansas Valley and Ridges, Eastern Part, is comprised mostly of Ultisols. They predominantly have a thermic[1] soil temperature regime, a udic[2] moisture regime, and their mineralogy is typically mixed or siliceous (formed from silicates). They are stony and non-stony and are medium textured. Soils on ridgetops, benches, and upper slopes are well drained, shallow and moderately deep. On the middle and lower slopes, soils are well drained and deep (USDA NRCS, 2006a).

The soils of the Southern Mississippi River Alluvium are predominantly Alfisols, Vertisols, Inceptisols, and Entisols. The soil temperature regime is thermic in the Project area and the soil moisture regime is predominantly aquic[3]. The clays typically have high shrink-swell ratios compared to other types of clay. The sand and silt mineralogy is mixed. The soils are very deep, predominantly poorly drained, and

[1] The thermic temperature regime is one in which the mean annual soil temperature is 15 degrees Celsius (C) or higher but lower than 22 degrees C, and the difference between mean summer and mean winter soil temperatures is more than 6 degrees C either at a depth of 50 centimeters (cm) from the soil surface or at a densic, lithic, or paralithic contact, whichever is shallower (USDA/NRCS, 2006b).

[2] The udic moisture regime is one in which the soil moisture control section is not dry in any part for as long as 90 cumulative days in normal years (USDA/NRCS, 2006b).

[3] The aquic moisture regime is a reducing regime in a soil that is virtually free of dissolved oxygen because it is saturated by water (USDA/NRCS, 2006b).

predominantly loamy or clayey. Slopes are nearly level on alluvial flats and backswamps. On other landforms, such as natural levees and terraces, slopes are nearly level to gently sloping or undulating. Controlling surface water and artificially draining the wet soils are major concerns for cropland management (USDA/NRCS, 2006a).

The Fayetteville Lateral route would cross the western portion of the Southern Mississippi Valley Loess. The dominant soil orders here are Alfisols, Entisols, Inceptisols, and Ultisols. These soils are deep or very deep, are medium textured, and have a thermic soil temperature regime. The soil moisture regime is udic, and the mineralogy is mixed. On ridgetops and side slopes, gently sloping to steep, well-drained and moderately well drained soils are found. On floodplains, soils are nearly level to very gently sloping and range from well drained to poorly drained (USDA/NRCS, 2006a).

Greenville Lateral

The Greenville Lateral would cross three MLRAs: the Southern Mississippi Valley Alluvium (MLRA 131A), the Southern Mississippi Valley Loess (MLRA 134), and Southern Coastal Plain (MLRA 133A). MLRA 131A and MLRA 134 are described above for the Fayetteville Lateral. The Greenville Lateral route would cross the eastern portion of the Southern Mississippi Valley Loess, where the loess mantle over late Pleistocene loamy terrace material is thinner than in the western portion of this MLRA.

The soils of the Southern Coastal Plain are predominantly Ultisols, Entisols, and Inceptisols. The soils mostly have a thermic soil temperature regime and a udic or aquic soil moisture regime. The sand and silt mineralogy is siliceous, and clays typically have a low shrink-swell ratio. These soils generally are very deep, somewhat excessively to poorly drained, and loamy (USDA/NRCS, 2006a).

4.2.2 Potential Impacts and Mitigation

Some soil characteristics can present limitations on how a given soil can be used and may result in problems during construction or in the operation phase of a project unless specific measures are implemented to mitigate those limitations. In the case of the proposed Project, there would be no soil limitations sufficient to require relocating the Project, but they must be anticipated and steps must be taken to minimize impacts on the soil. We evaluated the soils that could affect construction and operation of the Project or could increase the potential for soil impacts. Limitations were reviewed with respect to the pipeline and aboveground facilities.

4.2.2.1 Prime Farmland

Prime Farmland soils are defined by the USDA as those best suited for food, feed, forage, fiber, and oilseed crops (USDA/NRCS, 2005b). Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by artificial drainage). Soil map units designated as Prime Farmland do not have to be actively cultivated to receive such designation. Prime Farmland is an important resource because it provides the highest crop yield per unit of energy expended. The Prime Farmland soils encountered along the Fayetteville and Greenville Laterals are identified in appendix C, tables C-2 and C-4, respectively.

Forty-nine percent of the soil that would be affected by construction of the proposed Fayetteville Lateral would be classified as Prime Farmland, and another 19 percent is classified as Prime Farmland when adequately drained. An additional 8 percent is classified as Farmland of Statewide Importance. Thus, 76 percent of the soil along the proposed Fayetteville Lateral would be considered agriculturally important

(i.e., Prime Farmland or Farmland of Statewide Importance). Sixty-seven percent of the soil that would be affected by construction of the Greenville Lateral would be classified as Prime Farmland or Prime Farmland when adequately drained.

The proposed Kosciusko Compressor Station would permanently impact up to 30.5 acres of Prime Farmland soils.

Texas Gas would implement the measures included in our Plan to minimize and mitigate any impacts on Prime Farmland soils. Virtually all impacts on Prime Farmland soils resulting from construction and operation of the proposed Project would be temporary because the proposed pipeline would be buried and disturbed areas within the construction and permanent rights-of-way would largely revert to their preconstruction uses following restoration. The footprint of aboveground facilities would permanently affect some Prime Farmlands. Operation of the Kosciusko Compressor Station would impact about 30.5 acres of Prime Farmland. In addition, about 27.5 acres of designated Prime Farmland at the proposed M&R stations, MLVs, and other minor facilities would be lost due to operation of these aboveground facilities since these areas would be converted to an industrial land use.

Farmland Conversion Impact Rating documentation would not be required for the proposed Project since it would not be completed by or with assistance from a federal agency, as specified by the Farmland Protection Policy Act. Given the prevalence of Prime Farmland soils within the affected counties, the permanent impacts on Prime Farmland soils associated with construction and operation of the proposed Project's aboveground facilities would be minimal.

During pipeline construction in agricultural areas, a maximum of the upper 12 inches of topsoil would be excavated and segregated from subsoil trench spoil. The topsoil would be returned following construction, and the construction right-of-way would be revegetated according to our Plan. In addition, Texas Gas would restore all specialty agricultural areas to their original condition. This would minimize impacts on Prime Farmland soils and specialty agricultural areas.

4.2.2.2 Hydric Soils

Hydric soils are soils that are saturated, flooded, or ponded long enough during the growing seasons to develop anaerobic conditions in the upper part of the soil column. These soils under natural conditions are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation (USDA/NRCS, 2005b). Soils that formed under hydric conditions in their unaltered state are still considered hydric when artificially drained or altered for such purposes as agricultural use. Hydric soils are typically poorly drained, and the presence of hydric soils is one of the criteria used for defining wetlands (USDA/NRCS, 2005b). Hydric soils may be prone to compaction and rutting. Some of these soils may include substantial non-hydric inclusions, while some non-hydric soils may include hydric inclusions. Hydric soils may indicate the presence of wetlands or agricultural drain tiles. The locations where hydric soils would be encountered along the Fayetteville and Greenville Laterals are identified in tables C-2 and C-4, respectively.

About 32 percent of the soil along the Fayetteville Lateral would be considered predominantly hydric. Hydric soils are more common in the counties along the eastern portion of the Fayetteville Lateral than in counties along the western portion of the route. About 90 percent of the soil along the Greenville Lateral route would be considered predominantly hydric or contains significant hydric inclusions. Areas where hydric soils would occur with wetland hydrology and vegetation are identified in section 4.4.

Hydric soils are prone to compaction and rutting due to extended periods of saturation and high clay content. If construction of the pipeline system occurs when these soils are saturated, heavy equipment

operation would be impaired, and compaction and rutting could occur. Further, high groundwater levels that accompany hydric soils could create a buoyancy hazard for the pipeline. The pipeline would have concrete coating and other weighting methods would be used to overcome buoyancy when the pipeline is buried so that the buoyancy hazard is minimized during operation. Texas Gas also would install the pipeline in accordance with our Procedures and would restore all wetlands back to their original contours and elevations. Therefore, with implementation of these measures, we conclude that impacts on hydric soils would be minimized during construction and operation of the Project.

4.2.2.3 Compaction Potential

Soils with a high potential for compaction could be adversely affected during construction activities through the repeated movement of machinery across the soil surface. Soils with poor drainage characteristics and high shrink-swell potential tend to be susceptible to compaction, particularly when wet. In addition to hydric soils, described above, some non-hydric soils may have poor internal drainage characteristics that can cause wet conditions when nearby soils are dry.

Soils with a high shrink-swell potential would underlie about 8 percent of the Fayetteville Lateral, while an additional 16 percent would have a moderate shrink-swell potential. Soils with a high shrink-swell potential would underlie about 54 percent of the Greenville Lateral, while an additional 13 percent would have a moderate shrink-swell potential.

Formation of hardpans is a potential impact associated with repeated traffic over susceptible soils. The formation of hardpans is typically limited to soils with high to very high shrink-swell potential. Formation of hardpan in Mississippi is not considered to be a significant concern in this Project due to the short construction time frame and the fact that the soils susceptible to hardpan formation are those where hardpan already occurs (Adams, 2007; Johnson, 2007). Similar conclusions can be drawn for the Arkansas portions of the Project.

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of the soil. The degree of compaction is dependent on moisture content and soil texture. Construction equipment traveling over wet soils could disrupt soil structure, reduce pore space, increase runoff potential, and cause rutting. Compaction and rutting impacts would be more likely to occur when soils are moist or saturated.

The predominantly poorly drained clay and silt soils present along the pipeline right-of-way, especially in eastern Arkansas and Mississippi, have the potential to experience some level of soil compaction due to construction activities. Soil compaction in some saturated areas would be avoided by the use of HDD methods. In addition, board roads and/or low-ground-pressure equipment would be used for construction access where needed. In agricultural areas, Texas Gas would implement decompaction measures for severely compacted soils, such as para-plowing, deep tillage, or planting and plowing-in a green manure crop to improve soil bulk density, in accordance with our Plan. Therefore, we conclude that impacts associated with soil compaction would be minimized.

4.2.2.4 Soil Erosion - Highly Erodible Soils

Soil erosion potential is affected by the soil lithology, slope, and exposure to erosion mechanisms. Soil erosion increases in inverse proportion to the effectiveness of vegetation cover, i.e., soils with denser vegetation cover are less susceptible to erosion. The removal of vegetation during construction activities, whether by direct stripping or by other mechanical means, increases erosion potential. Highly erodible soils, as classified by the NRCS, are considered very susceptible to erosion by water. Tables C-2 and C-4 identify the soils with a high potential for erosion by wind or water that would be affected by the Project.

About 53 percent of the soils along the Fayetteville Lateral would be classified as highly erodible or potentially highly erodible. About 26 percent of the soils along the Greenville Lateral would be classified as highly erodible or potentially highly erodible, with the occurrence increasing in the Southern Mississippi Valley Loess MLRA.

Erosion is a continuing natural process that can be accelerated by human disturbance. Factors that influence the degree of erosion include soil texture, structure, length and percent of slope, vegetative cover, and rainfall and wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind erosion processes are less affected by slope angles. Clearing, grading, and equipment movement could accelerate the erosion process and, without adequate protection, result in discharge of sediment to waterbodies and wetlands. Soil loss due to erosion could also reduce soil fertility and impair revegetation.

Texas Gas has adopted our Plan and Procedures for erosion and sedimentation control during construction. For stream crossings, Texas Gas would use the waterbody crossing methods identified in our Procedures and the erosion and sediment control practices specified in the Plan. These erosion control measures include the installation of slope breakers, trench plugs, and sediment barriers such as silt fence or hay bales, the use of mulch and erosion control fabrics, temporary seeding, and right-of-way restoration within 20 days of backfilling the trench, weather conditions permitting, and revegetation. We conclude that implementation of these measures would minimize overall soil erosion resulting from construction of the Project.

4.2.2.5 Revegetation Potential

Several soil characteristics can limit how quickly and successfully disturbed areas can be revegetated. Among potentially limiting characteristics are depth, texture, slope, erosion potential, soil pH, moisture holding capacity, presence of impermeable layers, and percent organic matter. While some soils within the construction corridor would be more easily revegetated than others, there would be no soils that present significant limitations to successful revegetation, assuming sound practices for establishing vegetative cover are followed.

Successful restoration and revegetation in areas that are not permanently developed by construction and operation of aboveground facilities are important to maintain ecosystem productivity and to protect the underlying soil from potential damage such as erosion. Revegetation potential may be inhibited by soil erosion, loss of soil productivity through compaction or mixing of topsoil and subsoil, damage to soil structure, loss of fertility, damage to drainage systems, and unsuitable seed selection, methods or planting conditions. To avoid these conditions, Texas Gas would return the construction right-of-way, temporary work spaces, and pipe storage and contractor yards to pre-construction contours to the extent feasible. Further, Texas Gas would use appropriate erosion controls, manage spoil to avoid topsoil mixing, conduct decompaction where needed, repair damaged drainage systems, and consult with the NRCS and landowners about appropriate seed mixes.

In cultivated areas, seeding and mulching would conform to the areas adjacent to the right-of-way unless otherwise requested in writing by the landowner. Unless requested by a landowner, no areas would be left unseeded beyond the next available seeding season. Post-construction inspections would be conducted in accordance with our Plan and Procedures to ensure that revegetation is adequate.

Soils along the proposed Project pipelines and at aboveground facilities sites are currently well vegetated, unless regularly disturbed for agricultural purposes, and none are predicted to have a low revegetation potential following construction. Texas Gas would implement the measures in the Plan and Procedures

for revegetating disturbed areas following construction, in consultation with soil conservation authorities. Texas Gas also would maintain erosion control devices until revegetation is successful and would monitor disturbed areas for up to 3 years to ensure the success of revegetation. In addition, Texas Gas is coordinating with the USACE and other agencies to develop an appropriate wetland restoration plan for wetlands affected by Project construction (see section 4.4.3). We conclude that if revegetation is conducted in accordance with these measures, areas disturbed by construction would be successfully revegetated.

4.2.2.6 Drainage Systems and Drainage Patterns

Heavy equipment traffic and trenching along the construction right-of-way could damage existing drainage systems or existing drainage patterns, thereby affecting farm management by causing wet, unworkable soils. Future crop production would likely be lowered if such damage is not corrected. Texas Gas would be responsible for ensuring all areas affected by construction activities are finish graded and restored as closely as practicable to preconstruction contours. If active drainage tiles, culverts, or other drainage facilities are damaged during construction, Texas Gas would replace or repair them to a condition that is equal to or better than preconstruction condition. Although damage to drainage structures and patterns would result in short-term impacts, the corrective actions that would be implemented by Texas Gas would avoid or minimize any long-term impact.

4.2.2.7 Rocks

Introduction of rocks to surface soil layers would be of concern along the pipeline route in areas where shallow bedrock is encountered. Trenching and mixing of excavated materials in these areas could bring large rocks to the surface, which would adversely affect soil productivity and agricultural practices. In accordance with our Plan, Texas Gas would remove excess rock from at least the top 12 inches of soil in all rotated and permanent cropland, hayfields, pastures, residential areas, and other areas at the landowner's request. Following construction and restoration, the size, density, and distribution of rocks in all construction work areas would be similar to that in adjacent areas not affected by construction. Thus, no significant impacts are anticipated as a result of pipeline construction through areas of shallow bedrock if Texas Gas implements these mitigation measures.

4.2.2.8 Soil Contamination

No areas of soil contamination were identified within proposed Project workspaces, although soil contamination could result from construction and related activities. Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils; however, the effects of such contamination would typically be minor because of the low frequency and volumes of spills and leaks. Texas Gas would implement its SPCC Plan for the pipelines and aboveground facilities (see appendix D, SPCC Plan). This plan describes cleanup procedures that would be used in the event of soil contamination resulting from spills or leaks of fuel, lubricants, coolants, or solvents. Texas Gas and its contractors would use the SPCC Plan to prevent and, if necessary, contain accidental spills of any material that may contaminate soils and to ensure that inadvertent spills of fuels, lubricants, or solvents are contained, cleaned up, and disposed of in an appropriate manner.

If contaminated or suspect soils (e.g., oil-stained soils) are identified during trenching operations, work in the area of the suspected contamination would be halted until notification is sent to appropriate authorities and the type and extent of the contamination is determined. The response action would be identified based on the type and extent of contamination; the responsible party; and local, state, and federal regulations.

Successful use of the SPCC Plan would minimize the potential for spills of contaminated materials to occur and would contain spills that might occur during construction of the Project.

4.3 WATER RESOURCES

4.3.1 Groundwater

The proposed Project would cross three aquifer systems: a surficial aquifer system, the Mississippi Embayment Aquifer System, and the Western Interior Plains confining system. The surficial aquifer system consists of the major Mississippi River Valley Alluvial Aquifer and three minor alluvial aquifers (the Arkansas River, Ouachita-Saline Rivers, and Red River aquifers). The Mississippi Embayment Aquifer system comprises six individual aquifers: the Upper Claiborne, Middle Claiborne, Lower Claiborne-Upper Wilcox, Middle Wilcox, Lower Wilcox, and McNairy-Nacatoch. The Western Interior Plains confining system in Arkansas underlies the Boston Mountains, the highest erosional plateau in northern Arkansas, and extends under coastal plain sediments. In places, the Mississippi River Valley Alluvial Aquifer directly overlies and is hydraulically interconnected with aquifers of the Mississippi Embayment Aquifer system; in such places, water moves freely between the two aquifers (USGS 1998).

About two-thirds of the proposed Fayetteville Lateral would be above the Mississippi River Valley Alluvial Aquifer. This is the primary aquifer in the surficial system, underlying about 33,000 square miles of the Mississippi River valley in Arkansas, Mississippi, and Louisiana. Alluvial aquifers of the surficial aquifer system are characterized by their ability to yield large volumes of water and by their hydraulic interconnection with the rivers and streams that cross them (USGS, 1998). Within the Mississippi River Valley Alluvial Aquifer, properly constructed private wells can commonly yield up to 500 gallons per minute, and irrigation wells can produce up to 5,000 gallons per minute. Groundwater quality within the Mississippi River valley is considered adequate for most uses; however, groundwater withdrawals are predominantly used for agriculture and aquaculture purposes.

The remaining one-third of the proposed Fayetteville Lateral would be above the Western Interior Plains confining system, which is part of a widespread, thick, geologically complex, poorly permeable, sedimentary sequence that extends eastward from the Rocky Mountains to western Missouri and northern Arkansas (USGS, 1998). Locally, however, individual geologic units or parts of units within the confining system yield as much as 19 gallons per minute to wells, and the confining system is, therefore, considered to be a minor aquifer (USGS, 1998). Groundwater quality within the Western Interior Plains confining system is deemed variable, meeting nearly all secondary drinking-water standards, but is not used as a municipal supply source.

The western half of the proposed Greenville Lateral would be above the Mississippi River Valley Alluvial Aquifer, and the eastern half would be above the Upper Claiborne, Middle Claiborne, and Lower Claiborne-Upper Wilcox aquifers of the Mississippi Embayment Aquifer system. The Mississippi Embayment Aquifer system is the most widespread system in the Arkansas, Louisiana, and Mississippi region. The Middle Claiborne Aquifer is the most extensively used aquifer of the six that comprise the Mississippi Embayment Aquifer system. Individual domestic wells in the Middle Claiborne Aquifer generally yield from 100 to 300 gallons per minute in Mississippi. Groundwater quality within this aquifer can range from less than 500 milligrams per liter dissolved solids (freshwater) to greater than 35,000 milligrams per liter dissolved solids (brine). Calcium bicarbonate and sodium bicarbonate waters dominate the exposed and shallow subsurface areas of the Middle Claiborne Aquifer (USGS, 1998).

Sole-source or principal-source aquifers are defined by the EPA as those that supply a minimum of 50 percent of the drinking water used in the area overlying the aquifer. The areas served by these aquifers may not have readily available alternative water sources. No sole-source aquifers have been designated in

Arkansas. One sole-source aquifer exists in Mississippi; however, it is not located in the vicinity of the Project. Therefore, no impacts on sole-source aquifers or principal-source are likely to occur as a result of the Project.

No public water supply wells would be within 150 feet of the proposed Fayetteville Lateral. Three public water supply wells would be within 150 feet of the proposed Greenville Lateral: one along the pipeline at MP 62.23 and two in the vicinity of proposed storage yards near MP 37 and MP 72.9. The MDEQ confirms that a confining layer of clay would prevent localized infiltration due to Project construction into the aquifer utilized for these wells. Texas Gas would clearly mark these wellheads to prevent damage to them during construction activities. There are no additional requirements for the proposed Project near these wells.

There would be 15 private supply wells within 150 feet of the construction footprint and three private wells within 150 feet of access roads along the Fayetteville Lateral. The private well closest to the construction footprint of the Fayetteville Lateral would be about 11 feet southwest of the centerline at MP 120, in Lee, Arkansas. For the proposed Greenville Lateral, 12 private wells would be within 150 feet of the construction footprint, three private wells within 150 feet of access roads, and four private wells would be within 150 feet of the storage yards. The private well closest to the construction footprint of the Greenville Lateral would be about 48 feet north of the centerline at MP 89.9, in Attala, Mississippi (see tables 4.3.1-1 and 4.3.1-2). Additional water wells within 150 of construction workspaces may be identified during easement negotiations with landowners. In addition, Texas Gas would conduct a pre- and post-pipeline construction yield tests on any active wells within 150 feet of the pipeline work area with landowner approval.

The Arkansas Department of Health and Human Services (ADHHS) identified three Wellhead Protection Areas (WHPA) within 1 mile of the proposed Fayetteville Lateral (Smith, 2007): Russell Waterworks Well No. 1, McCrory Waterworks Well No. 4, and Patterson Waterworks Well No. 1. Based on the characteristics of the WHPAs, consultations with the ADHHS, and the potential impacts to WHPAs resulting from the proposed construction activities, we believe that the proposed Project would not significantly affect the Russell, McCory, and Patterson WHPAs.

The MDEQ identified three public water supply protection areas within 150 feet of workspaces associated with the proposed Greenville Lateral. These protection areas are located at MP 51.3, MP 63.6, and MP 81.2. MDEQ requested that caution be observed in these areas to avoid damage to the wellhead, but no other restrictions were recommended (MDEQ, 2007). Therefore, we believe that construction and operation of the proposed Project would have minimal, if any, impact on these public water supply protection areas.

No springs have been identified within 150 feet of the proposed Project. However, comments received during our March 21, 2007, scoping meeting indicated the potential presence of springs along the proposed pipeline route. Concerns were expressed regarding the potential loss or impact to these springs, as they may provide a primary source of water for some landowners. The locations of springs within 150 feet of construction workspaces may be identified during easement negotiations with landowners prior to construction, and the locations of water wells may also be known with greater refinement at that time. Texas Gas would consult with the appropriate regulatory agencies and the individual landowner to minimize any impacts. Therefore, **we recommend that:**

- **Texas Gas file with the Secretary the MP locations of water wells and springs within 150 feet of construction workspaces and include their distance and direction from the construction workspace, prior to construction.**

TABLE 4.3.1-1

Private Water Supply Well Locations Within 150 feet of the Proposed Fayetteville Lateral Workspaces

County, State	Milepost	Distance from Workspace (feet)	Direction	Total Depth of Well (feet)
Faulkner, AR	18.8	81	N	110
Faulkner, AR	18.8	87	N	60
Faulkner, AR	21.2	146	S	159
Faulkner, AR	26.3	69	N	295
White, AR	44.6	131	NNW	300
White, AR	62.1	31	ESE	220
Woodruff, AR	78.7	40	NE	118
Woodruff, AR	84.6	140	W	116
Woodruff, AR	92.9	131	WSW	127
Lee, AR	120	28	E	130
Lee, AR	120	11	SW	132
Lee, AR	130	109	WSW	136
Lee, AR	137.1	52	S	-- a/
Phillips, AR	140.1	93	ENE	150
Phillips, AR	145.1	45	E	120
Within 150 feet of access roads				
Woodruff, AR	71	-- b/	NNE	87
Lee, AR	135.6	-- b/	NE	145
Phillips, AR	149.7	-- b/	NE	105

Source: USGS National Water Information System, 2007.

a/ Data not provided.

b/ Data originally provided represented well distance from Project centerline, However, Texas Gas determined this access road to be within 150 feet of a private water supply well.

4.3.1.1 Pipeline Facilities

The typical depth of the trench excavation would be shallow (about 10 feet) relative to the depth to the aquifers within the Project area (about 25 feet). A typical trench depth would be above most surficial aquifers and the completion depth of most water wells in a shallow aquifer. However, construction activities could encounter shallow alluvial aquifers and could cause minor fluctuations in groundwater levels and/or increased turbidity potentially affecting water quantity and quality. However, most alluvial aquifers exhibit rapid recharge and groundwater movement; therefore, it is likely that they would quickly re-establish equilibrium and turbidity levels would rapidly subside. Impacts to groundwater would be avoided or minimized by following BMPs when working near water wells and in areas of shallow aquifers, and by implementing Texas Gas's proposed mitigation measures as well as the mitigation measures outlined in our Plan and Procedures during construction.

TABLE 4.3.1-2

Private Water Supply Well Locations Within 150 feet of the Proposed Greenville Lateral Workspaces

County, State	Milepost	Distance from Workspace (feet)	Direction	Total Depth of Well (feet)
Washington, MS	0.57	145	E	90
Washington, MS	2.57	104	NNE	97
Washington, MS	8.3	145	SW	67
Humphreys, MS	23.1	92	N	840
Humphreys, MS	31.5	60	S	115
Humphreys, MS	31.6	49	S	116
Holmes, MS	50.9	124	NE	1,148
Holmes, MS	63.9	122	SSE	800
Holmes, MS	72.9	121	S	323
Attala, MS	78.3	135	N	674
Attala, MS	89.9	48	N	120
Attala, MS	94.4	68	S	28
Wells within 150 feet of storage yards				
Humphreys, MS	35.5	-- b/	SSW	120
Humphreys, MS	36.7	-- b/	SW	790
Holmes, MS	51.5	-- b/	N	990
Holmes, MS	72.9	-- b/	N	849
Wells within 150 feet of access roads				
Washington, MS	9.4	-- b/	NNE	496
Holmes, MS	50.9	-- b/	N	1,148
Holmes, MS	59	-- b/	S	95

Source: USGS National Water Information System, 2007.

a/ Data not provided

b/ Data originally provided represented well distance from Project centerline, However, Texas Gas determined this access road to be within 150 feet of a private water supply well.

In some areas with shallow groundwater, it may be necessary to dewater the trench by pumping accumulated water from the trench prior to installing the pipeline. This dewatering may result in the temporary lowering of the groundwater level near the trench. Because of the relatively small amount of water removed, the short duration of the activity, and the local discharge of the water, the groundwater levels would quickly recover when the dewatering stops. Effects from trench dewatering on groundwater would be localized and temporary. Trench dewatering would be conducted in accordance with our Plan and Procedures.

Surficial aquifers could also experience minor impacts from changes in overland water flow and recharge caused by clearing and grading of the right-of-way. The soil's ability to absorb water could be altered through near-surface compaction by heavy construction vehicles. This minor impact would be temporary and is not expected to significantly affect groundwater resources or quality since the right-of-way would be restored and revegetated following construction. Soil compaction mitigation measures would be followed according to our Plan.

Refueling of vehicles and storage of fuel, oil, and other fluids during construction could potentially result in impacts to groundwater. Spills or leaks of hazardous liquids could contaminate groundwater and affect aquifer users. Soil contamination could add pollutants to the groundwater long after the spill has occurred. This type of impact would be avoided or minimized by restricting the location of refueling and storage facilities and by requiring immediate cleanup in the event of a spill or leak. Potential impacts on groundwater would be minimized by the use of standard construction techniques and by the implementation of erosion control measures contained in our Plan and Procedures. Potential impacts associated with spills would be minimized by implementation of Texas Gas's project-specific SPCC Plan for pipeline construction.

Texas Gas would adhere to the construction practices and mitigation measures outlined in our Plan and Procedures to minimize or avoid impacts on groundwater resources. Texas Gas's SPCC Plan requires that no construction equipment, refueling or maintenance equipment, or storage of hazardous substances, chemicals, fuels, and/or lubricating oils would be permitted within 100 feet of any stream bank, wetland, sensitive plant population, and/or groundwater well. Secondary containment would be provided for all stationary fuel storage tanks, pumps, and portable fuel containers, and all tanks would be inspected by the construction contractor. Contractor employees and subcontractors would complete spill prevention and containment training and would understand response procedures, prior to the start of construction activities. Emergency equipment, response coordination, and cleanup and disposal are also outlined in the SPCC Plan. Texas Gas would implement an individual SPCC Plan at each aboveground facility that stores oil in excess of volumes identified in 40 CFR 112 to protect groundwater sources during operation.

Texas Gas states that additional data on private water wells is being compiled to identify specific locations and minimize potential impacts. Texas Gas would conduct pre- and post-construction monitoring to determine whether impacts on active wells have occurred as a result of pipeline construction. If any water well or supply system is adversely affected, Texas Gas would repair or replace affected potable water supply wells within 150 feet of the construction work area damaged by construction activities or would fairly compensate the landowner for damage to potable water supply wells that results from pipeline construction. Texas Gas may obtain temporary water supplies from a variety of sources, and would continue to supply affected landowners/tenants with a temporary water supply until the damaged water well or water supply system is repaired or replaced. We believe that implementation of Texas Gas's proposed mitigation measures and the use of BMPs near water wells would minimize impacts to water wells and that construction and operation of the Project would have minimal impact on these resources.

4.3.2 Surface Water

The Project would be within three major watersheds: the Arkansas-Red-White River Basin; the Lower Mississippi River Basin, and the South Atlantic-Gulf Regional Watershed. The Arkansas-Red-White River Basin encompasses about 247,000 square miles in parts of Arkansas, Colorado, Kansas, Missouri, New Mexico, Texas, Louisiana, and Okalahoma. The proposed Fayetteville Lateral would cross three minor watersheds within this basin. The Lower Mississippi River Basin extends 954 river miles from the confluence of the Ohio and Mississippi Rivers at Cairo, Illinois, to the Gulf of Mexico. The proposed Fayetteville Lateral would cross five minor watersheds and the proposed Greenville Lateral would cross four minor watersheds within this basin. The South Atlantic-Gulf Regional Watershed covers about 272,000 square miles of land. Portions of six states are located in this drainage, including North Carolina, South Carolina, Georgia, Florida, Alabama, and eastern Mississippi. The proposed Greenville Lateral would cross one minor watershed in this basin. Table 4.3.2-1 identifies these major watersheds by state, MP, and county.

TABLE 4.3.2-1

Watersheds within the Proposed Project Area

Watershed	Approximate Mileposts	County
Fayetteville Lateral		
Arkansas		
Arkansas-Red-White River Basin	0 to 76	Conway, Faulkner, Cleburne, White
Cadron Creek	0 to 34.5	Conway, Faulkner, White
Little Red River	34.5 to 61	White, Cleburne
Upper White-Village	61 to 76	White
Lower Mississippi River Basin	76 to 166.2	Woodruff, St. Francis, Lee, Phillips
Cache River	76 to 99	Woodruff
Big River	99 to 118	Woodruff, St. Francis, Lee
L'Anguille	118 to 125	Lee
Lower White	125 to 154.5	Lee, Phillips
Lower Mississippi-Helena	154.5 to 155.6	Phillips
Mississippi		
Lower Mississippi-Helena	157.3 to 166.2	Coahoma
Greenville Lateral		
Mississippi		
Lower Mississippi River Basin	0.0 to 92.3	Washington, Sunflower, Humphreys, Holmes, Attala
Deer-Steele	0 to 10.3	Washington
Big Sunflower River	10.3 to 33.1	Washington, Sunflower, Humphreys
Upper Yazoo River	33.1 to 71	Humphreys, Holmes, Attalla
Upper Big Black River	71 to 92.3	Holmes, Attala
South Atlantic-Gulf Regional Watershed	92.3 to 96.41	Attala
Upper Pearl River	92.3 to 96.4	Attala

Source: USGS, 2006b.

The ADHHS also identified two public water supply watersheds (Brewer Lake and Little Red River) within 1 mile of the proposed Fayetteville Lateral route (Smith, 2007). To avoid impacts on these areas of concern, ADHHS requested either modifications to the Fayetteville Lateral route or for Texas Gas to provide planned construction methods for review so that ADHHS may document any potential impact on the water supply associated with planned activities. Route alternatives suggested by the ADHHS to avoid Little Red River and Brewer Lake Watersheds were analyzed but not selected (see section 3.3.3). However, we believe that Texas Gas should continue to consult with the ADHHS regarding construction and mitigation plans within these areas and to provide the ADHHS with an opportunity to comment on them. Therefore, **we recommend that:**

- **Texas Gas consult with the ADHHS about the construction methods that would be used to cross the Brewer Lake and Little Red River Watersheds and to file the results of that consultation, including any ADHHS-recommended modifications to those methods, with**

the Secretary prior to construction for review and written approval of the Director of OEP.

4.3.2.1 Pipeline Facilities

The Project would cross a total of 483 waterbodies (70 perennial and 413 intermittent). The Fayetteville Lateral would cross 278 waterbodies (40 perennial and 238 intermittent), 11 of which would be classified as major crossings (i.e., greater than 100 feet wide). The Greenville Lateral would cross 203 waterbodies (29 perennial and 174 intermittent), six of which would be classified as major crossings. The Kosciusko 36-inch Tie-in Lateral would cross one perennial and one intermittent stream (see table C-5 in appendix C). Texas Gas has provided site-specific plans for major waterbody crossings and HDD crossings which illustrate how it would configure the workspaces and construction activities at the crossings.

No public water intakes would be within 3 miles downstream of any proposed waterbody crossing along the Project.

Special Designation and Impaired Waterbodies

Table 4.3.2-2 lists waterbodies with special designations and impairments in Arkansas and Mississippi.

The ADEQ has eight designations for water quality and designated use: Extraordinary Resource Waters, Ecologically Sensitive Waterbodies, Natural and Scenic Waterways, Primary Contact Recreation (swimmable), Secondary Contact Recreation (wadeable), Fisheries (fishable), Domestic Water Supply, and Industrial Water Supply (ADEQ, 2002). Extraordinary Resource Waters, Ecologically Sensitive Waterbodies, Natural and Scenic Waterways, and Primary Contact Recreation (swimmable) are considered worthy of the highest level of protection by the state because of their beauty, value, or beneficial use (ADEQ, 2002). The remaining designations are federally mandated.

The proposed Fayetteville Lateral would cross three Extraordinary Resource Waters: Cadron Creek, Big Creek, and Cache River; three National Rivers Inventory (NRI) waterbodies: Cadron Creek, Big Creek, and Bayou DeView; a designated trout fishery stream, Little Red River; and a designated Ecologically Sensitive Waterbody, Departee Creek. The proposed Greenville Lateral would cross Big Black River (NRI), and Deer Creek, which is identified as an important aquatic habitat for rare species.

Waterbodies included in the NRI are considered to possess "outstandingly remarkable natural or cultural values judged to be of more than local or regional significance" (NPS, 2007). Texas Gas would cross Big Creek (MP 46.1), Bayou DeView (MP 96.0), and Big Black Creek (MP 77.7) using HDD to avoid or minimize impacts.

In addition to sensitive waterbodies, eight waterbodies in Arkansas and four waterbodies in Mississippi do not meet water quality standards associated with their designated use based on state CWA Section 303(d) lists. These waterbodies are listed in table 4.3.2-2 as impaired.

As indicated in table 4.3.2-2, eight of the waterbodies with special designations would be crossed using the HDD method to minimize potential impacts on those waterbodies. The remaining waterbodies would be crossed using an open-cut method. To ensure that impacts from sedimentation associated with an open-cut crossing are minimized, Texas Gas would implement BMPs to minimize construction impacts and would implement the mitigation measures identified in our Procedures.

TABLE 4.3.2-2

Sensitive and Impaired Waterbodies

State/County	Waterbody Name	Approximate Beginning Milepost	Approximate Width at Crossing (feet)	Crossing Method	Impairment	Sensitive Feature
Fayetteville Lateral						
Arkansas						
Faulkner	Cadron Creek	14	105	OCM	Siltation/Turbidity	EXR, NRI, MC
White	Big Creek	46.1	140	HDD	Agriculture	EXR, NRI, MC
	Little Red River	52.3	200	HDD	Unknown, Bacteria	TFS, MC
	Overflow Creek	61.9	13	OCM	Agriculture, Bacteria	NA
	Glaise Creek	66.6	30	OCM	Agriculture	NA
	Departee Creek	67.9	34	OCM	Not listed	ECS (near)
Woodruff	Cache River	82.4	140	HDD	Agriculture, Siltation/ Turbidity	EXR, MC
	Bayou DeView	96	250	HDD	Agriculture, Siltation/ Turbidity	NRI, MC
	Caney Creek	100.1	30	OCM	Agriculture	NA
St. Francis	Big Creek	111.6	72	OCM	Agriculture	NA
Greenville Lateral						
Mississippi						
Washington	Deer Creek	9.3	60	HDD	Not listed	MSNHP
Humphreys	Yazoo River b/	40.5	395	HDD	Nutrients, Organic Enrichment/Low DO	MC
Holmes	Tchula Lake b/	46.7	160	HDD	Nutrients, Organic Enrichment/Low DO, Sediment/Siltation	MC
	Box Creek	72.5	2	OCM	Sediment/Siltation	NA
Holmes-Attala	Big Black River b/	77.7	270	HDD	Sediment/Siltation	NRI, MC

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Source: EPA, 2004a.

a/ Sensitive Features include those that are: listed as MC and resources that are on the NRI (NPS, 2004); are state-designated EXR, ECS, or are a TFS (APCEC, 2006); important aquatic habitats for rare species (MSNHP, 2006); and/or do not currently support designated uses.

b/ Found under Section B, of the Mississippi 2006 Section 303(D) List of Impaired Waterbodies. For these waterbodies, no current monitoring data indicates impairments exist. MDEQ will monitor these waterbodies to determine their water quality condition before removing them from Section B (MDEQ, 2006).

Key:

DO = dissolved oxygen

ECS = ecologically sensitive

EXR = extraordinary resources

HDD = horizontal directional drilling

MC = Major Crossing

MSNHP = Mississippi Natural Heritage Program

NA = Not applicable

NRI = Nationwide Rivers Inventory

OCM = open-cut method

TFS = trout fishery stream

According to the EPA's contaminated sediments database (EPA, 2004b), many waterbodies in the Mississippi Delta contain contaminated sediments. Table 4.3.2-3 identifies waterbodies with known contaminated sediments that would be crossed by the proposed Project. The proposed Fayetteville Lateral would cross six waterbodies containing sediments contaminated primarily with pesticides and heavy metals. The sediment sampling locations ranged from 2.2 miles to 37 miles from the proposed pipeline crossing locations. Seven waterbodies that would be crossed by the proposed Greenville Lateral contain sediments contaminated primarily with pesticides and heavy metals. Sampling locations within these waterbodies ranged from 100 feet to 5.5 miles from the proposed pipeline crossing. Seven of the 13 contaminated waterbodies that would be crossed by the proposed pipelines are classified as major waterbodies. Six of these major waterbodies would be crossed using HDD, thereby avoiding sediment disruption. In addition, two areas of probable concern were identified in Mississippi: the Big Sunflower watershed and the Deer-Steele watershed.

The MDEQ would require special notification and mitigations (approved by MDEQ) for waterbody crossings in waters classified as impaired. Notification/mitigation should include:

- justification of why the impacts cannot be avoided;
- proposed BMPs that would minimize the impacts on receiving sensitive waters; and
- compensatory mitigation, primarily along the same reach of stream or on another impaired stream within the same drainage basin.

The ADEQ, Water Division, does not have specific guidance for the handling of contaminated sediments.

Texas Gas would file with the Secretary copies of the permits it receives from the ADEQ and MDEQ prior to construction.

Major Waterbody Crossings

The proposed Fayetteville Lateral would cross eleven major waterbodies, including the Mississippi River (see table 4.3.2-4). Eight of the major waterbodies would be crossed using the HDD method. The proposed Greenville Lateral would cross six major waterbodies, all of which would be crossed by HDD. Texas Gas filed acceptable site-specific diagrams for major waterbody crossings, in accordance with our Procedures. Texas Gas indicates that consultations with state and federal agencies, for mitigation of impacts associated with these crossings, are ongoing and that additional information would be filed with FERC as Texas Gas receives it.

Texas Gas provided site-specific plans for the three major waterbody crossings that would be open cut. We concur with the proposed plans for Long Lake Bayou and Phillips Bayou.

Texas Gas states that the conventional crossing method it would use to cross Cadron Creek would minimize the potential for downstream sedimentation. It would allow it to minimize the workspace needed to complete the crossing, would confine all work activities to the temporarily dewatered area of the waterbody for only the time needed to excavate the trench, place the pipe, and replace the creek bed. If Cadron Creek is flowing at the time of the crossing, Texas Gas would cross the waterbody by using flumes to conduct and maintain the flow downstream from the disturbed area created by trench excavation across the waterbody. If this waterbody is not flowing at the time of the crossing, Texas Gas would limit the lateral extent of work activities at the crossing to a 75-foot-wide corridor within the

TABLE 4.3.2-3

Known Contaminated Sediments near the Proposed Project Area

State/ County	Approximate Milepost	Name of Waterbody	Waterbody Classification	Crossing Method	Approximate Distance to Sampling Location a/
Fayetteville Lateral					
Arkansas					
Woodruff	82.09	Cache River	Major	HDD	19 miles downstream, 37 miles upstream
	95.7	Bayou DeView	Major	HDD	12 miles downstream, 6 miles upstream
St. Francis	111.63	Big Creek	Intermediate	OCM	26 miles downstream
Lee	118.02	Tributary of Larkin Creek	Minor	OCM	2.5 miles downstream
	123.34	Tributary of Larkin Creek	Intermediate	OCM	4 miles downstream
Phillips	151.01	Big Creek near Long Lake Bayou	Minor	OCM	2.2 miles southwest
Greenville Lateral					
Mississippi					
Washington	0.85	Tributary to Main Canal	Minor	OCM	3.6 miles downstream
	4.92	Canal to Black Bayou	Intermediate	OCM	5.5 miles upstream at Fish Lake
	5.2	Black Bayou	Intermediate	OCM	1.8 miles downstream
	11.22	Bogue Phalia	Major	HDD	1.3 upstream and 3.5 downstream
Humphreys	20.26	Big Sunflower River	Major	HDD	0.6 mile downstream
Holmes	40.4	Yazoo River	Major	HDD	100 feet north
	54	Fannegusha Creek	Major	HDD	0.5 mile upstream

Source: EPA, 2001.

HDD = horizontal direction drilling

OCM = open cut method

a/ Straight line distance between sampling location and the proposed pipeline crossing location.

waterbody buffer zone. For any crossing method use, Texas Gas states that it would complete the crossing as quickly as possible to minimize the time a trench is left open across the waterbody. It would use bladder dams or other low impact barriers upstream and downstream from the proposed conventional crossing if there is any flow in Cadron Creek at the time of the crossing. For Cadron Creek, Texas Gas proposes placing an ATWS within the waterbody itself. Since Cadron Creek is an ecological sensitive waterbody and listed on the NRI, **we recommend that:**

- **Texas Gas supplement its site-specific plan for crossing Cadron Creek (MP 14 on the Fayetteville Lateral) to include additional mitigation measures that would minimize and control sedimentation downstream from the proposed crossing. Texas Gas should consult**

with the NPS and ADEQ about the crossing plan and include any NPS- or ADEQ-recommended BMPs in the plan. Also, Texas Gas should file with the Secretary the supplemented site-specific waterbody crossing plan and the results of its consultation with NPS and ADEQ prior to the end of the comment period of this Draft EIS.

TABLE 4.3.2-4

Major Waterbodies

State/County	Waterbody Name	Approximate Beginning Milepost	Approximate Width at Crossing (feet)	Crossing Method a/
Fayetteville Lateral				
Arkansas				
Faulkner	Cadron Creek	14	105	OCM
White	Big Creek	46.1	140	HDD
	Little Red River	52.3	200	HDD
Woodruff	White River	70.3	700	HDD
	Taylor Bay	73.4	215	HDD
	Cache River	82.4	140	HDD
	Bayou DeView	96	250	HDD
	Long Lake Bayou	153	210	OCM
	Tributary of Long Lake Bayou	154.6	500	HDD
Arkansas/Mississippi				
Phillips/Coahoma	Mississippi River	157.3	4,000	HDD
Mississippi				
Coahoma	Phillips Bayou	160.7	110	OCM
Greenville Lateral				
Mississippi				
Washington	Bogue Phalia	11.2	200	HDD
Washington/Humphreys	Big Sunflower River	20.3	250	HDD
Humphreys	Yazoo River	40.5	395	HDD
Holmes	Tchula Lake	46.7	160	HDD
	Fannegusha Creek	54.3	100	HDD
Holmes/Attala	Big Black River	77.7	270	HDD

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HDD = horizontal directional drilling method.

OCM = open-cut method.

The proposed Project would cross 16 waterbodies by HDD. Texas Gas has not yet completed geotechnical investigations to determine if the proposed HDDs could be successfully completed. Therefore, **we recommend that:**

- **Texas Gas file reports on the geotechnical investigations for all proposed HDDs prior to the end of the draft EIS comment period.**

If an HDD is not completed successfully, Texas Gas would need to obtain permits for an alternate crossing plan from the USACE and the appropriate state agency. Therefore, **we recommend that:**

- **Texas Gas file with the Secretary a site-specific crossing plan for each waterbody if the directional drills are unsuccessful. Each site-specific plan should address how Texas Gas would seal the abandoned drill hole and should include scaled drawings identifying all areas that would be disturbed by construction. Texas Gas should file each plan concurrent with its application to the USACE for a permit to construct using this plan and the USACE permit when it is obtained. The Director of OEP must review and approve this plan in writing prior to construction of the crossing.**

Another concern with an HDD is the potential for a frac-out, which is the unintentional or inadvertent loss of drilling fluids from the HDD borehole to the ground surface at locations other than the HDD entry or exit points. Of particular concern are frac-outs into waterbodies or wetlands. Texas Gas filed a contingency plan for HDDs that includes a description of how an inadvertent release of drilling mud (a frac-out) would be contained and cleaned up. We reviewed this plan and find it acceptable.

Pipeline construction could affect surface waters in a variety of ways. Clearing and grading of waterbody banks, in-water trenching, trench dewatering, and backfilling could result in modifications to aquatic habitat, increased sedimentation and turbidity, decreased dissolved oxygen levels, increased water temperature, releases of chemical and nutrient pollutants from sediments, and accidental release of chemical contaminants such as fuels and lubricants. The greatest potential impacts for the waterbody crossings would result from suspension of sediments caused by in-water trenching and backfilling. The extent of the impact would depend on sediment loads, water velocity, and sediment particle size at the time of construction. These factors would determine the density, extent, and persistence of the sediment plume. In general, impacts on water quality are expected to be short term and localized.

To minimize construction impacts on surface waters, Texas Gas would develop and implement the mitigation measures in our Plan and Procedures, as well as the requirements in the permits issued by the USACE and state agencies. Our Procedures include provisions for ATWS setbacks, waterbody crossing duration constraints, bank stabilization requirements, maintenance of stream flow, sediment control procedures, and other erosion and sedimentation control requirements. The SPCC Plan includes specifications for hazardous materials transportation, storage and handling, spill prevention and response (see the SPCC Plan for pipeline construction in appendix D). Texas Gas would comply with federal and state agency requirements and permits when crossing waterbodies during construction of the proposed Project. Use of our Plan and Procedures and the SPCC Plan would minimize short- and long-term impacts on surface waters.

Hydrostatic Testing

Prior to being placed into service, the entire pipeline system would be hydrostatically tested to ensure structural integrity. The pipeline must be tested to DOT Standards, as listed in 49 CFR Part 192. Typically, a pipeline is tested in sections to reduce the amount of water needed at any one time. Smaller volumes of water are more easily managed and, generally, reduce the potential for adverse effects on the source waterbodies. Upon completion of a test section, the water may be pumped to the next test section or discharged. Water for hydrostatic testing of the pipeline system would be obtained from a variety of surface waters and municipal sources as shown in table 4.3.2-5.

In accordance with our Procedures, Texas Gas would screen intake hoses to prevent entrainment of fish, discharge hydrostatic test water at controlled discharge rates, and use appropriate energy dissipation device(s) and sediment barriers to prevent erosion, scour, suspension of sediments, or excessive stream

flow. No chemicals would be added to the hydrostatic test water before or after testing. Hydrostatic test water withdrawal and discharge would be conducted in accordance with all federal and state regulations and permit requirements. The discharge water would be tested in accordance with the applicable wastewater discharge permit requirements.

TABLE 4.3.2-5

Hydrostatic Test Water Requirements for the Pipeline System

Pipeline Facility	Water Source	Withdrawal Location a/ (MP)	Approximate Volume (gallons)	Discharge Location (MP)	Discharge Rate (gal/min)
Fayetteville Lateral					
	Cadron Creek	13.9	3,879,000	13.9	>4,000
	Cadron Creek	13.9	4,744,000	13.9	>4,000
	Little Red River	52.1	5,888,000	52.0	>4,000
	Little Red River	52.1	3,823,000	52.0	>4,000
	White River	70.0	1,144,000	69.8	>4,000
	White River	70.0	3,376,000	69.8	>4,000
	Farm Ponds	88.4	1,814,000	88.4	>4,000
	Farm Ponds	88.4	7,143,000	88.4	>4,000
	Larkin Creek	118.9	1,367,000	118.9	>4,000
	Larkin Creek	118.9	2,595,000	118.9	>4,000
	Lick Creek	139.5	3,153,000	139.5	>4,000
	Lick Creek	139.5	1,535,000	139.5	>4,000
	Mississippi River	157.2	3,432,000	157.3	>4,000
	Mississippi River	156.5	2,679,000	157.3	>4,000
Greenville Lateral					
	Big Sunflower River	20.3	5,692,000	20.4	>4,000
	Big Sunflower River	20.3	2,595,000	20.4	>4,000
	Yazoo River	39.9	2,832,000	39.9	>4,000
	Yazoo River	39.9	4,088,000	39.9	>4,000
	Big Black River	77.3	6,390,000	77.4	>4,000
	Big Black River	77.3	5,190,000	77.4	>4,000

a/ Milepost reflects actual withdrawal/discharge point and is not necessarily at a waterbody crossing.

Texas Gas would withdraw test water from one waterbody that is listed as a state designated Extraordinary Resource Water (Cadron Creek), one waterbody classified as a trout fishery stream (Little

Red River), and two waterbodies listed on the NRI (Big Black River and Cadron Creek). Several waterbodies that would be used for hydrostatic testing do not meet the water quality standards associated with their designated use based on state CWA Section 303(d) lists (i.e., Cadron Creek, Little Red River, and Big Black River) or are known to have contaminated sediments (i.e., Yazoo River, Big Sunflower River, and Big Black River). Our Procedures require that state-designated exceptional value waters and waters that provide habitat for federally listed threatened or endangered species cannot be used for hydrostatic test water withdrawal or discharge unless appropriate federal, state, and/or local permitting agencies grant written permission (Procedures, section VII.C.2). The use of these waterbodies as hydrostatic testing water sources or discharges would be subject to approval pursuant to any required NPDES permit. Texas Gas would be required to obtain and comply with the requirements of permits issued by the ADEQ, Arkansas Natural Resources Commission (ANRC), and MDEQ for the withdrawal and discharge of hydrostatic test water. The ANRC and MDEQ require prior notification of such withdrawals. The ANRC may require permits for some withdrawals. The MDEQ would take into account waterbody flows at the time of withdrawal and may require Texas Gas to postpone withdrawals if flows are too low. Compliance with the requirements of our Plan and Procedures and the permitting requirements from state and local agencies would mitigate potential impacts resulting from the withdrawal and discharge of hydrostatic test water.

4.3.2.2 Operational Impacts

Following completion of restoration activities and revegetation of disturbed areas as required, no further impacts on surface waters would be expected during operation of the proposed pipeline because it is not expected that any additional in-stream activities would be performed. Since the pipeline would be installed at a sufficient depth below the beds of waterbodies, exposure of the pipeline would not be expected. In the event that a pipeline anomaly (e.g., corrosion, dent, rupture) is detected during routine inspections that could require pipeline excavation or replacement within a waterbody, impacts would be expected to be the same as those described for construction. Operation of proposed aboveground facilities, including the Kosciusko Compressor Station, is not expected to affect water resources.

4.4 WETLANDS

Wetlands are defined by the USACE and the EPA as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of wetland vegetation typically adapted for life in saturated soil. Wetlands generally include swamps, marshes, bogs, and similar areas (Environmental Laboratory, 1987). Wetlands perform a number of valuable functions, including flood flow attenuation, surface water management, filtration of non-point source pollutants and compounds, groundwater recharge and discharge, erosion control, and sediment and nutrient retention, as well as providing wildlife habitat and recreational opportunities.

The proposed Project would be constructed in areas that support numerous wetlands. Wetland delineations for the proposed Project were conducted in accordance with the 1987 USACE Wetland Delineation Manual (Environmental Laboratory, 1987) to identify, characterize, and survey the boundaries of wetland resources along the pipeline construction right-of-way/corridor and the areas identified for aboveground facilities, additional workspaces, and access roads. Based on the Cowardin et al. (1979) wetland classification system, three primary wetland types were identified within the Project area: palustrine emergent (PEM), palustrine forested (PFO), and palustrine scrub shrub (PSS). Wetlands identified as containing two or more classifications (i.e., PFO/PEM or PEM/PSS), were categorized into one class using the tallest vegetative component. The species that are typically found in each wetland classification present in the Project area are identified below.

Palustrine Emergent Wetlands

PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens (Cowardin et al., 1979). Wildlife typically utilizes these areas for nesting and feeding during migratory periods. Common vegetative species found in the PEM wetlands that would be traversed by the proposed Project construction right-of-way include common rush (*Juncus effusus*), broomsedge bluestem (*Andropogon virginicus*), broom sedge (*Carex scoparia*), and giant goldenrod (*Solidago gigantea*).

Palustrine Forested Wetlands

PFO wetlands are dominated by woody vegetation, including bottomland hardwoods, that is at least 20 feet tall (Cowardin et al., 1979). These wetlands provide a diverse assemblage of vegetation and an abundance of food and cover for wildlife. Common vegetative species typically found in PFO wetlands observed within the proposed Project construction right-of-way include swamp chestnut oak (*Quercus michauxii*), black willow (*Salix nigra*), green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), tulip tree (*Liriodendron tulipifera*), river birch (*Betula nigra*), and poison ivy (*Toxicodendron radicans*).

Palustrine Scrub-Shrub Wetlands

PSS wetlands include all wetlands dominated by woody vegetation less than 20 feet tall (Cowardin et al., 1979). PSS wetlands are typically not as structurally diverse as forested wetlands due to the lack of trees comprising the canopy. As with PFO wetlands, PSS wetlands supply an abundance of food and cover for wildlife. Common vegetative species found in the PSS wetlands observed within the proposed Project construction right-of-way include box elder (*Acer negundo*), buttonbush (*Cephalanthus occidentalis*), groundsel tree (*Baccharis halimifolia*), black willow (*Salix nigra*), and Allegheny blackberry (*Rubus allegheniensis*).

High-Quality, Sensitive, or Special-Status Wetlands

Wetland Reserve Program

The proposed Project would include the crossing of wetlands managed under the NRCS's WRP along the proposed Greenville Lateral. Section 4.8 provides a detailed description of the WRP.

The proposed Greenville Lateral would cross one WRP tract, using conventional pipeline construction methods, between MP 43.0 and MP 43.3 in Humphreys County, Mississippi. The Greenville lateral would be aligned parallel and nest to a road right-of-way and would cross the WRP tract at a location that would avoid forested wetland habitats to the north and south of the proposed route and the road. Additional information about impact this WRP tract is in section 4.8.

Cache River Wildlife Refuge

The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources (Ramsar, 2007). Ramsar sites are wetlands that have been selected by the Convention's Contracting Parties and collectively designated as internationally important areas. The wetland systems of the Cache River and lower White Rivers, which comprise one of 17 United States wetlands on the Ramsar list of Wetlands of International Importance, represent the largest continuous expanse of bottomland hardwoods in the lower Mississippi River valley, comprising about one-third of the bottomland hardwoods in the Arkansas Delta (Arkansas MAWPT, 2007). The Cache River and Bayou De View are also part of the Big Woods complex, a 550,000-acre corridor of floodplain forest that

follows the bayous and rivers that flow into the Mississippi River (TNC, 2007). The Cache River and Bayou De View would be crossed by the proposed Fayetteville Lateral.

The Cache River NWR, a wetland system associated with the Cache River in the lower Mississippi River valley, contains about 64,000 acres of wetlands. The refuge is in the 10-year floodplain of the Cache River and extends from its confluence with the White River near Clarendon, Arkansas, to Grubbs, Arkansas, an air-mile distance of about 70 miles. Habitats within the refuge include 33,000 acres of bottomland forest and associated sloughs and oxbow lakes, 4,300 acres of croplands, and 7,500 acres of reforested areas (FWS, 2007a). The Cache River system represents the last remaining fragment of the once widespread mature forested wetlands of this area (ANHC, 2007a).

During initial agency coordination for the proposed Project, the FWS recommended avoidance of the Cache River NWR and Bayou De View to the extent possible, using HDD methods to cross these waterbodies and associated bottomland forests, and following a specific route variation to minimize crossing distance. Texas Gas addressed the FWS recommendations by modifying the proposed Project route, and committing to crossing these areas by HDD. The proposed Fayetteville Lateral would cross the Cache River NWR between MP 82.0 and MP 82.8 and Bayou De View between MP 95.9 and 96.6 by HDD. Texas Gas's use of this construction technique would largely eliminate impacts to bottomland hardwood forests in the NWRs. Agricultural fields outside of the refuge boundaries would be used as ATWSs to stage HDD activities and equipment and would be used for the drill entry and exit pits. While use of HDDs would avoid significant impact to forested wetlands adjacent to the Cache River and Bayou De View, the temporary workspaces for the bore pits and pull strings would impact PEM wetlands outside the NWR. Texas Gas would minimize impacts to the greatest extent practicable to the PEM wetlands outside the NWRs by implementing the construction, mitigation, and restoration measures of our Procedures. Therefore, we believe that using HDDs to cross the NWRs would minimize and avoid most impacts to wetlands in these important resource areas.

4.4.1 Affected Wetlands

Construction and operation of the proposed Project would affect a total of 141.5 acres of wetlands. Of this total, 107.4 acres would be temporarily impacted during construction and allowed to revert to pre-construction conditions. About 33.9 acres would overlap with portions of the permanent right-of-way that would be maintained for operational purposes. Of those 33.9 acres, about 13.2 acres would be permanently converted from forested and scrub-shrub wetland types to wetlands with herbaceous vegetation. These impacts would occur in a 10-foot-wide herbaceous strip Texas Gas would maintain above the centerline to facilitate operation and maintenance of the pipeline. The remaining 20.7 acres of impact would be associated with the conversion from a forested community to a shrub-scrub or emergent system within two 10-foot-wide strips on either side of the centerline strip. Texas Gas has indicated that 0.2 acre would be permanently lost due to installation and operation of the permanently maintained Kosciusko Compressor Station. As indicated in section 3.4, we believe that Texas Gas can avoid permanent impacts on the wetland within the Kosciusko Compressor Station property and have requested that additional engineering design be undertaken to assess avoidance of this site.

Table C-6 in appendix C lists each wetland that would be crossed by Project construction and operation based on completed field delineation surveys conducted by Texas Gas. Table 4.4.1-1 lists construction impacts and permanent conversion of wetland type. USACE verification of the wetland delineations conducted for the Project is pending.

4.4.1.1 Pipeline Facilities

The pipelines would cross a total of 12.0 miles (63,124 feet) of wetlands (see table 4.4.1-1). Each wetland, including MP, classification, crossing widths and methods, construction impacts, and conversion acreage, is listed in table C-6 of appendix C.

Impacts on wetlands associated with construction and operation of the Project would vary depending on the construction techniques used, the sensitivity of aquatic resources to disturbance, and the length of time required for wetlands temporarily impacted by construction to be restored. Impacts associated with construction of the Project would include the disturbance and removal of wetland vegetation. Following construction, temporarily disturbed wetlands would be restored and allowed to revegetate in accordance with our Procedures. Impacts associated with operation of the Project would consist of maintenance activities of the pipeline right-of-way that would permanently convert forested and scrub-shrub wetlands to herbaceous wetland and would maintain shrubs at heights of less than 15 feet, as per our Procedures.

During the pre-filing process, the FWS, USACE, and state agencies expressed concern about potential impacts on forested wetland areas that would be crossed by the proposed Project. The FWS and USACE Memphis District recommended adjustments to the proposed pipeline route alignment and ATWSs to reduce wetland impacts. The USACE recommended alignments that would bypass forested wetlands wherever possible and would instead cross farmland. Specific alternatives and variations suggested by the agencies are addressed in section 3 of this EIS. In some cases, Texas Gas modified its initial pipeline route as suggested by the agencies (see analysis in section 3.3). Due to the linear nature of pipelines and the extent of forested wetlands along linear features such as waterbodies, pipeline alignment would not be able to avoid all forested wetland areas. We believe that Texas Gas's adoption of several of the agencies' specific route modifications, in combination with crossing several waterbodies and wetlands by HDD, the use of our Procedures during construction, reducing wetland construction right-of-way widths to 75 feet, appropriate and timely restoration, and the use of the right-of-way maintenance protocol described in our Procedures during operation of the pipeline and related facilities, as well as the implementation of any specific Section 404 permit conditions, would reduce the impacts on all wetlands including forested wetlands to the greatest extent practicable.

Construction Impacts and Mitigation

Construction of the Fayetteville Lateral and Greenville Lateral and associated facilities would impact a total of 57.7 acres and 83.6 acres of wetlands, respectively, for a total of 141.3 acres. Texas Gas has indicated that an additional 0.2 acre would be permanently lost due to installation and operation of the permanently maintained Kosciusko Compressor Station. As indicated in section 3.4, we believe that Texas Gas can avoid permanent impacts on the wetland within the Kosciusko Compressor Station property and have requested that additional engineering design be undertaken to assess avoidance of this site.

Temporary impacts resulting from construction activities would occur within the pipeline construction work areas, where wetland vegetation would be cleared for equipment movement and installation of the pipeline. Additional temporary impacts associated with construction of the pipelines could include temporary changes to wetland soils and hydrology. In herbaceous wetlands, the impact on vegetation would be short term, since the herbaceous vegetation would regenerate quickly. However, failure to properly segregate soil could result in mixing of the soil layers, resulting in altered biological components of the wetland. These changes could affect the reestablishment and natural recruitment of native wetland vegetation. In addition, inadvertent compaction and rutting of soils during construction could result from the temporary stockpiling of soil and the movement of heavy machinery. This could alter the natural

TABLE 4.4.1-1

Summary of Impacts to Wetland Communities

State County	Wetland Type a/	Number of Wetlands Crossed	Approximate Centerline length crossed (feet) b/	Construction Impacts (acres) c/	Permanently Converted Wetland Types in 10-foot wide Area Over Pipeline Centerline (acres) d/	Additional Permanently Converted Wetland Types in 30-foot wide Area Over Pipeline Centerline (acres)e/
ARKANSAS						
Conway						
	PEM	1	51	0.10	n/a	n/a
	PFO/PEM	1	23	<0.1	0.01	0.01
Faulkner						
	PEM	18	1,399	2.40	n/a	n/a
	PSS	4	113	0.1	0.02	n/a
	PSS/PEM	2	42	<0.1	0.01	n/a
	PFO	2	313	0.6	0.07	0.14
Lee						
	PEM	1	658	1.20	n/a	n/a
	PFO	9	1,341	2.4	0.31	0.62
	PFO/PEM	1	n/a	0.1	n/a	n/a
Phillips						
	PEM	2	71	0.20	n/a	n/a
	PFO/PEM	3	776	1.4	0.18	0.36
	PFO	9	3,334	5.8	0.77	1.53
Saint Francis						
	PEM	1	162	0.30	n/a	n/a
	PFO/PEM	1	1,255	2.2	0.29	0.58
	PFO	1	751	1.3	0.17	0.34
White						
	PEM	2	55	0.10	n/a	n/a
	PSS	3	984	1.7	0.23	n/a

TABLE 4.4.1-1

Summary of Impacts to Wetland Communities

State County	Wetland Type a/	Number of Wetlands Crossed	Approximate Centerline length crossed (feet) b/	Construction Impacts (acres) c/	Permanently Converted Wetland Types in 10-foot wide Area Over Pipeline Centerline (acres) d/	Additional Permanently Converted Wetland Types in 30-foot wide Area Over Pipeline Centerline (acres)e/
	PFO/PSS	1	9	<0.1	0.002	0.004
	PFO/PEM	2	60	0.1	0.01	0.03
	PFO	9	1,570	2.7	0.36	0.72
Woodruff						
	PEM	14	2,515	4.20	n/a	n/a
	PSS/PEM	8	3,597	5.8	0.83	n/a
	PFO/PEM	10	1,586	4.3	0.36	0.73
	PFO	11	1,727	3.2	0.40	0.79
	Total Arkansas	**116**	**22,392**	**40.2**	**4.01**	**5.85**
MISSISSIPPI						
Attala						
	PEM	1	37	0.10	n/a	n/a
	PSS	2	n/a	0.1	n/a	n/a
	PSS/PEM	3	680	2.3	0.16	n/a
	PFO/PEM	1	69	0.2	0.02	0.03
	PFO/PSS	4	3,637	8.7	0.83	1.67
	PFO/PSS/PEM	3	712	1.1	0.16	0.33
	PFO	18	4,311	10.1	0.99	1.98
Coahoma						
	PFO	16	5,520	17.5	1.27	2.53
Holmes						
	PEM	1	n/a	<0.1	n/a	n/a
	PSS	2	419	0.5	0.10	n/a
	PSS/PEM	13	6,230	15.5	1.43	n/a
	PFO/PEM	6	5,930	13.5	1.36	2.72

TABLE 4.4.1-1

Summary of Impacts to Wetland Communities

State County	Wetland Type a/	Number of Wetlands Crossed	Approximate Centerline length crossed (feet) b/	Construction Impacts (acres) c/	Permanently Converted Wetland Types in 10-foot wide Area Over Pipeline Centerline (acres) d/	Additional Permanently Converted Wetland Types in 30-foot wide Area Over Pipeline Centerline (acres) e/
	PFO/PSS	4	553	1.3	0.13	0.25
	PFO	16	1,825	3.7	0.42	0.84
Humphreys						
	PEM	5	700	1.50	n/a	n/a
	PSS/PEM	4	90	0.3	0.02	n/a
	PFO/PEM	2	0	0.0	n/a	n/a
	PFO	14	9,685	24.3	2.22	4.45
Sunflower						
	PEM	2	37	0.00	n/a	n/a
Washington						
	PEM	2	65	0.10	n/a	n/a
	PSS/PEM	2	232	0.5	0.05	n/a
	Total Mississippi	**121**	**40,732**	**101.1**	**9.16**	**14.81**
	TOTAL Project	**237**	**63,124**	**141.5**	**13.17**	**20.66**

Notes: These totals were calculated using data provided by Texas Gas in their Resource Report 2 - Water Use and Quality and the PCN Attachment B. Variances in totals are due to fractional acreages, designated as <0.1 in the original data set.

a/ Cowardin Classification (Cowardin, et. al., 1979): PEM – palustrine emergent, PSS – palustrine scrub-shrub, PFO – palustrine forested

b/ n/a – wetland did not cross proposed Project centerline and, after critical review, it was determined that impacts are largely within temporary workspaces.

c/ Temporary construction impacts were determined using a 75-foot-wide corridor centered on the pipeline, plus the areas occupied by access roads and additional temporary workspaces.

d/ Reflects width of centered right-of-way that may be maintained in a herbaceous state to facilitate periodic pipeline corrosion leak surveys. Centerline length crossed was multiplied by 10 feet to obtain area of impact.

e/ Reflects acreage of permanent right-of-way where trees greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way. Represents 2 10-foot wide strips on either side of the 10-foot wide centerline area. Centerline length crossed was multiplied by 20 feet to obtain area of impact.

hydrologic patterns of the wetlands, inhibit seed germination, and increase seedling mortality. Altered surface drainage patterns and hydrology could increase the potential for siltation, and increased turbidity may result from construction and trenching activities. Construction clearing activities and disturbance of wetland vegetation could temporarily affect the wetland's capacity to buffer flood flows or control erosion. Construction activities also have the potential to diminish the recreational and aesthetic value of wetlands. However, these functional changes would not be considered a permanent loss of wetlands. Construction activities also would result in both short- and long-term loss of wildlife habitat and habitat quality. See section 4.6 for a description of wildlife impacts. Implementation of our Procedures, as well as other mitigation measures specified in other federal and state permits, would minimize these potential impacts.

Effects to wetlands would vary depending on wetland type. Due to the relatively long period required for PFO wetlands to regenerate, up to 30 years or more, impacts on these wetland types would be long-term to permanent. Impacts on PSS wetlands would be mostly short term, as regeneration would likely occur within two to four years. PEM wetlands, which can regenerate more rapidly, would typically be affected only temporarily, as they may become reestablished in one or two growing seasons.

To minimize construction impacts on wetlands, Texas Gas would develop and implement the measures in our Procedures, as well as the requirements in the permits issued by the USACE and state agencies. In addition, Texas Gas would comply with the requirements contained in state-issued NPDES permits and it's SPCC Plan. Our Procedures include provisions for ATWS setbacks, wetland crossing duration constraints, limitation on pulling tree stumps and grading activities directly over the trenchline, segregation of topsoil, sediment control procedures, trench dewatering, restoration, and maintenance requirements. The SPCC Plan includes specifications for hazardous materials transportation, storage and handling, spill prevention and response (see Texas Gas's SPCC Plan for pipeline construction in appendix D). Use of our Procedures and the SPCC Plan would minimize short- and long-term impacts on wetlands.

Texas Gas would use the minimum construction equipment necessary within wetlands for clearing and grading, trench excavation and backfilling, pipe fabrication and installation, and restoration activities. Construction methods for wetland crossings would include conventional open-ditch lay, open-ditch push/float lay, and HDD methods. Saturated areas may require use of the open-ditch push/float method to minimize wetland disturbance. Site-specific conditions at the time of construction would determine method selection. Texas Gas also would minimize impacts on wetlands by implementing the measures identified in our Procedures. These measures would include, but are not limited to, the following:

- limiting tree stump removal and grading to the area directly over the pipeline, unless it is determined that safety-related construction constraints require grading or removal of tree stumps from under the working side of the construction right-of-way;
- stripping and segregating topsoil from the area directly over the trench line to a maximum depth of 12 inches in unsaturated soils;
- using sediment barriers to prevent sediment flow into a wetland;
- dewatering trenches in a way that does not cause sedimentation in a wetland;
- implementing its SPCC Plan to avoid refueling and fuel storage incidents within the vicinity of a wetland;
- restoring preconstruction contours and vegetation; and

- monitoring the success of revegetation.

In addition to these measures, the USACE requires that all appropriate and practicable actions be taken to avoid or minimize impacts, pursuant to its Section 404(b)(1) guidelines, which restrict discharges of dredged or fill material where a less environmentally damaging and more practicable alternative exists. All proposed wetland crossings would be subject to review by the USACE to ensure that potential wetland impacts are fully identified and that appropriate wetland restoration and mitigation measures are implemented. Texas Gas would comply with all conditions of the Section 404 authorizations that may be issued by the USACE.

Operation Impacts and Mitigation

Operation of the Fayetteville Lateral and Greenville Lateral would permanently affect a total of 13.2 acres and 20.7 acres of wetlands, respectively. Table 4.4.1-2 identifies permanent conversion impacts by wetland type for the Fayetteville Lateral and Greenville Lateral.

In PFO wetlands, trees would be cleared from the construction work areas. Following construction, our Procedures specify that vegetation maintenance would not be conducted over the full width of the permanent right-of-way in wetlands. During operation, Texas Gas would maintain a 10-foot-wide herbaceous strip centered over the pipeline to facilitate periodic pipeline corrosion/leak surveys. In addition, trees that are within 15 feet of the pipeline and greater than 15 feet in height may be cut and removed. These measures would reduce the amount of PFO wetlands that would be permanently affected by pipeline construction since an additional 20 feet of the 50-foot-wide permanent pipeline easement would be allowed to revegetate naturally after construction. Maintenance activities would not significantly affect PEM wetlands since they would recover soon following periodic mowing. Functions associated with these wetland types would be altered where PFO or PSS wetlands within the maintained portion of the permanent pipeline right-of-way are permanently converted to an herbaceous state. However, these areas would still be wetlands since wetland hydrology would be maintained or reestablished after construction.

Any specific mitigation requirements for the conversion of forested and scrub-shrub wetlands would be established during the USACE Section 404 permitting process. We believe that the use of our Procedures during the construction of the proposed Project, and implementation of specific conditions set forth in any Section 404 permits that would be issued for the Project, would minimize impacts to wetlands to the greatest extent practicable.

Aboveground Facilities

About 0.2 acres of forested wetlands would be permanently impacted during construction and operation of the Kosciusko Compressor Station on the Greenville Lateral. The area for the proposed Kosciusko Compressor Station would be permanently cleared and graded, thus 0.2 acres of wetlands within the facility boundary would be permanently lost. As indicated in section 3.4, we believe that Texas Gas can avoid permanent impacts to the 0.2 acres of forested wetlands within the Kosciusko Compressor Station property. We are recommending that Texas Gas modify it site plan to avoid this wetland.

TABLE 4.4.1-2

Summary of Wetland Impacts to Forested and Scrub-shrub Communities within the Maintained Permanent Right-of-Way

Location	Wetland Type a/	Permanently Converted Wetland Types in 10-foot wide Area Over Pipeline Centerline (acres) b/	Additional Permanently Converted Wetland Types in 30-foot wide Area Over Pipeline Centerline (acres) c/, d/
Fayetteville Lateral			
	PSS/PEM	0.84	n/a
	PSS	0.25	n/a
	PFO/PEM	0.85	1.70
	PFO/PSS	0.002	0.004
	PFO	3.35	6.68
	Subtotal Fayetteville Lateral	*5.29*	*8.39*
Greenville Lateral			
	PSS/PEM	1.66	n/a
	PSS	0.10	n/a
	PFO/PEM	1.38	2.75
	PFO/PSS	0.96	1.92
	PFO/PSS/PEM	0.16	0.33
	PFO	3.63	7.27
	Subtotal Greenville Lateral	*7.89*	*12.27*
TOTAL Project		**13.17**	**20.66**

Notes: These totals were calculated using data provided by Texas Gas in their Resource Report 2 - Water Use and Quality and the PCN Attachment B. Variances in totals are due to fractional acreages, designated as <0.1 in the original data set.

a/ Cowardin Classification (et. al., 1979): PEM – palustrine emergent, PSS – palustrine scrub-shrub, PFO – palustrine forested

b/ Reflects width of centered right-of-way that may be maintained in a herbaceous state to facilitate periodic pipeline corrosion leak surveys. Centerline length crossed was multiplied by 10 feet to obtain area impacted.

c/ Reflects acreage of permanent right-of-way where trees greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way. Centerline length crossed was multiplied by 20 feet to obtain area impacted.

d/ n/a – No conversion of wetland type.

Additional Temporary Workspaces

Texas Gas proposes using ATWS in wetlands at certain locations. Table 4.4.1-3 identifies these locations, their purpose, and the acreage that would be impacted during construction. Acreage impacts identified in this table are included in the temporary construction impacts for the Project, provided in table 4.4.1-1 and table C-6 in appendix C. About 10.7 acres of wetlands would be temporarily affected by these ATWS. Affected wetlands would experience short- to long-term functional changes due to clearing activities for equipment movement but would subsequently be allowed to revert to preconstruction conditions. Our Procedures require that ATWS be located at least 50 feet away from wetland boundaries.

Texas Gas identified and provided justification for 34 locations where ATWS would come within 50 feet of a wetland boundary.

In compliance with our Procedures, Texas Gas should file site-specific plans for use of each of the ATWS in wetlands. Therefore, **we recommend that:**

- **Prior to construction, Texas Gas file with the Secretary for review and written approval by the Director of OEP, a site-specific construction plan for each ATWS with a less than 50-foot setback from wetland boundaries (except where adjacent upland consists of actively cultivated or rotated cropland or other disturbed land) and a site-specific explanation of the conditions that will not permit a 50-foot setback.**

TABLE 4.4.1-3

Wetlands Impacted by Additional Temporary Workspaces

Location	Activity	Nearest Milepost	Cowardin Classification a/	Temporary Impacts (acres) b/
Fayetteville Lateral				
Arkansas				
Woodruff	Truck turnaround and fabrication area	82.2	PFO/PEM	0.3
Woodruff	Pull string	83.1	PFO/PEM	1.0
Woodruff	P.I. and fabrication area	83.1	PFO/PEM	0.1
Woodruff	Truck turnaround, P.I., fabrication area, and access	96	PEM/PSS	0.3
Woodruff	Drag section	96.5	PEM/PSS	0.1
Woodruff	P.I. and road crossing	96.5	PEM/PSS	0.1
Phillips	Truck turnaround	156.7	PFO	0.5
Mississippi				
Coahoma	Hydrostatic test area	156.8	PFO	0.5
Coahoma	Hydrostatic test area	157.6	PFO	0.6
Coahoma	Truck turnaround	157.7	PFO	0.5
Coahoma	P.I. and fabrication area	158.1	PFO	0.5
Coahoma	Pull string	158.2	PFO	<0.1
Coahoma	P.I. and access	158.2	PFO	0.3
Coahoma	Pull string	158.2	PFO	2.1
Coahoma	P.I. and access	158.2	PFO	<0.1
Coahoma	Pull string	158.2	PFO	0.7
Coahoma	P.I. and fabrication area	158.4	PFO	0.3
Coahoma	Truck turnaround and access	158.5	PFO	1.0
		Subtotal: Fayetteville Lateral		**9.0**
Greenville Lateral				
Mississippi				
Humphreys	Temporary workspace and access road	40.6	PEM/PSS	<0.1
Humphreys	Pull string	44.3	PFO	0.2
Humphreys	Fabrication area	44.9	PFO	0.1
Humphreys	Access road and fabrication area	45.5	PFO	0.1

TABLE 4.4.1-3

Wetlands Impacted by Additional Temporary Workspaces

Location	Activity	Nearest Milepost	Cowardin Classification a/	Temporary Impacts (acres) b/
Humphreys	Waterbody crossing and fabrication area	46.1	PFO	0.2
Holmes	Road crossing and fabrication area	55.1	PFO	<0.1
Holmes	Road crossing and fabrication area	59.1	PFO	<0.1
Holmes	Waterbody crossing and fabrication area	59.6	PEM/PSS	0.1
Holmes	Road crossing and fabrication area	59.9	PEM/PSS	0.1
Holmes	Road crossing and fabrication area	60.4	PEM/PSS	<0.1
Holmes	Pipeline crossing and fabrication area	60.6	PEM/PSS	0.1
Holmes	Pipeline crossing and fabrication area	60.6	PEM/PSS	0.2
Holmes	Access road and fabrication area	77.2	PFO/PEM	0.1
Holmes	Pull string	77.2	PFO/PEM	<0.1
Holmes	Truck turnaround and access	77.5	PFO/PEM	0.4
Attala	Access road and fabrication area	78.1	PFO	<0.1
			Subtotal: Greenville Lateral	**1.7**
			Project Total:	**10.7**

Notes: These totals were calculated using data provided by Texas Gas in their Resource Report 2 - Water Use and Quality and the PCN Attachment B. Variances in totals are due to fractional acreages, designated as <0.1 in the original data set.

P.I. – Point of Inflection

a/ Cowardin Classification (Cowardin et al., 1979): PEM – palustrine emergent, PSS – palustrine scrub-shrub, PFO – palustrine forested.

b/ Impact acreage is also accounted for in Table 4.4.1-1.

Access Roads

Access roads would temporarily impact about 0.8 acre of wetlands (see table 4.4.1-4). These acreage impacts are included in the temporary construction impacts for the Project provided in table 4.4.1-1 and table C-6 in appendix C. No permanent impacts on wetlands are anticipated as a result of the use or modification of existing access roads.

Based on our review of Texas Gas's proposal, we believe that these access road modifications would be reasonable. Texas Gas would implement any additional requirements regarding these temporary access road improvements in wetlands that may be imposed by the USACE.

Contractor/Pipe Yards

Use of the proposed contractor/pipe yards would not impact any wetlands.

TABLE 4.4.1-4

Wetlands Impacted by Access Roads

Location	Access Road	Nearest Milepost	Cowardin Classification a/	Temporary Impacts (acres)
Fayetteville Lateral				
Arkansas				
Woodruff	64	96	PSS/PEM	<0.1
Lee	27	119.1	PFO	<0.1
Phillips	52A	156.6	PFO	<0.1
Mississippi				
Coahoma	41	158.4	PFO	0.1
Coahoma	41B	158.4	PFO	0.5
Coahoma	41A	158.6	PFO	<0.1
			Subtotal: Fayetteville Lateral	**0.6**
Greenville Lateral				
Mississippi				
Humphreys	AR-15	40.1	PFO	<0.1
Humphreys	AR-18	44.3	PFO	<0.1
Humphreys	AR-19	45.5	PFO	0.1
Holmes	AR-38	59.6	PEM/PSS	<0.1
Holmes	AR-40	60.5	PEM/PSS	<0.1
Holmes	AR-60	77.2	PFO/PSS	0.1
Attala	AR-61	78.1	PFO	<0.1
			Subtotal: Greenville Lateral	**0.2**
			Project Total:	**0.8**

Notes: These totals were calculated using data provided by Texas Gas in their Resource Report 2 - Water Use and Quality and the PCN Attachment B. Variances in totals are due to fractional acreages, designated as <0.1 in the original data set.

a/ Cowardin Classification (Cowardin et. al. 1979): PEM – palustrine emergent, PSS – palustrine scrub-shrub, PFO – palustrine forested.

4.4.2 Wetland Restoration and Compensatory Mitigation

The requirements for wetland restoration measures identified in our Procedures include, but are not limited to, the following:

- consultation with appropriate land management or state agencies to develop a project-specific restoration plan that includes measure for reestablishing herbaceous and woody species;
- prohibition on the use of herbicides or pesticides within 100 feet of a wetland, except as allowed by the appropriate agencies; and
- monitoring of the success of wetland revegetation annually for the first three years after construction or until wetland revegetation is considered successful.

Texas Gas would complete wetland permitting, including development of measures of compensatory mitigation for all wetland impacts, in consultation with the USACE Little Rock, Memphis, and Vicksburg Districts. Texas Gas is proposing to compensate for wetland impacts through purchase of wetland mitigation bank credits. Mitigation banking is an approved alternative to on site mitigation and often provides for greater likelihood of success in replacement of wetland function and long-term management of restored wetland areas.

Texas Gas would comply with the conditions contained in the permit issued by the USACE and in the water quality certification permits issued by ADEQ and MDEQ.

Further, Texas Gas indicates that it would provide compensation for permanent wetland impacts including all impacts on forested wetlands in all construction work areas, including temporary construction work areas. A total of 33.9 acres of permanent forested and scrub-shrub conversion impacts would occur due to the permanently maintained right-of-way. A total of 0.2 acre of potentially permanently impacted forested wetlands has been identified; however, additional engineering design to avoid this site has been requested. Mitigation for these wetland impacts would be at a mitigation ratio as determined by the USACE. Because the final wetland Mitigation Plan has not yet been finalized, **we recommend that:**

- **Prior to construction, Texas Gas file with the Secretary a copy of the Section 404/10 permit issued by the USACE, and the finalized wetland Mitigation Plan developed in consultation with the USACE.**

Texas Gas would implement the construction, restoration, and maintenance measures described in our Procedures for project construction and operation. The Project pipeline routes have been developed in consultation with the USACE and would avoid wetlands where practicable. Wetland impacts would be minimized by using HDDs to cross several larger wetlands and associated waterbody crossings since wetlands within the path of the HDD would be avoided. Therefore, we believe that the proposed Project's impact on wetlands have been minimized to the greatest extent practicable. The USACE will require compensation for permanent wetland impacts as mitigation.

4.5 VEGETATION

4.5.1 Habitat/Community Types

There would be nine distinct vegetation habitat/community types in the Project area:

- hardwood upland forest;
- pine-hardwood upland forest;
- pine plantation;
- palustrine forested wetland;
- palustrine scrub/shrub wetland;
- palustrine emergent wetland;
- agricultural;
- upland pasture; and
- open water.

Of these, open water is characterized by a lack of vegetation, and agricultural and upland pastures by uniform vegetation. Therefore, these habitat/community types are not addressed in this section. The predominant vegetation community in the Project area is agriculture (66 percent), which is addressed in section 4.8.1.

4.5.1.1 Typical Habitat/Community Types in the Project Area

Upland Forest

Upland forest communities in the vicinity of the proposed Project consist of both cold-deciduous, broad-leaved forest and needle-leaved evergreen trees. Upland forests comprise about 15 percent of the Project area.

Hardwood Upland Forest

The hardwood upland forest community is generally found throughout the Project area. The main cover type is oak-hickory, where common species include post oak (*Quercus stellata*), bur oak (*Quercus macrocarpa*), northern red oak (*Quercus rubra*), black oak (*Quercus velutina*), white oak *(Quercus alba*), mockernut hickory (*Carya tomentosa*), and pignut hickory (*Carya glabra*). Common understory species include American beautyberry (*Callicarpa americana*), American hornbeam (*Carpinus caroliniana*), and dogwood species (*Cornus* spp.). Other hardwood upland communities include beech-maple, rich cove, and sandpond forests. The federally listed endangered pondberry is known to occur in sandpond communities.

Pine-Hardwood Upland Forest

The pine-hardwood upland forest habitat is found in less anthropologically disturbed areas where the forests are allowed to vegetate naturally and mature without much management, leading to the mix of hardwoods and pine. This habitat type is more common along the western and eastern portions of the Project area. Overstory species in pine-hardwood upland forest are similar to pine upland forest and include loblolly pine (*Pinus taeda*), white oak (*Quercus alba*), southern red oak (*Quercus falcata*), American beech (*Fagus grandifolia*), black gum (*Nyssa sylvatica*), southern magnolia (*Magnolia grandiflora*), sweet gum (*Liquidambar styraciflua*), and species of elm (*Ulmus* spp.). The understory is composed of species such as American beautyberry (*Callicarpa americana*), American hornbeam (*Carpinus caroliniana*), supple jack (*Berchemia scandens*), Virginia creeper (*Parthenocissus quinquefolia*), wax myrtle (*Myrica cerifera*), greenbrier (*Smilax* spp.), dogwood species (*Cornus* spp.), and yaupon (*Ilex vomitoria*).

Pine Plantation

Managed forests and pine plantations are scattered throughout the Project area. These communities, which are dominated by pine, are managed for commercial production and undergo periodic silvicultural maintenance.

Wetlands

Palustrine Forested Wetlands

Palustrine forested wetlands are the most common wetland type crossed by the proposed Project. These wetland communities contain bottomland hardwood wetlands, southern floodplain forests, forested canebreaks, and cypress-tupelo swamps. The vegetation varies widely among the various wetland types, but all are dominated by woody vegetation and usually have hydric soils and wetland hydrology. Vegetation found in this habitat includes bald cypress (*Taxodium distichum*), water tupelo (*Nyssa aquatica*), Nuttall oak (*Quercus nuttalii*), water hickory (*Carya aquatica*), and overup oak (*Quercus lyrata*). These wetlands can vary from the semi-permanently flooded cypress tupelo swamp to the never inundated mixed pine-hardwood wetlands.

Palustrine Scrub-shrub Wetlands

The palustrine scrub-shrub wetland community is similar vegetatively to scrub-shrub upland habitat but exists where there are hydric soils and wetland hydrology. Vegetation found in this habitat consists of species such as marsh elder (*Iva annua*), water oak (*Quercus nigra*), red maple (*Acer rubrum*), wax myrtle (*Myrica cerifera*), eastern baccharis (*Baccharis halimifolia*), and various sedges (*Carex* spp.) and rushes (*Juncus* spp.).

Palustrine Emergent Wetlands

Palustrine emergent wetlands are found throughout the Project area. This community can also be found in fields that have lain fallow for a few years and have hydric soils and wetland hydrology. The main requirement of this habitat type is a lack of woody vegetation. These marshes typically includes species such as spikerushes, soft stem rush (*Juncus effusus*), green flatsedge (*Cyperus virens*), bushy bluestem (*Andropogon glomeratus*), swamp smartweed (*Polygonum hydropiperoides*), and maiden cane (*Panicum hemitomon*).

Wetlands are described in more detail in section 4.4.

4.5.1.2 Pipeline Facilities

Fayetteville Lateral

Construction of the proposed Fayetteville Lateral (including construction work areas, access roads, pipe yards, and aboveground facilities) would involve the temporary clearing and disturbance of about 3,082.4 acres of land, including 2,197.7 acres of agricultural land, 432.5 acres of upland and managed forest, and 452.2 acres of other land and water. The primary wetland vegetative community that would be affected by construction would be mixed palustrine forested/emergent wetlands (see section 4.4).

Greenville Lateral

Construction of the proposed Greenville Lateral pipeline system (including construction work areas, access roads, pipe yards, and aboveground facilities) would involve the temporary clearing and disturbance of about 1,956.3 acres of land, including 1,020.9 acres of agricultural land, 303.7 acres of upland and managed forest, and 631.7 acres of other land and open water. The primary wetland vegetative community that would be affected by construction would be mixed palustrine forested/emergent wetlands (see section 4.4).

Kosciusko 36-inch and Kosciusko 20-inch Tie-in Laterals

Construction of the Kosciusko 36-inch and Kosciusko 20-inch Tie-in Laterals would involve the temporary clearing and disturbance of about 12.3 acres and 6.2 acres of land, respectively. About 4.2 acres of agricultural land and 5.6 acres of forest would be affected by construction of the Kosciusko 36-inch Tie-in Lateral; the remaining 2.5 acres of land affected during construction of the pipeline would consist of other land and water. Construction of the Kosciusko 20-inch Tie-in Lateral would involve temporary clearing and disturbance of 5.6 acres of forest and 0.6 acre of other land. Agricultural land would not be affected by construction of the Kosciusko 20-inch Tie-in Lateral.

The primary impact of the proposed Project on vegetation communities would be the removal of vegetation along the proposed pipeline routes, at aboveground facilities, and at ATWSs. Cutting or

removal of vegetation for Project construction could lead to increased soil erosion, associated sedimentation and turbidity in streams and wetlands, an increase in invasive or exotic plant species, and a reduction in wildlife habitat. Clearing and construction activities along the proposed pipeline right-of-way and associated facilities could result in soil compaction. The use of heavy machinery could damage riparian vegetation adjacent to sensitive waterbodies, thereby potentially reducing water quality in those waterbodies.

The permanent right-of-way would be maintained in an herbaceous state following construction. There would be no long-term impacts on areas with existing herbaceous cover types following restoration. Long-term vegetation impacts would occur in forested wetlands and upland forests along the pipeline right-of-way where vegetation types would be converted to open land with herbaceous vegetation. Routine vegetation maintenance clearing would occur within the existing permanent right-of-way no more than once every 3 years. However, to facilitate leak and corrosion surveys in wetlands, a corridor no more than 10 feet wide centered on the pipeline(s) may be maintained by mowing or a similar means on an annual basis, and trees within 15 feet of the pipeline that are greater than 15 feet in height may be cut and removed from the permanent right-of-way.

Permanent impacts also would occur at the proposed aboveground facilities, where existing vegetation types would be converted to industrial land. The existing vegetation that would be the most affected by construction and operation of these facilities would be agricultural, however, some impacts to upland forested also would occur.

To minimize Project-related effects on vegetative communities, Texas Gas would implement our Plan and Procedures. Implementation of our Plan and Procedures would aid vegetative restoration and prevent or minimize sedimentation and turbidity in streams and wetlands. Following construction, all construction work areas would be restored, seeded with conservation grasses, legumes, native plant species or other standard erosion control/cover species, where required, and generally allowed to revegetate to pre-construction conditions in accordance with our Plan. The FWS recommends that native or non-persistent annual species be used to revegetate works areas. Texas Gas has indicated that it would consult with local conservation authorities.

Project impacts on vegetative communities would vary depending upon disturbance duration, magnitude, and vegetation cover type. As described above, long-term and permanent impacts on forested habitat would result from construction and operation of the Project. Texas Gas cooperated with federal and state agencies to align the pipeline in a manner that avoids or minimizes forested habitat impacts, either through facility siting or use of measures such as HDD to cross forested habitat. In addition, Texas Gas collocated the proposed pipeline along existing pipeline rights-of-ways to minimize forest fragmentation. Furthermore, Texas Gas would minimize impacts on forested areas through implementation of the mitigation measures in our Plan and Procedures. Impacts on other vegetation communities such as agriculture, pasture, and open land would be considered minimal and limited primarily to the construction phase. Based on Texas Gas's proposed measures to minimize impacts on forested areas, the relatively minor impacts on agricultural areas, pastures, and open lands, and the implementation of our Plan and Procedures and our recommendations, we believe that impacts on vegetation communities would be minimized.

4.5.2 Vegetative Communities of Special Concern

The NRCS, ANHC, Mississippi Museum of Natural History, and FWS identified several sensitive communities that could potentially be impacted by the Project. Specifically, these communities include the following:

- WRP land;
- bluff habitat adjacent to Cadron Creek;
- wetland corridors along Cache River and Bayou De View;
- wooded depressional habitat;
- bald cypress swamps; and
- bottomland hardwoods.

Wetland Reserve Program Lands

The WRP is a voluntary program administered by the NRCS that allows landowners to receive financial incentives to restore, protect, and enhance wetlands in exchange for retiring marginal land from agriculture. Texas Gas has identified one WRP that would be crossed by the Project along the proposed Greenville Lateral between MP 43 and MP 45, in Humphrey's County, Mississippi. Impacts on WRP lands and mitigation are addressed in section 4.8 of this EIS.

Bluff Habitat Adjacent to Cadron Creek

Cadron Creek is listed on the NRI and the Arkansas Registry of Natural and Scenic Rivers, and is listed by the ADEQ as an Extraordinary Resource Water. The ANHC noted that two species of state concern may occur on the bluffs along Cadron Creek: the Arkansas alumroot (*Heuchera villosa var. arkansana*) and mock orange (*Philadelphus hirsutus*). Texas Gas did not identify either of these species during field surveys; nonetheless, ANHC recommended that Texas Gas avoid areas where these species are known to occur. Texas Gas has determined that it would not be feasible to cross Cadron Creek using HDD methods and has proposed crossing Cadron Creek using open-cut crossing methods. Texas Gas would implement measures in our Plan and Procedures to minimize impacts associated with this crossing and would continue to coordinate with the ANHC to develop measures to avoid or minimize potential impacts on this habitat, and we have recommended additional consultation with the NPS regarding the development of additional mitigation measures for this crossing since Cadron Creek is NRI listed. Texas Gas also would implement any specific conditions associated with the USACE Section 404 permit and the state 401 Water Quality Certification if, in fact, these permits are issued for the Project. Further information about Cadron Creek is in section 4.3, and impacts on sensitive species are addressed in section 4.7.

Cache River and Bayou De View Wetlands

The wetlands associated with the Cache River and Bayou De View have been identified as wetlands of international importance by the Ramsar Convention and as the most important wintering area for mallards by the North American Waterfowl Management Plan. The ivory billed woodpecker (*Campephilus principalis*) was identified within the Bayou De View portion of the Cache River NWR. The Cache River basin contains a variety of wetland communities, including some of the most intact and least disturbed bottomland hardwood forests in the Mississippi Valley Region. Texas Gas proposes to use HDDs to cross the Cache River, Bayou De View, and associated forested wetlands. We believe that Texas Gas's use of HDDs to avoid impacts to the waterbodies and adjacent forested wetlands, and the use of our Procedures would minimize impacts to these resources.

Wooded Depressional Habitats

ANHC expressed concern over potential impacts on wooded depressional habitats that may support pondberry (*Lindera melissifolia*), a federally listed plant species. The FWS in Mississippi also requested that surveys of wooded depressional habitat be completed. Texas Gas conducted surveys of the pipeline corridor between November 2006 and May 2007 and did not identify any pondberry species within the Project area. Impacts on pondberry habitat are further addressed in section 4.7.

Bald Cypress Swamp

The proposed Project would cross bald cypress swamp habitat in Woodruff County, Arkansas, and Phillips, Humphreys, and Attala Counties, Mississippi. The Mississippi Natural Heritage Program (MSNHP) identified bald cypress swamps as a vegetation community of special concern in Mississippi. Bald cypress swamps are found around oxbow lakes and along abandoned stream channels and contain a variety of mixtures and densities of bald cypress, black gum, water tupelo, and other hardwood trees. Silver and red maple, persimmon, green ash, ironwood, and water oak are occasional associates. Bald cypress/gum swamps are considered vulnerable in Mississippi due to historic widespread declines and recent losses caused by a wide range of developments that create additional isolation and fragmentation (MDWFP, 2005).

Bottomland Hardwood Forest

The FWS is concerned about potential Project impacts on bottomland hardwood habitats. Bottomland hardwood forests are a type of wetland community comprised of both hardwood and softwood species that are found along the floodplains of rivers and streams. Only 20 percent to 25 percent of the bottomland hardwood forests that occurred across Arkansas prior to European settlement remain today (ANHC, 2007b). Potential natural vegetation types in these areas include the southern floodplain forest with bottomland forest and woodland components. These forests are predominantly overcup oak, water hickory, nuttal oak, willow oak, red maple, green ash, elm, and sweet gum. The riparian forests adjacent to the Mississippi River include black willow, cottonwood, river birch, and sycamore. Bald cypress and water tupelo are found in the wettest sites. Bottomland hardwoods occur throughout the Project area. The largest tracts are crossed by the Project in Phillips and Woodruff Counties in Arkansas, and Coahoma, Humphreys, Holmes, and Attala Counties in Mississippi. The White and Cache Rivers along the Fayetteville Lateral contain some of the most intact and least disturbed bottomland hardwood forests in the Mississippi Valley Region. Texas Gas proposes to use HDD to traverse large tracts of bottomland hardwood forested habitat that would be crossed by the Project.

Impacts and Mitigation

Construction impacts described in section 4.5.1.2 are applicable to vegetation communities of special concern, depending on the vegetation present. During the pre-filing period, the FWS, ANHC, and MSNHP commented that construction activities that fragment or destroy certain vegetative communities could adversely impact a number of threatened or endangered species. Impacts on threatened and endangered species are in section 4.7. Based on our review, the alignment of the proposed Project was developed, to the extent possible, to minimize impacts on high-quality habitats, conservation areas, or other designated sensitive vegetative communities. Texas Gas has collocated the proposed pipeline with existing utility rights-of-way wherever possible in order to minimize forest fragmentation and avoid creating new corridors through forested habitat or other sensitive communities. Where these areas cannot be avoided, Texas Gas has consulted with the appropriate resource agencies to determine both suitable crossing locations and crossing methods. Texas Gas would restore sensitive areas crossed by the Project to the extent practicable in accordance with our Plan and Procedures and any other mitigation measures required by permitting agencies. Texas Gas would continue to work with the applicable state and federal agencies to develop measures to avoid or minimize potential impacts on riparian areas, forested wetlands, and other vegetative communities that may provide habitat for federally or state-listed threatened or endangered species or species of special concern in Arkansas and Mississippi.

4.5.3 Noxious Weeds and Other Invasive Plants

Invasive species can out-compete and displace native plant species, which can alter the appearance, composition, and habitat value of affected areas. Cogon grass (*Imperata cylindrica*), water hyacinth (*Eichhornia crassipes*), and Johnson grass (*Sorghum halepense*) are some of the invasive species that could occur within the Project area.

In order to minimize the impacts of exotic and invasive species, Texas Gas would implement our Plan, which includes measures to reduce erosion such as topsoil stripping and specific vegetation restoration measures. Soils imported to agricultural and residential areas would be certified as free of noxious weeds and soil pests, and only weed-free straw or hay would be used to construct sediment control devices or used as mulch applications.

Texas Gas has also developed an Exotic and Invasive Species Control Plan (see appendix E). The plan identifies the following management measures to minimize introduction and/or spread of these species:

- pressure washing of all construction equipment before first entering the construction area, all water and material captured from pressuring washing would be contained and properly disposed to prevent dispersal of potential seeds or plant parts;
- monitoring and selective spot treatment/eradication of any exotic or invasive species encountered during construction;
- implementing construction techniques along the pipeline route that minimize the time that bare soil is exposed;
- segregating topsoil and restoring the segregated topsoil to its original location; and
- seeding exposed areas within a short time to minimize potential for exotic or invasive species to become established.

The temporary removal of vegetation may result in increased opportunities for invasive and exotic species to establish themselves in Project rights-of-way and extra workspaces. Adherence to the Exotic and Invasive Species Control Plan, in conjunction with consultations with local, state, and federal agencies, would minimize the potential for the introduction or establishment of nuisance and exotic species within the Project area. Re-establishment of vegetation in all disturbed areas soon after backfilling the trench and final grading would minimize the opportunities for invasive species to become established. Texas Gas states it would implement our Plan during construction and operation of the Project. The Plan requires that final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). Grading the construction right-of-way would restore pre-construction contours and leave the soil in the proper condition for planting/seeding, and Texas Gas would seed disturbed construction workspaces with an appropriate seed mix.

4.6 WILDLIFE AND AQUATIC RESOURCES

This section provides a description of the wildlife and aquatic resources in the Project area. Potential impacts on these resources from construction and operation of the Project are described, and proposed or additional mitigation measures needed to eliminate or minimize adverse impacts are identified. Threatened and endangered species that may occur within the proposed Project area are described in section 4.7.

4.6.1 Wildlife Resources

Wildlife species that may be found within the Project area are typical of the Eastern Temperate Forest Eco-region (EPA, 2007). This region is described as having a moderate and mildly humid climate; dense and diverse forest cover; high human density; and diverse populations of mammal, birds, fish, reptiles, and amphibians. Based on vegetative characteristics, the Project area can be divided into the following five basic wildlife habitat/community types:

- palustrine wetland
- pasture
- upland forest/scrub-shrub
- open water/riparian

Since each wildlife habitat/community type supports a distinct collection of wildlife species, analysis of habitat types, rather than individual species, is provided to meaningfully describe Project-related impacts on wildlife resources. An overview of each Project area habitat type that would be impacted is provided below.

4.6.1.1 Wildlife Habitats in the Project Area

Palustrine Wetlands

Palustrine wetlands, which include emergent, scrub-shrub, and forested habitat, provide foraging, breeding, migratory, and wintering habitat for a variety of terrestrial and aquatic wildlife. Small emergent areas contain less than 0.5 foot of water during the spring and provide habitat for several species of amphibians and invertebrates. This habitat supports a species diversity comprised of species such as ringed salamander (*Ambystoma annulatum)*, wood frog (*Rana sylvatica)*, ornate box turtle (*Terrapenne ornate ornate)*, northern crawfish frog (*Rana areolata circulosa*), four-toed salamander *(Hemidactylium scutatum)*, northern pintail *(Arnas acuta)*, king rail *(Rallus elegans)*, northern harrier *(Circus Cyaneus)*, southeastern shrew (*Sorex longirostris)*, and swamp rabbit *(Sylvilagus aquaticus)* (Anderson, 2006; AGFC, 2007).

Pasture

Upland pasture habitat in the Project area provides foraging area and/or cover for a variety of species. Based on the presence of habitat and their regional occurrence, these species may include Henslow's sparrow (*Ammodramus henslowii*), Le Conte's sparrow (*Ammodramus leconteii*), northern bobwhite *(Colinus virginianus)*, red milkweed beetle (*Tetraopes tetraopthalmus)*, prairie mole cricket *(Gryllotalpa major)*, southern prairie skink *(Eumeces septentrionalis)*, Texas horned lizard (*Phrynosoma cornutum*), prairie vole (*Microtus ochrogaster)* striped skunk *(Mephitis mephitis)*, and eastern cottontail *(Sylvilagus floridanus)* (Anderson, 2006; AGFC, 2007).

Upland Forest/Scrub-Shrub

Upland forest/scrub-shrub habitat types provide refuge for a variety of wildlife. Based on the presence of habitat and their regional occurrence, these species may include spring peeper *(Pseudacris crucifer)*, bell's vireo *(Vireo bellii)*, eastern wood pewee *(Contopus virens)*, wood thrush *(Hylocichla mustelina)*, black-and-white warbler *(Mniotilta varia)*, red-headed woodpecker *(Melanerpes erythrocephalus)*, barn owl *(Tyto alba)*, eastern chipmunk *(Tamias striatus)*, southern flying squirrel *(Glaucomys volans)*, woodland vole *(Microtus pinetorum)*, and American woodcock *(Scolopax minor)* (AGFC, 2007).

Open Water/Riparian

Open water/riparian areas are valuable resources and provide habitat for numerous species. Riparian habit is generally defined as the aquatic and terrestrial habitat adjacent to streams, lakes, estuaries, or other waterways. Riparian areas help stabilize stream banks, improve water quality, reduce flooding and sedimentation, and enhance wildlife habitat. In the Project area, open water and associated riparian areas potentially support numerous species, including great blue heron *(Ardea herodias)*, mallards *(Anas platyrhynchos)*, northern shoveler (*Anas clypeata)*, white ibis *(Eudocimus albus)*, and beaver *(Castor Canadensis)*. Aquatic species associated with open water habitat are described in more detail in section 4.6.2. The location of riparian habitat crossed by the proposed pipelines is identified in table C-9 in appendix C.

4.6.1.2 Impacts and Mitigation

Initial clearing and construction activities would result in the disruption of wildlife habitat comprised of palustrine wetland, upland forest/shrub-scrub, cropland and pasture, and open water/riparian habitat. Smaller, less-mobile wildlife species could experience direct mortality during clearing and grading activities. Other wildlife species would likely leave the Project area when construction begins and relocate into similar nearby habitats. Stress related to increased levels of competition could cause disruption of breeding cycles of some wildlife species, lower reproductive success, and reduced survival.

The primary impact of construction and operation of the Project on wildlife would be the temporary alteration of habitat in temporary construction work areas. There also would be permanent loss of habitat in areas where aboveground facilities would be built, and permanent impacts also would occur where forested uplands and wetlands are cleared. Following construction of the pipeline system, all construction work areas would be restored to preconstruction contours and revegetated. Areas within the permanent right-of-way would be maintained in herbaceous vegetation in accordance with our Plan and Procedures. Long-term or permanent impacts would be limited to the conversion of upland and wetland forested areas to open grassy areas for the new permanent right-of-way.

Operation of the pipeline system would result in the conversion of 381.7 acres of upland and wetlands forests to open herbaceous habitat. This herbaceous habitat would be of less value to wildlife species that prefer forested habitats, but would provide new habitat for those species preferring herbaceous habitats. In particular, prairie bird species, small mammals, amphibians, and reptiles would be able to utilize these restored areas, since they would provide scrub-shrub and grassland habitats. Other negative impacts resulting from construction and operation of the Project (e.g., noise) are expected to be minimal.

Although temporary and permanent impacts on food, cover, and water sources may occur, the species known to occur in the Project area are not dependent on habitats that would be affected by construction for the overall fitness or reproductive viability of the populations as a whole. Many of the mammal, bird, reptile, and amphibian species can adapt to changing habitat conditions and have the ability to temporarily expand or shift their home ranges to find alternative sources of food, water, and shelter until the construction work area habitats become reestablished. The permanent pipeline right-of-way would be maintained in an herbaceous state. In wetlands, the right-of-way would be allowed to revegetate naturally to preconstruction conditions, except in forested wetlands where a 10-foot-wide corridor centered on the pipeline may be maintained in an herbaceous state to facilitate periodic pipeline corrosion/leak surveys. In addition, trees within 15 feet of the center of the pipeline that are greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way in forested wetlands (see section 4.4).

4.6.1.3 Migratory Birds and Colonial Nesting Waterbirds

Migratory Birds

The Migratory Bird Treaty Act regulates the taking of and impacts on migratory birds, including their nests. Texas Gas identified more than 200 migratory bird species that could potentially occur along the proposed Project route. Migratory birds would be expected to occur at least as transients in the proposed Project area throughout most of the year.

Migratory birds follow broad routes called "flyways" between breeding grounds in Canada and the U.S. and wintering grounds in Central and South America. The Project would be within the Mississippi Flyway, which extends from Alaska and central Canada to Patagonia, South America. Through the U.S., this flyway generally follows the Mississippi River. About 40 percent of all North American migrating waterfowl and shorebirds use this route. Texas Gas would minimize impacts on migratory birds by utilizing HDD methods to cross the Mississippi River and other waterbodies and associated wetlands, thereby minimizing impacts on habitats used by migrating birds.

The wetland system associated with the Cache and Lower White rivers was designated as a Wetland of International Importance under the Ramsar Convention on Wetlands, especially for its waterfowl habitat. This wetland system is known to support up to 10,000 Canada geese (*Branta canadensis*), about 100 bald eagles (*Heliaetus leucocephalus*), and hundreds of wood storks *(Mycteria Americana)*. These wetlands are considered the most important wintering area for mallards in North America, with an average of 306,000 individuals. Thousands of southbound Mississippi kites (*Ictinia mississippiensis)*, and hundreds of red-tailed hawks (*Buteo jamaicensus*), red-shouldered hawks (*Buteo lineatus*), and broad-winged hawks (*Buteo platypterus*) migrate through the region per day during migration. A variety of migratory songbirds breed here, including: Acadian flycatcher (*Empidonax virescens*), wood thrush, prothonotary warbler (*Protonotaria citrea*), hooded warbler (*Wilsonia citrina*), and cerulean warbler (*Dendroica cerulean*) (Audubon 2007). In addition, the wetlands along the Cache River and Bayou De View may represent habitat for the federally listed as endangered ivory billed woodpecker, believed to have been extinct for more than 60 years. Texas Gas would minimize impacts on migratory birds by utilizing HDD methods to cross the Cache River, Bayou De View, and their associated wetlands. We believe that Texas Gas's use of HDD methods and use of our Procedures would minimize potential impacts within these ecosystems and, therefore, on migratory birds.

Since some construction along the Project right-of-way would likely occur during the breeding season, migratory birds would be affected. Following construction, a corridor (with associated edge habitat) would be maintained in an herbaceous state for the life of the Project. Although some migratory birds may benefit from the creation and maintenance of edge habitat, other species would be adversely affected. Nonetheless, population-level impacts would not be expected, since migratory birds that occur along the pipeline route would likely opt for more suitable habitat. Further, creation of new right-of-way corridors through forested areas, and particularly forest wetland areas, would be minimized compared to conventional pipeline construction methods by the use of HDDs to cross them.

Colonial Nesting Waterbirds

Colonial nesting waterbirds include a variety of bird species that obtain all or most of their food from aquatic and wetland environments and gather in large colonies, or rookeries, during their respective nesting seasons (FWS 2002). Colonial nesting waterbirds concentrate in these rookeries on sandbars and islands within or along the riparian areas, or along major waterways such as the Mississippi River. Texas Gas would cross the Mississippi River using HDD methods. A primary advantage to using HDD is that it

avoids disturbance of the streambed, stream banks, sandbars, and adjacent upland areas in the immediate vicinity of the waterbody crossing.

No documented rookeries were identified within 0.5 mile of the Project. A wading bird rookery occurs in the Hillside NWR at a distance greater than 1 mile from the proposed Greenville Lateral. Texas Gas would cross the Hillside NWR by HDD, thereby minimizing disturbance of this resource. Operation of the Project would have no effect on this rookery since the NWR would be crossed by HDD, and typical right-of-way maintenance activities such as periodic mowing would not be required. If rookeries are observed along any portion of the Project during construction, Texas Gas would consult with appropriate state and federal agencies to ensure that appropriate measures are implemented to prevent adverse impacts on the species utilizing these areas. Therefore, we conclude that the Project would have no effect on documented rookeries.

4.6.1.4 Managed Wildlife Areas

As previously described, the majority of the Project area consists of agricultural lands. The Project would also traverse two federally protected areas, the Cache River NWR in Woodruff County, Arkansas, and the Hillside NWR in Holmes County, Mississippi.

The proposed Fayetteville Lateral would cross the Cache River NWR between MP 82.0 and MP 82.8, and the Bayou De View portion of the NWR between MP 95.9 and MP 96.6. The NWR, which encompasses an area totaling 64,000 acres, supports large concentrations of wintering waterfowl. It is comprised largely of bottomland forests and associated sloughs and oxbows, as well as cropland and reforested areas. The NWR is recognized as a Wetland of International Importance by the Ramsar Convention and the most important wintering area of mallards by the North American Waterfowl Management Plan (FWS, 2007).

The proposed Greenville Lateral would cross the northern tip of the Hillside NWR between MP 54.1 and MP 55.9, in Holmes County. The Hillside NWR occupies about 15,572 acres and provides important stopover and nesting habitat for over 200 species of neotropical migratory birds. The refuge is home to large numbers of wintering waterfowl, at times often exceeding 125,000 birds. A wading bird rookery provides nesting and roosting habitat for several species of marsh and wading birds, including white ibis; cattle egrets (*Bubulcus ibis*); great blue, little blue (*Egretta caerulea*), and green-backed herons (*Butorides striatus)*; and yellow-crowned night herons (*Nyctanassa violacea*). The rookery is located more than 1 mile from the Project area (Loveall, 2007).

We have consulted with both the Mississippi and Arkansas Field and Refuge Offices of the FWS about construction impacts in the NWRs. The NWRs would be crossed by HDD. The HDD exit and entry pits would be on private land adjacent to the NWRs. The crossing of these resource areas by HDD would minimize direct construction and operation impacts, resulting in minimal, if any, impacts on existing vegetation, soils, and wildlife. Construction-related dust and noise would be limited to several days during the HDD process and would have a minimal effect on refuge activities. Texas Gas would implement any additional recommendations of the FWS to minimize construction impacts and would comply with all permit conditions it would obtain. Operation of the Project would have no effect on the NWR since it would be crossed by HDD, and typical right-of-way maintenance activities such as periodic mowing would not be required. In the event that the HDD attempt fails, Texas Gas would be required to consult with appropriate state and federal agencies prior to implementing an alternative crossing method.

Use of the HDD method to cross the Cache River and Hillside NWRs and implementation of any additional mitigation recommended by the FWS would minimize impacts on the NWR due to construction and operation of the Project.

4.6.2 Aquatic Resources

The 262.6-mile-long Project would cross 483 waterbodies within three major watersheds, including the Arkansas-Red-White River Basin, Lower Mississippi Regional Watershed, and South Atlantic-Gulf Regional Watershed. The Fayetteville Lateral would cross 278 waterbodies, including 40 perennial and 238 intermittent waterbodies. The Greenville Lateral would cross 203 waterbodies, including 29 perennial and 174 intermittent waterbodies. The Kosciusko 36-inch Tie-in Lateral would cross one perennial and one intermittent waterbody. The Kosciusko 20-inch Tie-in Lateral would not cross any waterbodies. The ADEQ and MDEQ have developed their own regulatory systems for evaluating, classifying, and monitoring their surface waters.

The following sections provide an overview of the aquatic resources found within the Project area and potential impacts on these resources. Any federally or state-listed threatened or endangered aquatic species are addressed in section 4.7.

4.6.2.1 Freshwater Fish and Invertebrates

Commonly occurring species of fish and invertebrates in waterbodies that would be crossed by the proposed Project are typical of species found in waterbodies in Arkansas and Mississippi. Representative fish species include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), Alabama shad (*Alosa alabama*), alligator gar (*Atractosteus spatula*), and common carp (*Cyprinus carpio*). Representative mussel species in the Project area include the deertoe (*Truncilla truncata*), elktoe (*Alasmidonta marginata*), rainbow (*Villosa iris*), and wartyback (*Quadrala nodulata*).

Habitat requirements, life history characteristics, and abundance and diversity of aquatic species in freshwater rivers and streams reflect a range of habitat features, from water depth, water flow, water quality characteristics, abundance of prey, and presence of physical structure such as woody debris and submerged aquatic vegetation. Many of the fresh waterbodies that would be crossed by the proposed Project are ditches with only ephemeral water. This temporary nature reduces the value of the ditches as aquatic habitat, as they can be occupied only for a portion of the year. However, the flushing of the ditches during fluctuating water levels can release organic detritus and small invertebrate prey into perennial waterbodies. Areas of ephemeral surface water also can function as nursery areas for larvae and juveniles, where restricted access or shallow water levels may reduce the presence of predatory fish. Conversely, the larger perennial waterbodies provide a more consistent year-round habitat, which allows for a robust food web that includes large predatory piscivores as well as bottom feeders. In general, the rivers and streams that would be crossed by the proposed Project are typical of those found in Arkansas and Mississippi.

Arkansas and Mississippi do not classify waterbodies as either warm-water or cold-water systems. Both states have developed regulatory systems for classifying surface waters through assignment of beneficial use designations. The Arkansas "Fisheries" designation does include a classification for trout water. Waterbodies designated as "trout water" may be *de facto* cold-water fisheries. Waterbodies without this designation may be viewed as warm-water fisheries. Therefore, Texas Gas states the construction timing window identified in our Procedures for cold-water fisheries (June 1 through September 30) would be implemented for waters classified as "trout water," and the construction timing window identified in our Procedures for warm-water fisheries (June 1 through November 30) would be implemented for all other waterbodies.

The Arkansas Pollution Control and Ecology Commission (APCEC) defines fisheries of special concern as important fisheries of exceptional recreational or commercial value, or as those that provide habitat for

special status species, i.e., threatened, endangered, or sensitive species (APCEC, 2006). Extraordinary Resource Waters are waters with a beneficial use that is a combination of the chemical, physical, and biological characteristics of the waterbody and its watershed and which is characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential, and intangible social values. Ecologically Sensitive Waterbodies are those waterbodies with segments known to provide habitat within the existing range of threatened, endangered, or endemic species of aquatic or semi-aquatic life forms. APCEC also defines trout waters as water suitable for the growth and survival of trout.

The proposed Fayetteville Lateral would cross several waterbodies designated as Extraordinary Resource Waters, including Big Creek in White County, Cadron Creek in Faulkner County, and the Cache River in Woodruff County. Cadron Creek also is listed on the State Registry of Natural and Scenic Rivers. Cadron Creek, Big Creek, and Bayou De View also are listed on the NRI. Waterbodies on the NRI are believed to possess one or more outstandingly remarkable (natural or cultural) values judged to be of more than local or regional significance. Departee Creek in White County is designated as an Ecologically Sensitive Waterbody because it supports the flat floater mussel. Texas Gas would cross Big Creek, Cache River and Bayou DeView using HDD methods, thereby minimizing potential impacts on these waterbodies. Cadron Creek and Departee Creek would be crossed using conventional open-cut methods. The ANHC expressed concern regarding the open-cut crossing of the Cadron Creek and recommended that BMPs be implemented to minimize waterbody and adjacent riparian habitat impacts. Texas Gas would minimize impacts by implementing our Procedures and would continue to coordinate with appropriate agencies about impacts to these waterbody crossings.

About 50 miles of the Little Red River, from just below Greers Ferry Dam to the Town of Searcy, Arkansas, is designated as a Trout Water. The Little Red River is one of the most popular fishing and floating streams in Arkansas. The proposed Fayetteville Lateral would cross the Little Red River about 41 miles downstream of the Greers Ferry Dam. Texas Gas would construct the pipeline across the Little Red River by HDD, thereby minimizing potential impacts on this fishery.

Several waterbodies that would be crossed by the Fayetteville Lateral also support species of special concern. Glaise Creek, at MP 66.2 in White County, supports the taillight shiner (*Notropis maculates*), and the White River, crossed at MP 70 in White County, is known to support the hickorynut mussel (*Obovaria olivaria*) The White River would be crossed by HDD, thereby minimizing potential impacts on this fishery. Texas Gas would cross Glaise Creek using open-cut methods and would implement the mitigation measures of our Procedures, including the construction timing window, to avoid impacts on fish during spawning.

In Mississippi, waterbodies are classified by uses. All of the waterbodies that would be crossed by the proposed Project are classified as Fish and Wildlife. A regulatory program that designates fisheries of special concern does not currently exist in Mississippi; however, the MDWFP indicates that several waterbodies support species of special concern, including Deer Creek and Bogue Phalia in Washington County and Big Sunflower River in Washington and Humphreys Counties. Perennial waterbodies in Coahoma County may contain potential habitat for the fat pocketbook, an endangered mussel species. Streams within the Big Black River, Yazoo, and Mississippi Alluvial Plain drainages also have been identified in Mississippi's Comprehensive Wildlife Conservation Strategy as supporting species of greatest conservation need, including the blue sucker and paddlefish (MDWFP, 2005). Texas Gas would cross Deer Creek, Bogue Phalia, Big Sunflower River, and Big Black River by HDD, thereby minimizing potential impacts on these waterbodies. Perennial waterbodies within the Big Black River, Yazoo, and Mississippi alluvial plain drainages would be crossed using conventional open-cut methods.

Open-cut crossing of waterbodies would be conducted in accordance with our Procedures, and Texas Gas would implement the mitigation measures of our Procedures, including the construction timing windows

for cold-water and warm-water fisheries. Texas Gas would implement any additional conditions or requirements associated with the USACE Section 404 permit and the state 401 Water Quality Certification that may be issued for the Project. Texas Gas indicates that it would continue to coordinate with the appropriate agencies about crossing Cadron Creek and would notify us about any additional agency recommendations or requirements.

4.6.2.2 Commercial and Recreational Fisheries

The Mississippi River supports the most economically significant commercial fisheries in the Project area. Commercial fishing in the Lower Mississippi River corridor includes both marine and freshwater fisheries. The proposed Project would cross the river 300 river miles upstream of the Gulf of Mexico and thus would not impact marine fisheries. The most important freshwater species harvested from the Mississippi River include crayfish, catfish, buffalo, and gar (IEC, 2004). Texas Gas proposes to cross the Mississippi River by HDD, thereby minimizing any potential impacts on the associated fisheries.

Although not commercial fishing in the traditional sense, Arkansas and Mississippi both support large aquaculture industries. The primary fish species produced is catfish. Aquaculture "crops" are raised in man-made earthen ponds that typically rely on groundwater as their primary source of water (Stone and Sheldon, 2006). Although catfish ponds are present in the proposed Project area, Texas Gas indicates that it has developed its pipeline route to avoid impacting any catfish ponds.

Commonly occurring recreational fish species found in waterbodies crossed by the Project include: largemouth bass, catfish, crappie, and bream. The Little Red River, the only designated trout fishery crossed by the Project, is considered a premier-class trout fishery in Arkansas. Recreational fish species occurring in the Little Red River include rainbow, brown, and cutthroat trout (Arkansas Department of Parks and Tourism, 2007). Texas Gas would cross the Little Red River by HDD, thereby avoiding impacts on this trout fishery. In addition, Texas Gas would implement measures in our Procedures to minimize impacts on recreational fisheries.

4.6.2.3 Construction Impacts on Aquatic Resources

Construction of the pipeline system would result in the temporary alteration of open water and temporary disturbance of palustrine wetland habitats (see sections 4.3.3 and 4.4). The use of access roads and extra workspaces and pipe storage yards would not result in permanent fill or alteration of waterbodies and associated aquatic habitats. However, the use of some access roads and possibly some pipe yards may result in temporary disturbance of wetland areas. Operation of the Kosciusko Compressor Station, as currently proposed, would result in the permanent loss of some wetlands. The surface water features along the proposed pipelines range from narrow man-made ditches to lakes and major rivers. This corresponds to a broad range of habitats and species inhabiting those waterbodies.

The Project would cross a total of 70 perennial waterbodies. Pipeline construction and restoration activities within and adjacent to these waterbodies would be conducted in accordance with our Plan and Procedures to minimize impacts on fisheries, their habitat, and other aquatic organisms. Texas Gas's proposed waterbody crossings are listed in table C-5 of appendix C. Depending on the construction method used, direct impacts on aquatic habitat and species would either be avoided (e.g., by use of an HDD to cross the resource) or would occur in localized areas. Waterbody crossings would be accomplished using open-cut or HDD methods. The use of the open-cut crossing method would result in several temporary effects on aquatic resources, including plankton, aquatic vegetation, amphibians, fish, and aquatic invertebrates such as mussels. Impacts on water quality and associated aquatic habitats would include sedimentation, turbidity, altered water temperatures and dissolved oxygen levels, and possible introduction of contaminants, if present, all of which can affect the ability of aquatic life to survive and

reproduce. Impacts also would include the physical disturbance or destruction of in-stream habitat due to trenching and removal of riparian vegetation. Construction activities also would result in blockage of fish migration, interruption of spawning activities, as well as entrainment of fishes or reduced stream flows during withdrawals for hydrostatic testing.

Pipeline construction using open-cut methods would result in sedimentation and turbidity in surface waters and aquatic habitats. Benthic macroinvertebrates, which typically provide a key food source for fishes, may be buried under accumulated sediments along with fish nesting sites containing eggs or larvae. However, waterbodies within the Project area tend to have relatively low gradients; and water flow velocities tend to be low, indicating that suspended sediments within these waterbodies would be transported only over short distances. Some of these impacts would be lessened or avoided by using appropriate sediment and erosion controls during construction, minimizing the clearing of riparian vegetation, and restoring riparian and wetland areas.

Clearing overhanging vegetation in riparian and adjacent wetland areas and removal of undercut banks, logs, and other streamside features that provide cover for fish would result in decreased shading, increased water temperatures, and displacement of fish from disturbed areas. However, streamside clearing would be localized and would occur within the construction right-of-way. Overall, these impacts would be minor, as they would affect a relatively small length of a much longer, linear, stream feature.

The open-cut method also would affect fish by blocking migration pathways and interrupting spawning activities. Our Procedures require that, in waterbodies with cold-water fisheries, in-stream work be completed between June 1 through September 30, and in warm-water fisheries, in-stream work be completed between June 1 and November 30. Although construction disturbances would temporarily displace fish or hinder migrations in waterbodies, we anticipate that these affects would be localized, temporary, and generally minor.

To avoid direct impacts on aquatic habitat, Texas Gas would cross 17 waterbodies by HDD. The HDD method (see section 2.5.1) is considered a preferred method for crossing sensitive habitats because stream bottom disruption and subsequent impacts on aquatic habitats along that portion of the pipeline route would be eliminated or minimized. Texas Gas has developed an HDD Plan that describes the procedures that would be implemented to monitor, contain, and clean up any potential releases of drilling fluids during HDD operations. In addition, Texas Gas has developed an HDD Contingency Plan in the event that HDD fails. Any modifications to the crossing method would be reviewed and approved by the appropriate federal and state resource agencies prior to Texas Gas implementing the modification. Given these protective measures, we believe that the use of HDDs at the proposed locations would minimize impacts on aquatic habitats and species.

Pollutants could be introduced into waterbodies and aquatic habitats by the disturbance of contaminated soils or sediments, accidental spills, and inadvertent release of drilling fluids during HDD operations. Pollutants could affect fish and other aquatic life through acute or chronic toxicity, and sub-lethal effects could affect reproduction, growth, and recruitment. In addition, pollutants could be introduced during the discharge of hydrostatic test waters if any chemicals are added to the test water during this procedure. However, Texas Gas has stated that it would not use chemicals during hydrostatic testing of the proposed Project. Texas Gas would implement its SPCC Plan to prevent and contain spills of contaminating materials that might occur during construction of the Project, and it would comply with our Procedures to structure its operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. The disturbance and resuspension of contaminated soils and sediments would result in adverse impacts on water quality and in-stream habitat. Texas Gas would coordinate crossings of waterbodies with known contaminated sediments with the ADEQ and MDEQ (see

section 4.3.2). Given these conditions and protective measures, the risks to water quality and aquatic species from contaminated sediments, accidental spills, and inadvertent releases of drilling fluids is low.

Entrainment of fish and other aquatic organisms could occur during withdrawal of hydrostatic test water from the source waterbodies listed in table 4.3.2-5. Texas Gas would prevent or limit impacts from hydrostatic testing by implementing the measures in our Procedures. These measures include screening to limit entrainment of fishes and maintenance of adequate flow rates to protect aquatic life during withdrawals for hydrostatic testing.

While the majority of impacts of pipeline construction on fish and other aquatic organisms would be expected to be localized and short term, longer-term impacts could occur if habitat is permanently altered. We believe that successful implementation of the construction methods and mitigation measures proposed by Texas Gas and identified in our Procedures would minimize impacts on aquatic resources during construction of the Project.

4.6.2.4 Post-Construction and Operational Impacts on Aquatic Resources

Post-construction and operational impacts of the pipeline on aquatic resources would be minimal. Restoration of the vegetation within the construction work areas would minimize potential impacts from erosion on waterbodies. Minimal impact on fisheries is expected from maintenance mowing or manual removal of woody vegetation in the vicinity of the pipeline right-of-way because maintenance activities would be performed in accordance with our Plan and Procedures. These require that vegetation maintenance adjacent to waterbodies be limited so that a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark, would be allowed to permanently revegetate with native plant species across the entire construction right-of-way. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in a herbaceous state, and trees that are located within 15 feet of the pipeline that are greater than 15 feet in height may be cut and removed from the permanent right-of-way. Adherence to our Plan and Procedures would allow for the continued re-growth of vegetation along the edges of the waterbodies, thus minimizing long-term effects on the fisheries. We believe that if the maintenance activities described in our Plan and Procedures are implemented and if riparian areas are successfully revegetated, then operation of the Project would have minimal impact on aquatic resources.

4.7 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

Federal agencies are required by Section 7 of the ESA (Title 19 USC Part 1536(c)), as amended (1978, 1979, and 1982), to ensure that any actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of a federal-listed endangered or threatened species, or result in the destruction or adverse modification of the designated critical habitat of a federal-listed species. A federal "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future. Candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA.

As the lead action agency for the proposed Project, the FERC is required to consult with the USFWS to determine whether federal-listed endangered or threatened species or designated critical habitat are found in the vicinity of the proposed Project, and to determine the proposed action's potential effects on those species or critical habitats. For actions involving major construction activities with the potential to affect listed species or designated critical habitat, the federal agency must prepare a BA for those species that

may be affected. The action agency must submit its BA to the USFWS and, if it is determined that the action may adversely affect a listed species, the federal agency must submit a request for formal consultation to comply with Section 7 of the ESA. In response, the USFWS would issue a Biological Opinion (BO) as to whether or not the federal action would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

Texas Gas informally consulted with the FWS to determine if federal-listed endangered, threatened, or candidate species; and Arkansas and Mississippi state listed threatened, endangered, special concern or sensitive species could potentially occur in the proposed Project area. The species identified during these consultations are listed on table 4.7-1 and described in the following sections.

TABLE 4.7-1

Federally Listed Endangered or Threatened Species Potentially Occurring in the Project Area

Common Name (Scientific Name)	Status	Preferred Habitat/ Potential Use of the Project Area	Determination
Mammals			
Louisiana black bear (*Ursas americanus luteolus*)	E MS - SC	Bottomland hardwood and floodplain forests along the Mississippi River and in the southern part of Mississippi.	Not likely to adversely affect
Birds			
interior least tern (*Sterna antillarum athalassos*)	E AR- SC MS- SC	Sand and gravel bars within wide, unobstructed river channels, or open flats along shorelines of lakes and reservoirs.	Not likely to adversely affect
ivory billed woodpecker (*Campephilus principalis*)	E	Thick hardwood swamps and pine forest with large amounts of dead and decaying trees. Rediscovered in 2004 in the Big Woods of Arkansas within the Bayou De View Management Area. Last observed about 11 miles south of the Project.	Not likely to adversely affect
wood stork (*Mycertia Americana*)	E MS- SC	Freshwater wetlands, including ponds, bayheads, flooded pastures, oxbow lakes, and ditches. Nest in bald cypress trees in swamps. Recent U.S. breeding is restricted to Florida, Georgia, and South Carolina. Potential to occur in counties bordering the Mississippi River.	Not likely to adversely affect
Mussels			
fat pocketbook (*Potamilus capax*)	E	Clean loose sand and gravel in medium to small waterbodies. Mississippi: Coahoma County. Arkansas: St. Francis, Lee, and Phillips Counties. Perennial waterbodies.	Not likely to adversely affect
scaleshell (*Leptodea leptodon*)	E	Occurs in medium to larger rivers with low to medium gradients. Primarily inhibits stable riffles and runs with gravel or mud substrate and moderate current velocity. Arkansas: Perennial waterbodies in St. Francis, Lee, and Phillips Counties.	Not likely to adversely affect
speckled.pocketbook (*Lampsilis streckeri*)	E	Course to muddy sand in depths up to 1.3 feet. It has been found only in well-oxygenated water with a constant flow. Arkansas: Perennial waterbodies in Cleburne County.	Not likely to adversely affect
pink mucket (*Lampsilis abrupta*)	E	Found in mud and sand and in shallow riffles and shoals swept free of silt in major rivers and tributaries. Arkansas: Perennial waterbodies in Woodruff County.	Not likely to adversely affect
Insects			

TABLE 4.7-1

Federally Listed Endangered or Threatened Species Potentially Occurring in the Project Area

Common Name (Scientific Name)	Status	Preferred Habitat/ Potential Use of the Project Area	Determination
American burying beetle (*Nicrophorus americanus*)	E	Lives in a variety of habitat, with a slight preference for grasslands and open understory oak hickory forests. Carrion specialists, they need carrion the size of a dove or chipmunk to in order to reproduce. Carrion availability may be the greatest factor in determining where the species can survive. Arkansas: Cleburne County.	Not likely to adversely affect
Fish			
pallid sturgeon (*Scaphrhynchus albus*)	E	Adapted for living close to the bottom of large, silty rivers with swift currents. Preferred habitat is made up of sand flats and gravel bars. Known to occur in the Mississippi River.	Not likely to adversely affect
Plants			
pondberry (*Lindera melisifolia*)	E	Poorly drained swampy depressions associated with small sand dunes. These depressions are typically underwater (up to 12 inches) during the spring but are very dry by autumn. Overstory vegetation is typically a closed canopy of mature bottomland hardwoods.	Not likely to adversely affect

_____

Key:

T = Threatened

E = Endangered

SC = Special Concern

4.7.1 Federally Listed Threatened and Endangered Species

Based on consultation with the FWS and a review of existing records, we have identified 12 federally listed threatened or endangered species potentially occurring in the vicinity of the proposed Project. A description of these species, their preferred habitats and potential for occurrence, and our assessment of potential impacts on them resulting from construction and operation of the proposed Project is provided below.

4.7.1.1 Mammals

Louisiana Black Bear (Ursus americanus luteolus)

The federally threatened Louisiana black bear is one of 16 subspecies of the American black bear (*U. americanus*). A habitat generalist, it often overwinters in hollow cypress trees in or along sloughs, lakes, and riverbanks in bottomland habitat. These bears are mobile, opportunistic, largely herbivorous omnivores that exploit a variety of foods. Their movements closely track the distribution and abundance of foods, particularly mast. Habitat requirements include hard and soft mast, escape cover, denning sites, corridor habitats, and some freedom from disturbance by humans (FWS, 1995).

The Louisiana black bear's habitat consists primarily of bottomland hardwood timber found in river basin habitats. The primary threats to this species are continued loss of bottomland hardwoods and fragmentation of remaining forested tracts. Changes in land use and conversion of virgin forest for

farming combined to bring about the decline of the Louisiana black bear. The Louisiana black bear is now primarily restricted to the Tensas and Atchafalaya River Basins in Louisiana; however, these bears make long-range movements and not uncommonly occur in adjacent Mississippi. It is unknown whether breeding numbers exist outside of Louisiana.

The Louisiana black bear occurs primarily in bottomland hardwood and floodplain forest along the Mississippi River and in the southern part of Mississippi. According to the FWS, the species is known to occur in Humphrey, Holmes, and Attala Counties, Mississippi (FWS, 2006a). In addition, the MDFWP reports that the bear may occur in Washington, Sunflower, and Coahoma Counties, Mississippi (MDFWP, 2006).

Adverse impacts on the Louisiana black bear can result from activities that fragment forest corridors or remove denning trees. Denning trees are defined as bald cypress (*Taxodium distichum*) and tupelo gum (*Nyssa* sp.) with visible cavities, having a diameter at breast height of 36 inches or greater, and occurring in or along rivers, lakes, streams, bayous, sloughs, or other waterbodies. In a letter dated April 12, 2007, the FWS recommended that Texas Gas avoid cutting or removing actual or candidate denning trees for black bears.

Louisiana black bears were not observed during the field surveys, and no candidate or actual denning trees were identified during biological surveys completed along the proposed Project route. To identify actual or candidate denning trees within the construction corridors, Texas Gas would continue visual surveys using environmental inspectors trained to recognize such trees. In accordance with FWS recommendations, Texas Gas would avoid cutting of actual or candidate denning trees during construction. If actual or candidate denning trees are discovered within the construction corridor at locations where impacts appear unavoidable, Texas Gas would initiate further consultation with the FWS to determine an acceptable resolution. Therefore, we have determined that construction and operation of the proposed Project would not adversely affect the Louisiana black bear or its critical habitat.

4.7.1.2 Birds

Interior Least Tern (Sterna antillarum athalassos)

The endangered interior least tern migrates up the Mississippi River and nests directly on sandbars in and associated with the river. The birds may nest together, forming colonies (FWS, 2006b). The primary threat to the interior least tern has been the loss of habitat from dam construction and river channelization. The breeding season of the interior least tern lasts from May through August, with the peak of the nesting season usually occurring from mid-June to mid-July. No rookeries were identified during the initial survey of the proposed pipeline route.

In accordance with FWS recommendations, Texas Gas would cross the Mississippi River by HDD, thereby minimizing disturbance of the streambed, stream banks, sandbars, or upland areas in the immediate vicinity of the crossing. Based on the Interior Least Tern's habitat requirements, surveys conducted by Texas Gas, and the use of HDD methods to cross the Mississippi River, we have determined that construction and operation of the proposed Project would not likely adversely affect interior least terns or its critical habitat.

Ivory-billed Woodpecker (Campephilus principalis)

The ivory-billed woodpecker (IBWO) was rediscovered within the "Big Woods" of Arkansas in 2004. Until that time, the IBWO was thought to be extinct, as the last confirmed sighting was in 1944. The potential range for the IBWO in Arkansas includes contiguous forested habitats in parts of Arkansas,

Desha, Jefferson, Lincoln, Monroe, Phillips, Prairie, and Woodruff Counties. Within these counties, the IBWO potential range is further defined as the mostly contiguous forest of the lower White River floodplain, encompassing the Cache River and White River NWRs, the AGFC's Dagmar and Wattensaw WMAs, and adjacent contiguous forested private lands. The perimeter of the IBWO potential range generally follows the edge of large contiguous forests but also includes forested corridors extending outward from the edge of core contiguous forest until the width decreases to less than 0.25 mile for a distance of more than 0.25.

Texas Gas states that, based on the lack of evidence that this species is present or has recently inhabited the Bayou De View area, and the fact that the proposed Project would be 11 miles north of the northernmost boundary of the Bayou De View Managed Access Area, the potential for IBWO habitat appears remote. In a letter dated May 2, 2007, the FWS recommended that Texas Gas avoid water quality degradation and habitat disturbance by boring under the Cache River, Bayou De View, and their associated wetlands. Texas Gas would cross these sensitive habitats by HDD, thereby avoiding impacts on potential IBWO habitat. In the event that HDD fails, Texas Gas would re-initiate consultation with the appropriate agencies to determine an acceptable alternative crossing method and develop appropriate mitigation, if necessary. Based on the information above, we have determined that construction and operation of the proposed Project would not likely adversely affect the IBWO or its critical habitat.

Wood Stork (Mycteria americana)

The FWS lists the wood stork as endangered in Florida, Georgia, Alabama, and South Carolina; however, wood storks are known to move northward after breeding, as far as Arkansas and Tennessee in the Mississippi Valley.

No wood stork or wading bird rookeries were observed during field surveys; however, the MDWFP reported that wood storks have been observed in Mississippi counties bordering the Mississippi River (e.g., Coahoma County) and that nesting usually occurs in bald cypress swamps. Coahoma County may be on the periphery of the wood stork's range. Based on wood stork habitat requirements, surveys conducted by Texas Gas, the absence of wood stork sightings, and the lack of suitable habitat, we have determined that construction and operation of the proposed Project would not likely adversely affect the wood stork or its critical habitat.

4.7.1.3 Fish

Pallid Sturgeon (Scaphrynchus albus)

The endangered pallid sturgeon, one of the largest fish inhabiting the Mississippi River, requires large, turbid, free-flowing riverine habitats. Like other sturgeon, the pallid's mouth is toothless and positioned under the snout for sucking small fish and other food items from the river bottom. Modification of the pallid sturgeon's habitat by human activity has blocked fish movement, destroyed or altered spawning areas, reduced food sources or ability to obtain food, altered water temperatures, reduced turbidity, and have contributed to the species population decline (FWS, 1993).

Texas Gas would cross the Mississippi River using HDD methods. Based on habitat requirements for the pallid sturgeon, and use of HDD to cross the Mississippi River, we have determined that construction and operation of the Project would not likely adversely affect the pallid sturgeon or its critical habitat.

4.7.1.4 Mussels

Fat Pocketbook Pearly Mussel (Potamilus capax)

The fat pocketbook pearly mussel is listed as federally endangered and is known to occur in the large perennial waterbodies of Arkansas and Mississippi. This mussel inhabits areas with a mixture of sand, silt, and clay substrates, solitarily or in groups with other species. Channel maintenance activities and impoundments are the greatest threats to the survival of this species (FWS, 2007c).

Scaleshell Mussel (Leptodea leptodon)

Listed as federally endangered, the scaleshell mussel is known to occur in medium to large rivers with low to medium gradients in Arkansas and Mississippi. The scaleshell is a ridged and elongated mussel with a yellow-green or brown shell and faint green rays. This mussel inhabits gravel or mud substrates in stable riffles or runs with a moderate water current velocity. High water quality is essential to this species' survival. Spread of the invasive zebra mussel (*Dreissena polymorpha*), non-point source pollution, and reservoir construction are factors known to contribute to the decline of the scaleshell population (FWS, 2007c).

Speckled Pocketbook Mussel (Lampsilis streckeri)

Listed as federally endangered, the speckled pocketbook mussel is known to occur in perennial waterbodies in Arkansas. The speckled pocketbook is a medium-sized mussel with a yellow-brown shell, v-shaped spots, and chain-like rays. This mussel is known to inhabit coarse to muddy sand substrates in consistent flowing water with high dissolved oxygen contents. In 2003, the only known remaining population existed in the Middle Fork of the Little Red River. As recently as 2005, however, populations were found to have persisted in all forks of the Little Red River. Gravel mining, cattle grazing, non-point source pollution, and production of natural gas using river water are factors believed to be contributing to the decline of the speckled pocketbook population (FWS, 2007c).

Pink Mucket (Lampsilis abrupta)

Listed as federally endangered, the pink mucket mussel is known to occur in perennial waterbodies in Arkansas. The pink mucket is a medium-sized mussel with a yellow-green shell and green rays. This species is known to inhabit sand and gravel substrates in high-velocity currents, but it also has been found in mud and sand substrates in slow-moving waters. Prior to becoming endangered, populations of this mussel were known to exist in 25 rivers and tributaries in the Midwest and Southeast U.S. Threats to this species include habitat modifications such as impoundments, channelization, and dredging, as well as commercial harvesting (FWS, 2007c).

All waterbodies in Mississippi and six waterbodies in Arkansas that provide potential habitat for mussel species would be crossed by HDD. Impacts on mussel species in these waterbodies would be avoided. In the event that HDD operations fail, Texas Gas would coordinate alternative crossings methods with the appropriate state and federal agencies.

In accordance with recommendations from the FWS and AGFC, Texas Gas conducted mussel surveys in 12 specific Arkansas waterbodies that it proposes to cross using conventional open-cut methods. These waterbodies include: Cove Creek (MP 7.9), Batesville Creek (MP 12.8), Cadron Creek (MP 14), Piney Creek (MP 29.7), Jones Creek (MP 32), Graham Branch (MP 32.9), Brier Creek (MP 48.1), Chinquapin Creek (MP 58.9), Glaise Creek (MP 66.5), East Flat Fork Creek (MP 107.7), Big Creek (MP 111.6), and Long Lake Bayou (MP 153). The surveys were conducted by a qualified malacologist in September

2007. The surveys extended about 100 feet upstream and 300 feet downstream of each pipeline crossing. No threatened or endangered mussel species were identified during the surveys. Texas Gas states that the final report of findings will be filed with the FERC and the appropriate agencies.

Pipeline construction and restoration activities within and adjacent to these waterbodies would be conducted in accordance with our Plan and Procedures to minimize impacts on mussels and their habitat. Based on the information above, we believe that construction and operation of the proposed Project would not likely adversely affect the fat pocketbook pearly mussel, scaleshell mussel, speckled pocketbook mussel, or pink mucket mussel or their critical habitat. However, after review of the pending mussel survey report, we will make a determination about project impact on these species.

4.7.1.5 Insects

American Burying Beetle (Nicrophorus americanus)

The endangered burying beetle was recorded historically from at least 150 counties in 35 states in the eastern and central U.S., as well as along the southern fringes of Ontario, Quebec, and Nova Scotia in Canada. Considering the broad geographic range formerly occupied by the American burying beetle, it is unlikely that vegetation or soil type were historically limiting. Today, the American burying beetle seems to be restricted to areas largely undisturbed by human activities. Carrion availability (appropriate in size as well as numbers) may be more important than the type of vegetation or soil structure in determining where these beetles occur; however, specific habitat requirements are unknown (FWS, 2007d).

The FWS reports that the American burying beetle is known to occur in counties west of the Project area. ANHC's online database indicates that this species is known historically from Cleburne County, Arkansas, and is ranked as a species of special concern in Cleburne County by the ANHC. However, the last known siting in Cleburne County was in 1969. No evidence of the American burying beetle was identified during field surveys. Based on this information, we have determined that construction and operation of the proposed Project would not likely adversely affect the American burying beetle or its critical habitat.

4.7.1.6 Plants

Pondberry (Lindera melissifolia)

The endangered pondberry is a deciduous aromatic shrub that grows about 6 feet tall and is known to occur in seasonally flooded wetlands, sandy sinks, pond margins, and swampy depressions. It is known to occur in the Yazoo delta region of Mississippi and in Clay, Woodruff, Lawrence, and Jackson Counties in Arkansas. The FWS and ANHC recommend that a visual survey for pondberry be conducted in potential habitat throughout the Project area. The FWS stated that if pondberry is found in any seasonally flooded wetlands that would be impacted by the proposed Project, further consultation with the FWS would be required.

Texas Gas did not observe any occurrences of pondberry during Project field surveys. In addition, as part of construction, Texas Gas would employ trained environmental inspectors to conduct visual surveys of potential pondberry habitat within the construction corridor. If pondberry are encountered within the construction corridor, Texas Gas would initiate further consultation with us and the FWS and ANHC. The ANHC concurs with Texas Gas's statement that no pondberry was discovered during field surveys; however, it recommend that Texas Gas avoid potential pondberry habitat (i.e., sandpond forest and wooded depressional habitat) wherever possible (Osborne, 2007). Texas Gas states that it would attempt to minimize the number of crossings in these sensitive areas and would consult with appropriate land

management agencies to determine suitable crossing methods. We have determined that construction and operation of the Project would not likely adversely affect pondberry or its critical habitat. However, to address the ANHC's recommendations that Texas Gas avoid impacts on pondberry habitat, **we recommend that:**

- **Prior to the end of the draft EIS comment period, Texas Gas file with the Secretary a table that identifies the milepost locations of potential pondberry habitat within or immediately adjacent to construction workspaces and explain how it would implement the ANHC's recommendations to avoid suitable pondberry habitat (i.e., sandpond forest and wooded depressional habitat) at each location. Texas Gas should file an update of its consultation with the FWS and ANHC about the pondberry.**

4.7.2 Candidate for Federal Listing

Yellow Cheek Darter (Etheostoma moorei)

The yellow cheek darter is a candidate species for possible listing as endangered or threatened under the ESA. This species is endemic to and in decline in the Little Red River. Although candidate species are not given the protection of the ESA, federal agencies encourage avoidance to minimize impacts on candidate species to potentially prevent the need to list the species. Conservation agreements that protect, restore, and manage candidate species are highly encouraged (FWS, 2007e). Texas Gas would cross the Little Red River by HDD, so impacts on the waterbody and the yellow cheek darter would be avoided or minimized. Therefore, we have determined that construction and operation of the proposed Project would not affect the yellow cheek darter or its critical habitat.

4.7.3 Federally Managed Species

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle was recently delisted from the federal threatened and endangered species list. However the Bald eagle is still protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The bald eagle also is listed as a state species of special concern in Faulkner and Cleburne Counties, Arkansas, and Coahoma County, Mississippi. Bald eagles are associated with riparian habitat along coasts, rivers, and lakes. They are opportunistic foragers, and their diet varies based upon the prey species available.

Bald eagles could potentially nest, migrate, and roost throughout the Project area. Arkansas is considered a favorite wintering ground for bald eagles, whose arrival generally coincides with that of migrating waterfowl in late October and peaks in January and February. Bald eagles also are known to nest in Arkansas from December through January.

Along the proposed Fayetteville Lateral route, Texas Gas observed a mature bald eagle perched in a large, isolated snag about 2.2 miles east of the Bayou De View crossing near MP 95.9; an immature bald eagle was observed hunting over a rice field about 1.9 miles southwest of MP 99; and a pair of mature bald eagles was observed at a nest in a snag located about 100 feet south of an existing unimproved road that may be used as a temporary access road during pipeline construction; however, the section of the road that would be used for access is about 0.9 mile south of the observed nest. No bald eagles or nesting sites were observed during the initial surveys in the vicinity of the proposed Greenville Lateral route.

The FWS Arkansas Field Office recommends that it be consulted prior to performing any construction activities within 660 feet of Bald Eagle nest trees. Furthermore, Texas Gas should implement the

National Bald Eagle Management Guidelines (Bald Eagle Guidelines) (FWS, 2007b) to protect bald eagles. The FWS Mississippi Field Office recommends that further consultation with the Service may be required for any construction activities within 1,500 feet of a bald eagle nest during the nesting season. No nesting sites have been observed within 1,500 feet of the construction areas. However, to avoid or minimize potential impacts on bald eagles, Texas Gas would conduct visual surveys for nests within 1,500 feet of the construction corridor. If bald eagle nests are encountered within 1,500 feet of the construction corridor during construction activities, and Texas Gas would follow the FWS recommendations for avoiding disturbance associated with construction of linear utilities as described in the Bald Eagle Guidelines. With implementation of the protective measures identified above, we believe that construction and operation of the proposed Project would not likely adversely affect the bald eagle or its critical habitat.

4.7.4 State-Listed Threatened and Endangered Species

State-listed threatened and endangered species that are also federally listed are addressed above. The remaining state-listed species are addressed below. Texas Gas states that state-listed species were not identified during its field surveys.

Arkansas State Listed Species

Small-Headed Pipewort (***Eriocaulon koernickianum*****).** State-listed as endangered, small-headed pipewort is known to occur in 11 counties in Arkansas, including Conway County, which would be crossed by the proposed Project (NatureServe, 2007). The small-headed pipewort is intolerant of shade and can be found in or near permanently moist to wet seepage areas (particularly upland sandstone glade seeps), bogs, and prairie stream banks. The small-headed pipewort was not observed during Project field surveys.

Alabama Snow Wreath (*Neviusia alabamensis*). State-listed as endangered, Alabama snow wreath is a deciduous species that typically grows in large clumps up to 1 to 2 meters in height. The Alabama snow wreath can be distinguished by its thicket-forming growth habit under an open to completely closed forest canopy. The Alabama snow wreath inhabits forested bluffs, talus slopes, and stream banks on blocky limestone boulders and along limestone-bedded intermittent streams below the sandstone caprock on the Cumberland plateau. Texas Gas reports that the Alabama snow wreath was not observed during field surveys.

Arkansas Alumroot (*Heuchera villosa* var. *arkansana*). State-listed as endangered, Arkansas alumroot is endemic to Arkansas and is known to exist from the Ozark and Ouachita Mountains in north-central to northwestern Arkansas. Arkansas alumroot inhabits bluffs, cliffs, and rocky woods, generally on sandstone (ANHC, 2007c). Texas Gas states that the Arkansas alumroot was not observed during field surveys.

Mock Orange (*Philadelphus hirsutus*). State-listed as endangered, mock orange is a deciduous shrub that grows to about 6 feet in height. Mock orange occurs along streams and on bluffs, cliffs, and rocky banks. It grows along limestone ledges and in piles of sandstone or quartzite rocks. Mock orange is found in eight Arkansas counties, but the Project would pass through only two of these counties, Cleburne and Faulkner (ANHC, 2007c). Mock orange was not observed during field surveys.

Water Parsnip (*Sium suave*). State-listed as endangered, water parsnip is a hardy perennial that grows to about 6 feet tall. Water parsnip is found in shallow water along pond and lake edges, or in other wet areas such as swamps and roadside ditches. Water parsnip is found in four Arkansas counties, and the Project would cross one, Cleburne (ANHC, 2007c). Water parsnip was not observed during field surveys.

Corkwood (*Leitneria floridana*). State-listed as endangered, corkwood can be found only in Arkansas, Florida, Georgia, Missouri, and Texas. Corkwood is a tree-like shrub that can grow up to about 20 feet tall. Corkwood prefers low, moist, or poorly drained areas with sandy or silty soils in full or partial sun. It is extremely flood tolerant and can survive in complete inundation for long spells. Corkwood typically inhabits freshwater swamps, wetland thickets, pond habitats, brackish tidal streams, and brackish marshes. Corkwood was not observed during field surveys.

Mississippi State-Listed Species

Ironcolor Shiner (*Notropis chalybaeus*). State-listed as endangered in Mississippi, the ironcolor shiner is found primarily in lowland waterbodies where their reaches are characterized by either abundant aquatic vegetation, open swamp habitat, and/or areas draining densely canopied woods. The ironcolor shiner is known to occur in Tchula Lake in Holmes County, Mississippi. Texas Gas would cross Tchula Lake by HDD, thus avoiding impact on this species.

Rabbitsfoot (*Quadrula cylindrical cylindrical*). State-listed as endangered, the rabbitsfoot inhabits medium to larger rivers in gravel or mixed sand and gravel substrates. It is known to occur in the Big Black and Sunflower Rivers in Mississippi (NatureServe, 2007). Texas Gas would cross the Big Black and Sunflower Rivers by HDD, thus avoiding impact on this species.

Alabama Hickorynut (*Obovaria unicolor*). State-listed as endangered, Alabama hickorynut is most commonly found in moderately flowing waters in sand/gravel substrates, but it also can be found in almost any habitat type. The Alabama hickorynut is endemic to small streams leading to the Gulf of Mexico; it is restricted to large streams in the Mobile Basin and has been extirpated from most of its historical range by impoundment and channelization of large stream habitat and/or declining water quality (NatureServe, 2007). Based on the current distribution of this species, the Project would not affect the Alabama hickory nut.

Pyramid Pigtoe (*Pleurobema rubum*). State-listed as endangered, pyramid pigtoe inhabits large rivers but may occur in medium-sized lotic environments. Pyramid pigtoe can be found in the Big Black River, Big Sunflower River, and Yazoo River drainages of Mississippi. Texas Gas would cross the Big Black, Big Sunflower, and Yazoo Rivers by HDD, thus avoiding impact on this species.

Scarlet Woodbine (*Schisandra glabra*). State-listed as endangered, scarlet woodbine is a woody vine with small crimson flowers and is found in rich woods and ravine slopes. Scarlet woodbine occurs in the Atlantic and Gulf coastal plains from Arkansas east to North Carolina, south to northern Florida, and west to Louisiana. Major threats come from competition from non-native invasive species (e.g., Japanese honeysuckle [*Lonicera japonica*]), land-use conversion, habitat fragmentation, and forest management practices (NatureServe, 2007). Scarlet woodbine was not observed during field surveys.

Texas Gas states that it would continue to consult with state agencies to determine whether additional surveys are warranted for any species and, if required, develop mitigation measures to avoid or minimize potential impacts on these species.

4.7.5 Conclusions and Recommendations

A variety of measures have been proposed by Texas Gas that would minimize environmental impacts on federally and state-listed species, including using HDDs to cross sensitive waterbodies, and forested wetlands, and implementing the construction methods and mitigation measures described in our Plan and Procedures. These measures would reduce the loss of vegetated habitats, minimize water quality impacts,

and lessen delays in restoration of areas temporarily disturbed during construction. While beneficial to general wildlife, fisheries, and vegetation in the area, these measures would also benefit listed species with potential to occur in the vicinity of the Project. Based on the information provided to date, we believe that, the Project is not likely to adversely affect threatened or endangered species or their critical habitat.

In a letter dated July 27, 2007, the FWS Mississippi Field Office stated that the Project was not likely to adversely affect federally listed species in Mississippi, and that unless there are changes in the scope or location of the proposed Project, or if federally listed species are discovered during construction, no further consultation with the Mississippi Field Office is required. However, if the proposed Project has not been initiated within one year of the letter, follow-up consultation should be made with the FWS.

We have not completed consultation with the FWS in Arkansas. Therefore, **we recommend that:**

- **Texas Gas not begin construction activities until:**

  a. the FERC completes any necessary consultations with the FWS; and

  b. Texas Gas receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin.

  If construction of the pipeline system has not begun within 1 year from the date of FERC approval of the Project, Texas Gas should consult with the appropriate offices of the FWS to update the species list and to verify that previous consultations and determinations of effect are still current. Documentation of these consultations, and additional surveys and survey reports, if required, and FWS comments on the survey and its conclusions, should be filed with the Secretary prior to beginning construction.

4.8 LAND USE, RECREATION, AND VISUAL RESOURCES

In this section we further quantify the land requirements for construction and operation of the proposed Project, describe current land use types, and evaluate the significance of Project-related impacts on those lands, as well as to specially designated areas, transportation corridors, visually sensitive areas, and hazardous waste sites.

4.8.1 General Land Use Types

The route of the Project would cross nine general land use types: agricultural land, upland forest, managed forest, wetlands, open water, open land, right-of-way, commercial/industrial, and residential. Table 4.8.1-1 summarizes the miles of land use types that would be traversed by the Project in each county.

Construction of the proposed Project would temporarily disturb a total of about 5,057.2 acres of land. This includes the 3,199.6 acres for construction of the proposed pipeline facilities, 113.5 acres for construction of aboveground facilities, 635.0 acres of ATWS, 946.6 acres for pipe and contractor storage yards, and 162.5 acres for access roads. Of this total, about 1,731.2 acres would be permanently maintained for the pipeline right-of-way and aboveground facilities.

4.8.1.1 Pipeline Rights-of-Way

Construction of the Project pipelines would impact a total of about 3,199.6 acres. About 1,602.6 acres of the land disturbed for construction would be retained by Texas Gas as permanent pipeline right-of-way to operate the pipelines, and about 1,597.0 acres would be affected only temporarily during construction and would be restored or allowed to return to pre-construction use and land cover. A detailed breakdown of the land use impacts associated with construction and operation of the pipelines is presented in table 4.8.1-2. Impacts associated with ATWS, aboveground facilities, pipe storage and contractor yards, and access roads are described in sections 4.8.1.3 through 4.8.1.6, respectively

Both the Fayetteville Lateral and the Greenville Lateral would be installed using a nominal 100-foot-wide construction right-of-way. In wetland areas, Texas Gas would reduce the right-of-way to 75 feet, in compliance with our Procedures. Following construction, a permanent 50-foot-wide right-of-way would be maintained for operation in upland areas and a 30-foot-wide corridor would be maintained through wetlands. In addition to the temporary construction right-of-way, additional temporary workspace areas would be required at road and railroad crossings, waterbody crossings, and in areas with steep side slopes or other difficult terrain, as well as in areas needed for topsoil segregation, truck turn-arounds, hydrostatic test water withdrawal and discharge locations, pipeline crossovers, tie-ins, staging and fabrication areas, and at foreign utility crossings (see section 4.8.1.3).

The Fayetteville Lateral would cross about 112.7 miles of agricultural land, 29.5 miles of upland forest land, 10.1 miles of open land, 6.5 miles of wetlands, 3.4 miles of managed forest land, 2.2 miles of existing right-of-way land, 1.7 miles of open water, 0.1 mile of commercial/industrial land, and 0.1 mile of residential land. The Greenville Lateral would cross about 56.1 miles of agricultural land, about 18.3 miles of upland forest land, 9.3 miles of open land, 7.8 miles of wetlands, 1.9 miles of right-of-way land, 1.5 miles of open water, 1.3 miles of managed forest land, and 0.2 mile of residential land use. The proposed Kosciusko 36-inch Tie-in Lateral would cross about 0.3 mile each of agriculture and upland forest land, and about 0.1 mile of open and right-of-way land uses. The proposed Kosciusko 20-inch Tie-in Lateral would cross about 0.3 mile of upland forest and 0.1 mile of right-of-way land uses.

All lands used for construction activities would be restored to preconstruction contours and revegetated. Land along the permanent right-of-way may return to previous land use where that land use does not conflict with operation of the pipeline.

Agricultural Land

Agricultural land would be the land use most impacted by construction and operation of the Project pipelines. A total of about 2,046.6 acres of agricultural land would be disturbed by construction of all Project pipelines. Of this total, about 1,027.9 acres would be within the permanent pipeline right-of-way Project-wide. Along the Fayetteville Lateral, about 1,363.3 acres of agricultural land would be disturbed during construction and about 682.1 acres would be within the permanent pipeline right-of-way. For the Greenville Latera, about 679.3 acres of agricultural land would be disturbed during construction

TABLE 4.8.1-1

Summary of Land Uses Crossed by the Proposed Project (in miles)

County, State	Agriculture	Upland Forest	Managed Forest	Wetlands	Open Water	Open Land	Right-of-way	Commercial/ Industrial	Residential	Total
Fayetteville Lateral										
Conway, AR	1.6	3.0	0.3	0.0	0.1	2.5	0.0	0.0	0.0	7.5
Faulkner, AR	10.2	7.2	0.5	0.4	0.1	2.4	0.5	0.1	0.0	21.4
Cleburne, AR	2.0	2.3	0.1	0.0	0.0	0.4	0.0	0.0	0.0	4.8
White, AR	15.7	14.8	2.1	0.5	0.2	2.6	0.4	0	0.1	36.4
Woodruff, AR	32.7	0.7	0.0	2.8	0.3	1.4	0.4	0.0	0.0	38.3
St. Francis, AR	7.3	0.1	0.0	0.4	0.0	0.2	0.2	0.0	0.0	8.2
Lee, AR	21.8	0.4	0.0	0.4	0.1	0.1	0.3	0.0	0.0	23.1
Phillips, AR	14.3	0.9	0.4	0.9	0.8	0.3	0.2	0.0	0.0	17.8
Coahoma, MS	7.1	0.1	0.0	1.0	0.1	0.2	0.1	0.0	0.0	8.6
Total	**112.7**	**29.5**	**3.4**	**6.5**	**1.7**	**10.1**	**2.2**	**0.1**	**0.1**	**166.2**
Greenville Lateral										
Washington, MS	16.6	0.2	0	0.1	0.1	0.3	0.3	0	0	17.6
Sunflower, MS	2.7	0	0	0	0	0	0	0	0	2.7
Humphreys, MS	21.4	0.7	0	2.3	0.9	0.1	0.3	0	0	25.7
Holmes, MS	12.1	10.5	0.9	2.9	0.3	4.3	0.5	0	0.2	31.7
Attala, MS	3.3	6.9	0.4	2.5	0.2	4.6	0.8	0	0	18.7
Total	**56.1**	**18.3**	**1.3**	**7.8**	**1.5**	**9.3**	**1.9**	**0**	**0.2**	**96.4**
Kosciusko 36-Inch Tie-in Lateral										
Attala, MS	0.3	0.3	0	0	0	0.1	0.1	0	0	0.8
Kosciusko/ 20-Inch Tie-in Lateral										
Attala, MS	0	0.3	0	0	0	0	0.1	0	0	0.4
Project Total	**169.1**	**48.4**	**4.7**	**14.3**	**3.2**	**19.5**	**4.3**	**0.1**	**0.3**	**263.8**

TABLE 4.8.1-2

Summary of Land Use Impacts Associated with Construction and Operation of the Proposed Pipelines (in acres)

County, State	Agriculture		Upland Forest		Managed Forest		Wetlands		Open Water		Open Land		Right-of-Way		Commercial/ Industrial		Residential		Total	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Fayetteville Lateral																				
Conway, AR	20.5	10.0	35.5	18.2	3.1	1.5	0.2	0.1	1.0	0.5	31.4	15.5	0.4	0.2	0.0	0.0	0.0	0.0	92.1	46.0
Faulkner, AR	121.4	61.3	79.8	43.0	5.8	3.2	4.3	3.5	2.2	1.0	28.2	14.2	16.4	3.4	1.0	0.5	0.0	0.0	259.1	130.1
White, AR	188.7	94.6	179.4	89.5	25.3	12.6	6.8	3.3	2.6	1.8	31.7	16.4	6.9	2.8	0.0	0.0	0.8	0.4	442.2	221.4
Cleburne, AR	23.8	11.9	27.3	14.4	0.6	0.3	0.0	0.0	0.2	0.1	4.9	2.4	0.2	0.1	0.0	0.0	0.0	0.0	57.0	29.2
Woodruff, AR	397.6	197.8	8.5	4.8	0.0	0.0	33.9	16.9	3.7	2.6	17.2	8.6	4.4	2.2	0.0	0.0	0.0	0.0	465.3	232.9
St. Francis, AR	89.0	45.1	0.8	0.4	0.0	0.0	5.0	2.5	0.2	0.1	2.0	1.0	2.3	1.1	0.0	0.0	0.0	0.0	99.3	50.2
Lee, AR	263.7	132.0	4.6	2.3	0.0	0.0	4.9	2.3	1.2	0.6	0.8	0.4	3.1	1.6	0.0	0.0	0.4	0.2	278.7	139.4
Phillips, AR	172.8	86.5	10.5	5.2	4.7	2.4	11.1	5.5	9.7	4.9	3.9	2.0	3.1	1.4	0.0	0.0	0.0	0.0	215.8	107.9
Coahoma, MS	85.8	42.9	1.1	0.6	0.0	0.0	12.6	6.3	0.7	0.3	2.6	1.3	1.2	0.6	0.0	0.0	0.0	0.0	104.0	52.0
Total	**1,363.3**	**682.1**	**347.5**	**178.4**	**39.5**	**20.0**	**78.8**	**40.4**	**21.5**	**11.9**	**122.7**	**61.8**	**38.0**	**13.4**	**1.0**	**0.5**	**1.2**	**0.6**	**2,013.5**	**1,009.1**
Greenville Lateral																				
Washington, MS	203.6	101.4	2.4	1.2	0.0	0.0	0.7	0.4	0.8	0.6	3.6	1.8	3.2	1.6	0.2	0.0	0.0	0.0	214.5	107.0
Sunflower, MS	32.2	16.1	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	32.6	16.3
Humphreys, MS	258.7	130.4	7.9	4.0	0.0	0.0	28.7	13.8	10.6	5.3	1.8	0.8	5.0	2.0	0.0	0.0	0.0	0.0	312.7	156.3
Holmes, MS	143.8	75.2	129.8	62.5	10.7	5.3	34.9	17.7	3.0	1.5	51.8	25.9	8.4	3.0	0.0	0.0	1.8	0.9	384.2	192.0
Attala, MS	41.0	20.7	83.4	41.7	5.2	2.6	29.8	14.8	3.0	1.2	53.4	27.8	11.6	5.8	0.0	0.0	0.0	0.0	227.4	114.6
Total	**679.3**	**343.8**	**223.5**	**109.4**	**15.9**	**7.9**	**94.2**	**46.7**	**17.6**	**8.7**	**110.6**	**56.3**	**28.3**	**12.5**	**0.2**	**0.0**	**1.8**	**0.9**	**1,171.4**	**586.2**

TABLE 4.8.1-2

Summary of Land Use Impacts Associated with Construction and Operation of the Proposed Pipelines (in acres)

	Agriculture		Upland Forest		Managed Forest		Wetlands		Open Water		Open Land		Right-of-Way		Commercial/ Industrial		Residential		Total	
Kosciusko 36-Inch Tie-in Lateral																				
Attala, MS	4.0	2.0	3.3	1.7	0.4	0.2	0.0	0.0	0.3	0.2	0.4	0.3	1.4	0.5	0.0	0.0	0.0	0.0	9.8	4.9
Kosciusko 20-Inch Tie-in Lateral																				
Attala, MS	0.0	0.0	4.3	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.0	0.0	4.9	2.4
Project Total	2046.6	1027.9	578.6	291.6	55.8	28.1	173.0	87.1	39.4	20.8	233.7	118.4	67.7	26.7	1.2	0.5	3.0	1.5	3,199.6	1,602.6

Note: The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the exact sum of the addends in all cases.

and about 343.8 acres would be within the permanent right-of-way. Construction of the Kosciusko 36-inch Tie-in Lateral would affect about 4.0 acres of agricultural land during construction and about 2.0 acres would be within the permanent right-of-way. No agricultural land would be affect by construction or operation of the Kosciusko 20-inch Tie-in Lateral.

The primary impact on agricultural land would be the temporary loss of crops within the work area, and possibly immediately adjacent areas, since this land would be taken out of production for one growing season. In addition, construction-related activities could damage or interrupt irrigation. If the flow of irrigation water is disrupted for a prolonged period, crops outside the Project right-of-way could be damaged and crop yields reduced. Following construction, most agricultural land uses would continue within the permanent right-of-way. The only locations where this would change would be at the proposed aboveground facility sites where land use would change to industrial. Because the right-of-way could be used for crop production following construction, any loss of production would be a short-term impact.

About 99 acres of the agricultural land that would be crossed by the Project is characterized as pivot-irrigated crop land. The pivot-irrigated crop land occurs in the four counties listed below for the Fayetteville Lateral and the three counties listed for the Greenville Lateral . Also included are the approximate temporary and permanent impacts on pivot-irrigated crop land:

Fayetteville Lateral Route

- Woodruff County, 19 acres;
- Lee County, 3 acres;
- Phillips County, 9 acres; and
- Coahoma County, 9 acres;

Greenville Lateral Route

- Washington County, 31 acres;
- Sunflower County, 7 acres; and
- Humphreys County, 21 acres.

Pivot irrigation involves the use of a central pivot in the irrigation of crops, often creating a circular pattern in crops when viewed from above. During construction of the pipelines, the presence of large piles of topsoil, an open trench, and construction equipment, etc., would likely make the movement of a pivot irrigation system across the pipeline corridor problematic. Texas Gas would need to coordinate closely with landowners to ensure that crop irrigation continues by another means if pivot irrigation is not feasible during the construction period. Following construction of the pipeline, there would be no permanent impacts on any pivot irrigation systems.

Texas Gas states it would be committed to implementing the mitigation measures in our Plan, and any other applicable management plans in order to minimize potential impacts of construction on agricultural lands and future crop production. Texas Gas would segregate topsoil in lands with annually cultivated or rotated crops, in hayfields, and at the landowner's request. Texas Gas would implement its agriculture compensation program for impacts resulting from construction and operation of the proposed Project, including compensating landowners for anticipated crop losses resulting from construction and operation of the Project. The compensation would be offered prior to construction. Based on the mitigation measures that Texas Gas would implement as part of construction and operation of the proposed Project, we believe that impacts on agricultural lands would not be significant.

Conservation Reserve Program. Established by Congress in 1985, the Farm Service Agency's (FSA's) CRP is a voluntary program for agricultural landowners. The program provides eligible farmers and ranchers both technical and financial assistance to conserve and protect soil, water, and related natural resources on their land. It also provides these individuals guidance and assistance in complying with federal and state environmental laws, thereby enabling environmental enhancement. The CRP encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Participating lands exhibit reduced soil erosion, improved water quality, and enhanced wildlife habitats. These areas are afforded special consideration to avoid any breaches in the landowners' contracts.

It is expected that disturbances to CRP lands would be temporary during construction because they would be restored as soon after final grading as possible to encourage rapid revegetation of herbaceous plant cover and discourage the invasion of weed species. Operation of the Project would not change this land use. The species selected for revegetation could be determined in consultation with the landowner/tenant; however, local agency recommendations would also be taken into consideration.

Special Crops/Orchards

Table 4.8.1-3 lists the special crops (e.g., rice, cotton, sorghum) and orchards (e.g., fruit trees, nut trees) that would be affected by construction and operation of the Project. About 210.6 acres of special crops/orchards would be affected by construction of the Fayetteville Lateral, and 91.2 of these acres would be within the permanent pipeline right-of-way. Along the Greenville Lateral, about 90.5 acres of special crops would be affected by construction, and about 45.1 of these acres would be within the permanent right-of-way. There would be no impacts on orchards along the Greenville Lateral. In addition, there would be no impact on special crops or orchards along the Kosciusko 36-inch Tie-in Lateral or the Kosciusko 20-inch Tie-in Lateral. Compensation for temporary and permanent crop losses would be determined during Texas Gas's easement negotiations with affected landowners/tenants.

About 105.1 acres of land used for rice farming would be affected by Project construction, and 48.9 acres would be within the permanent right-of-way. However, we expect that pre-construction land uses would be reestablished following construction, minimizing long-term impacts. As indicated above in table 4.8.1-3, rice farming occurs along the Fayetteville Lateral in St. Francis, White, Lee, and Phillips Counties and along the Greenville Lateral in Washington and Holmes Counties. Table 4.8.1-3 indicates the milepost, temporary workspace acreage impacts, and acreage of rice crops that would be within the permanent right-of-way. Due to the micro-leveling farming practices associated with rice farming, Texas Gas states that construction through rice fields would begin with notification and discussions with landowners prior to construction activities. Construction activities would be planned to occur at a time that would minimize impacts on special agricultural practices, which typically include flooding of the fields. Texas Gas anticipates requesting that these landowners refrain from flooding fields crossed by the proposed route to allow sufficient time for the fields to dry and therefore allow conventional construction methods to be used. In order to ensure that appropriate mitigation measures are in place to protect rice fields during and after construction, **we recommend that:**

- **Prior to construction, Texas Gas shall develop site-specific crossing plans in consultation with the landowner for each identified rice field impacted by construction and file them with the prior to the end of the draft EIS comment period**.

TABLE 4.8.1-3

Special Crops Crossed by Temporary and Permanent Rights-of-Way

County	Begin Milepost	End Milepost	Special Land Use	Specialty Crop	Temporary Workspace Acreage	Acreage within Permanent Right-of-Way
Fayetteville Lateral Route						
Faulkner	12.2	12.5	Managed Forest	Fruit Tree	3.1	1.6
Faulkner	15.9	16.3	Managed Forest	Fruit Tree	5.2	2.2
Faulkner	17.1	17.3	Managed Forest	Nut Tree	2.2	2.2
Faulkner	17.1	17.3	Managed Forest	Nut Tree	2.2	1.1
White	36.4	37.1	Managed Forest	Fruit Tree	10.5	4.6
White	54	54.2	Managed Forest	Fruit Tree	2.9	1.4
White	60.2	60.3	Special	Cotton	1.3	0.5
White	64.6	65	Special	Cotton	4.6	0.9
White	66	66.3	Special	Cotton	4.7	1.4
White	66.5	66.5	Special	Cotton	0.8	0.3
White	68	68.2	Special	Rice	4.1	1.7
Woodruff	71.3	72.4	Special	Sorghum	15.2	7
Woodruff	75.9	76.3	Special	Sorghum	5	2.4
Woodruff	77.5	77.7	Special	Sorghum	3.1	1.5
Woodruff	78.7	79	Special	Sorghum	3.3	1.5
Woodruff	85.2	85.5	Special	Sorghum	5.3	1.4
Woodruff	86.2	87.6	Special	Sorghum	20.8	8.7
Woodruff	87.8	87.9	Special	Sorghum	1.5	0.8
Woodruff	90.4	90.7	Special	Cotton	3.5	1.6
Woodruff	92.4	93	Special	Cotton	8.1	3.6
Woodruff	93.5	95.3	Special	Cotton/Sorghum	25.8	10.7
Woodruff	98.1	98.78	Special	Cotton/Sorghum	8.6	3.6
Woodruff	106.7	106.9	Special	Cotton	1.8	0.8
St. Francis	109.3	109.7	Special	Sorghum	4.5	2.1
St. Francis	109.9	111.6	Special	Rice	24.7	10.4
St. Francis	113.7	113.9	Special	Cotton	2.5	1
Lee	119.5	119.8	Special	Cotton	3.8	1.8
Lee	120.3	120.5	Special	Rice	3.1	1.4
Lee	121.2	121.3	Special	Rice	1.1	0.5
Lee	137.6	137.9	Special	Rice	4.1	1.9
Lee	138.2	138.5	Special	Rice	3.7	1.5
Phillips	145.9	146.3	Managed Forest	Fruit Tree	4.5	2.3
Phillips	149.5	150.6	Special	Rice	15	6.8
				Total	**210.6**	**91.2**
Greenville Lateral Route						
Washington	4.2	4.7	Special	Rice	6.1	3

TABLE 4.8.1-3

Special Crops Crossed by Temporary and Permanent Rights-of-Way

County	Begin Milepost	End Milepost	Special Land Use	Specialty Crop	Temporary Workspace Acreage	Acreage within Permanent Right-of-Way
Washington	9	9.2	Special	Cotton	3.5	1.7
Washington	9.3	10.4	Special	Cotton	13.5	6.7
Humphries	25.6	25.9	Special	Cotton	4.6	2.3
Humphries	31.2	31.4	Special	Cotton	2.3	1.1
Humphries	34.3	34.7	Special	Cotton	5.9	2.9
Holmes	46.7	50.2	Special	Rice	43.2	21.7
Holmes	51.4	52.4	Special	Cotton	11.4	5.7
				Total	**90.5**	**45.1**
				Project Total	**301.1**	**136.3**

About 30.6 acres of orchards would be affected by Project construction, and 15.4 acres would be within the permanent right-of-way. Table 4.8.1-3 identifies where fruit and nut tree orchards would occur along the Fayetteville Lateral in Faulkner, White, and Phillips Counties, Arkansas. There are no orchards along the Greenville Lateral. The primary impact of construction on orchards would be the temporary removal of trees from the construction right-of-way. Following construction, trees would be allowed outside of a 30-foot-wide permanent corridor centered over the pipeline. After final construction cleanup, orchards would be restored in accordance with our Plan and landowner requests.

Following construction, disturbed special crop and special land use areas would be returned to preconstruction conditions to the extent feasible. Texas Gas would conduct bi-annual monitoring of special crops and special land use areas for two years to determine the success of restoration. If successful restoration does not occur, landowners would be compensated for losses.

Forest Land

Upland Forest. Upland forest includes mixed hardwood and evergreen forests. A total of about 578.6 acres of upland forest land would be disturbed by construction of all Project pipelines. Of this total, about 291.6 acres would be maintained as permanent pipeline right-of-way. About 347.5 acres of upland forest land would be disturbed during construction, and about 178.4 acres would be maintained permanently as open land within the Fayetteville Lateral 50-foot-wide permanent pipeline right-of-way. About 223.5 acres of upland forest land would be disturbed during construction of the Greenville Lateral, and about 109.4 acres would be maintained as open land within the 50-foot-wide permanent right-of-way. Construction of the Kosciusko 36-inch Tie-in Lateral would affect about 3.3 acres during construction, and about 1.7 acres would be maintained as open land within the 50-foot-wide permanent right-of-way. Construction of the Kosciusko 20-inch Tie-in Lateral would affect about 4.3 acres of upland forest, and about 2.1 acres would be maintained as open land within the 50-foot-wide permanent right-of-way.

The primary impact of construction on forest land by the Project would be the removal of trees and shrubs from the 100-foot-wide construction right-of-way. Following construction, trees and shrubs would be allowed to regenerate within the areas that would not be retained as part of the 50-foot-wide permanent

right-of-way. After final construction cleanup, the temporary workspaces would be restored in accordance with applicable permit requirements, our Plan, and landowner requests.

Pipeline construction results in long-term to permanent impacts on forest land use. The impact on forest land use within the permanent 50-foot-wide right-of-way would be the permanent change to open land. Outside of the 50-foot-wide permanent right-of-way, the construction right-of-way would revegate naturally. The rate of forest reestablishment would depend upon the type of vegetation, length of growing season, and natural fertility of the soils. Early successional species would be anticipated to begin colonizing the right-of-way within a few years of construction, followed gradually by the establishment of later successional species. Re-growth to the sapling/young tree stage could take 15 to 30 years, while re-growth of forests to mature conditions could take from 50 to 100 years, depending upon the species. Texas Gas would compensate landowners for loss of timber in accordance with negotiated easement agreements.

The proposed Project would not involve crossing any old growth forests or sugar maple stands.

Managed Forest. Managed forest includes forests planted primarily for timber harvest and fruit/nut tree orchards. A total of about 55.8 acres of managed forest land would be disturbed by construction of all Project pipelines. Of this total, about 28.1 acres would be maintained as permanent pipeline right-of-way. About 39.5 acres of managed forest land would be disturbed during construction, and about 20.0 acres would be maintained as permanent pipeline right-of-way of the Fayetteville Lateral. About 15.9 acres of managed forest land would be disturbed during construction of the Greenville Lateral, and about 7.9 acres would be maintained as permanent right-of-way. Construction of the Kosciusko 36-inch Tie-in Lateral would affect about 0.4 acre during construction, and about 0.2 acre would be maintained as permanent right-of-way. Construction of the Kosciusko 20-inch Tie-in Lateral would not affect any managed forest. Orchards traversed by the Project are described in more detail below with special land use areas.

Similar to upland forests, pipeline construction results in long-term to permanent impacts on managed forest land use. Except in areas that would be retained as part of the 50-foot-wide permanent right-of-way, the construction right-of-way would revegate naturally. Since regrowth of forests could take over 20 years, the impact would be long-term to permanent. The impact on forest land use within the permanent 50-foot-wide right-of-way would be the permanent change to open land. Texas Gas would compensate landowners for loss of timber or orchard crops in accordance with negotiated easement agreements.

Wetlands and Open Water

Impacts on open water and wetlands are addressed in sections 4.3 and 4.4, respectively.

Wetland Reserve Program. The WRP is a voluntary NRCS program that provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands in an environmentally beneficial and cost-effective manner. The program provides an opportunity for landowners to receive financial incentives to restore, protect, and enhance wetlands in exchange for retiring marginal land from agriculture. Under the WRP program, the U.S. government holds an easement (30 years or permanent). The proposed pipeline routes were sited to avoid most WRP lands. However, as indicated in section 4.4, one WRP tract would be traversed by the Greenville Lateral between MP 43.0 and 43.3 in Humphreys County, Mississippi.

Where the pipeline would traverse the WRP tract, the pipeline route avoids a number of forested wetlands and has been sited to specifically avoid a sensitive environmental resource. The pipeline would parallel the south side of an existing road (Mathena Brake Road) within the boundaries of the WRP. The portion

of the WRP tract that would be crossed by the proposed pipeline route would not impact wetlands. High-quality forested wetlands within the WRP tract and associated with Mathena Brake are on the north side of Mathena Brake Road. Forested wetland habitat also has been identified south of the proposed pipeline route within the WRP tract. Impacts from proposed alignment of the pipeline across the WRP tract would be minimized by avoiding wetland habitat as much as possible, paralleling Mathena Brake Road, and avoiding fragmentation of WRP lands. We believe that the proposed pipeline route would minimize potential environmental impacts. Based on our consultation with NRCS, the route as proposed by Texas Gas would be acceptable (Bozeman, 2007).

Impacts on WRP lands would largely be temporary in nature. Following construction, the right-of-way would be restored to preconstruction conditions, or better. Texas Gas would select specific native species for revegetation of the WRP tract in consultation with the landowner/tenant and NRCS.

In order to cross the WRP tract, Texas Gas would be required to obtain a subordination of the U.S. government easement prior to construction. The subordination would be dependent on the development of a restoration plan satisfactory to NRCS. Therefore, **we recommend that:**

- **Prior to construction, Texas Gas file with the Secretary the site-specific restoration plan for construction and restoration of the WRP tract crossed between MP 43.0 and 43.3 of the Greenville Lateral developed in consultation with the NRCS.**

Open Land

Open land includes non-forested rangeland, pastureland, non-agricultural fields, prairie, and open land in the early stages of succession. A total of about 233.7 acres of open land would be disturbed by construction of all Project pipelines. Of this total, about 118.4 acres would be maintained as permanent pipeline right-of-way. About 122.7 acres of open land would be disturbed during construction, and about 61.8 acres would be maintained as permanent pipeline right-of-way of the Fayetteville Lateral. About 110.6 acres of open land would be disturbed during construction of the Greenville Lateral, and about 56.3 acres would be maintained as permanent right-of-way. Construction of the Kosciusko 36-inch Tie-in Lateral would affect about 0.4 acre during construction, and about 0.3 acre would be maintained as permanent right-of-way. Construction of the Kosciusko 20-inch Tie-in Lateral would not affect any open land use.

Open land could be temporarily disturbed during grading, trenching, and backfilling. The primary impact on open land during construction would be the loss of grazing capacity for the duration of the construction period and until grasses and herbs could reestablish the following year. After final construction cleanup, these areas would be reseeded in accordance with Texas Gas's project-specific mitigation plans, agency requirements associated with applicable permits, and landowner recommendations. The majority of grassland uses would continue within the permanent right-of-way. Because the right-of-way could be used for grazing following construction, any loss of grazing capacity would be limited to a short-term construction impact.

Rights-of-Way

Right-of-way land uses include roads, railroads, and utility corridors (e.g., pipelines and powerlines) perpendicularly crossed by or collocated along the proposed pipelines. A total of about 68.3 acres of right-of-way land would be disturbed by construction of all Project pipelines. Of this total, about 26.7 acres would be maintained as permanent Project right-of-way. About 38.0 acres of right-of-way land would be disturbed during construction, and about 13.4 acres would be maintained as permanent Project

right-of-way of the Fayetteville Lateral. About 68.3 acres of right-of-way land would be disturbed during construction of the Greenville Lateral, and about 12.5 acres would be maintained as permanent right-of-way. Construction of the Kosciusko 36-inch Tie-in Lateral would affect about 1.4 acres during construction, and about 0.5 acre would be maintained as permanent Project right-of-way. Construction of the Kosciusko 20-inch Tie-in Lateral would affect about 0.6 acre of right-of-way land, and about 0.3 acre would be maintained within the permanent Project right-of-way. Right-of-way land could be temporarily disturbed during grading, trenching, drilling, and backfilling. Texas Gas would obtain any required permits for crossing roads or working within road rights-of-way and would coordinate with the owners/operators of the utilities to address any issues about working in proximity to their facilities. Following final construction cleanup, these areas would be returned to preconstruction conditions, where feasible, and agency requirements associated with applicable permits would be adhered to. Impacts on this land use would be short-term and temporary.

Commercial/Industrial

Commercial/industrial land includes utility stations, manufacturing and industrial plants, landfills, mines, quarries, and commercial retail facilities. About 1.2 acres of commercial/industrial land would be affected by Project construction. About 1.0 acre of industrial land in Faulkner County, Arkansas, would be affected by construction of the Fayetteville Lateral, and about 0.5 acre would be affected by its operation. About 0.2 acre of commercial/industrial land would be affected by construction of the Greenville Lateral in Washington County, Mississippi; no commercial land would be affected by its operation. No commercial/industrial land would be affected by construction or operation of the Kosciusko 36-inch Tie-in Lateral or the Kosciusko 20-inch Tie-in Lateral. Commercial/industrial structures within 50 feet of construction workspaces are listed by milepost in table 4.8.1-4.

Potential impacts on commercial/industrial land uses would include minor traffic flow interruptions and short-term use restrictions associated with the construction right-of-way. However, Texas Gas states that it would reduce construction activities along public roads during peak traffic times. Construction of the proposed Project may have some temporary impacts on commercial/industrial land use, but operation of the Project is not anticipated to have any impact on commercial/industrial land use.

Residential

A total of about 3.0 acres of residential land would be disturbed by construction of all Project pipelines. Of this total, about 1.5 acres of residential land would be within the permanent right-of-way. Along the Fayetteville Lateral, about 1.2 acres of residential land would be disturbed during construction, and about 0.6 acre would be within the permanent right-of-way. Along the Greenville Lateral, about 1.8 acres of residential land would be disturbed during construction and about 0.9 acre would be within the permanent right-of-way. Construction of the Kosciusko 36-inch Tie-in Lateral and Kosciusko 20-inch Tie-in Lateral would not affect any residential land. Residential structures within 50 feet of construction workspaces are listed in table 4.8.1-5. Twenty-two residences would be within 50 feet and 12 residences would be within 25 feet of the proposed construction right-of-way.

TABLE 4.8.1-4

Commercial/Industrial Structures within 50 Feet of Construction Workspaces

County	Milepost	Approximate Distance (feet) from Construction Workspaces	Approximate Direction from Pipeline Corridor
Fayetteville Lateral			
	--	--	--
Greenville Lateral			
Washington, MS	7.2	0	East
Holmes, MS	51.4	41	Southwest
Holmes, MS	55.1	0	Northeast
Holmes, MS	55.2	36	Northeast
Holmes, MS	64.1	2	North
Holmes, MS	64.2	47	North
Holmes, MS	75.5	20	Northwest
Attala, MS	78.7	21	Northeast
Attala, MS	83.4	0	North
Attala, MS	92.1	10	South
Washington, MS	7.2	0	East
Holmes, MS	51.4	41	Southwest
Holmes, MS	55.1	0	Northeast
Kosciusko 36-Inch Tie-in Lateral			
Attala, MS	- -	- -	- -
Kosciusko/Southern Natural 20-Inch Tie-in Lateral			
Attala, MS	1.2	29	East

Temporary construction impacts on residential areas can include inconveniences caused by some increased construction-related traffic on local roads, noise and dust generated by construction equipment, the presence of on-site construction personnel, and trenching through roads or driveways; ground disturbance of lawns; removal of trees, landscaped shrubs, or other vegetative screening between residences and/or adjacent rights-of-way; potential damage to existing septic systems or wells; and removal of aboveground structures such as sheds or trailers from within the right-of-way. These impacts would be greatest where construction equipment is operating near homes but would diminish quickly once construction activities move away.

Texas Gas also would install and maintain construction fencing at the edge of the construction work area for a distance of 100 feet on either side of the residence and at a minimum maintain this fencing throughout the open trench phases of the pipe installation, as well as maintain a buffer of vegetation, leaving mature trees and landscaping within the edge of the construction work areas, where practicable and feasible. In addition, Texas Gas would restore all work areas following construction in accordance with our Plan.

TABLE 4.8.1-5

Residential Structures within 50 Feet of Construction Workspaces

County	Milepost	Approximate Distance from Construction Workspaces (feet)	Approximate Direction from Pipeline Corridor
Fayetteville Lateral			
Conway, AR	2.6	46	South
Conway, AR	2.6-2.7	37	South
Conway, AR	3.4-3.5	34	South
Faulkner, AR	10.3	20	South
Faulkner, AR	26.4	35	South
White, AR	34.7	0	South
White, AR	38.9	33	South
White, AR	38.9	7	South
White, AR	39.2	27	South
Cleburne, AR	41.2	32	South
Cleburne, AR	41.3	20	North
White, AR	46.9	23	South
White, AR	49.8-49.9	3	North
White, AR	49.8-49.9	45	South
White, AR	54.4	39	North
White, AR	57	39	Southwest
White, AR	62.1-62.2	20	East
White, AR	62.2-62.3	15	Southwest
Coahoma, MS	163.9	16	South
Greenville Lateral			
Holmes, MS	55.1	0	Northeast
Holmes, MS	63.6	15	Northeast
Holmes, MS	65.0	34	South
Holmes, MS	55.1	0	Northeast
Kosciusko 36-Inch Tie-in Lateral			
Attala, MS	--	- -	N/A
Kosciusko/Southern Natural 20-Inch Tie-in Lateral			
Attala, MS	--	--	N/A

Texas Gas would provide site-specific construction details on its construction alignment sheets that would be included with Texas Gas's Project Implementation Plan that would be filed prior to construction. In addition, Texas Gas would provide each landowner with a copy of the site-specific construction plan and obtain an address and or telephone number for construction notification purposes. However, to better address possible issues related to construction on these residential properties**, we recommend that:**

- **Texas Gas file site-specific plans for the residential properties listed on table 4.8.1-5 of the draft EIS prior to the end of the comment period for the draft EIS.**

With Texas Gas's implementation of the measures described above, impacts on residences would be minimized.

4.8.1.2 Use of Existing Rights-of-Way

Fayetteville Lateral

The proposed Fayetteville Lateral would parallel existing pipeline and utility corridors, including an existing Texas Gas right-of-way, for about 90.5 miles, or 54 percent, of its 166.2-mile length. The locations where existing rights-of-way would be used are listed in table 4.8.1-6.

Greenville Lateral

The Greenville Lateral would utilize primarily new right-of-way for most its entire length. Five isolated, short collocations totaling about 6.4 miles would be used, as identified in table 4.8.1-6.

Kosciusko Tie-in Laterals

The *Kosciusko* 36-inch *Tie-In L*ateral and the Kosciusko 20-inch *Tie-in L*ateral would utilize new right-of-way for the entire length of each lateral.

4.8.1.3 Additional Temporary Work Spaces

In addition to the land required for the construction right-of-way, ATWS of various sizes would be required for equipment staging at road and railroad crossings, wetland and waterbody crossings, and in areas with steep side slopes or other difficult terrain, as well as areas used for topsoil segregation, truck turn-arounds, hydrostatic test water withdrawal and discharge locations, crossovers, tie-ins, staging and fabrication areas, at foreign utility crossings, and wherever special construction techniques would be required. Construction of the proposed pipelines would require about 635.0 acres of ATWS, mainly affecting 494.5 acres of agricultural and 92.7 acres of forest (both managed and upland forest) land uses. The proposed ATWSs would be used only during construction of the Project. Once construction is complete, these areas would be returned to preconstruction conditions to the extent feasible. In forested areas, temporary workspaces would revegetate naturally, but since regrowth of forests could take over 20 years, the impact would be long-term to permanent. Table C-7 of appendix C lists the location and existing land use of each proposed ATWS.

TABLE 4.8.1-6

Summary of Collocated Rights-of-Way

State	County	Name	Begin MP	End MP	Length of Right-of-Way Collocations (miles)
Fayetteville Lateral					
AR	Conway	Ozark Pipeline right-of-way	0.5	6.5	6.0
AR	Conway	Ozark Pipeline right-of-way	7.4	7.8	0.4
AR	Faulkner	Ozark Pipeline right-of-way	7.8	7.8	0.0
AR	Faulkner	CenterPoint Pipeline right-of-way	7.8	8.7	0.9
AR	Faulkner	Ozark Pipeline right-of-way	8.7	9.2	0.5

TABLE 4.8.1-6

Summary of Collocated Rights-of-Way

State	County	Name	Begin MP	End MP	Length of Right-of-Way Collocations (miles)
AR	Faulkner	Desoto Gas Pipeline right-of-way	9.2	9.7	0.5
AR	Faulkner	Ozark Pipeline right-of-way	9.8	10.9	1.1
AR	Faulkner	Desoto Gas Pipeline right-of-way	10.9	11.4	0.5
AR	Faulkner	Ozark Pipeline right-of-way	11.4	12.6	1.2
AR	Faulkner	CenterPoint Pipeline right-of-way	12.6	13.2	0.6
AR	Faulkner	Ozark Pipeline right-of-way	13.2	15.1	1.9
AR	Faulkner	Desoto Gas Pipeline right-of-way	15.6	16.1	0.5
AR	Faulkner	Ozark Pipeline right-of-way	16.1	16.4	0.3
AR	Faulkner	CenterPoint Pipeline right-of-way	16.4	19.7	3.3
AR	Faulkner	Ozark Pipeline right-of-way	19.7	20.1	0.4
AR	Faulkner	CenterPoint Pipeline right-of-way	20.1	21.8	1.7
AR	Faulkner	CenterPoint Pipeline right-of-way	22.3	22.8	0.5
AR	Faulkner	Ozark Pipeline right-of-way	22.8	23.6	0.8
AR	Faulkner	Desoto Gas Pipeline right-of-way	23.6	23.7	0.1
AR	Faulkner	CenterPoint Pipeline right-of-way	23.7	29.2	5.5
AR	White	CenterPoint Pipeline right-of-way	29.2	30.3	1.1
AR	White	Desoto Gas Pipeline right-of-way	30.3	32.4	2.1
AR	White	CenterPoint Pipeline right-of-way	33.9	34.3	0.4
AR	White	Desoto Gas Pipeline right-of-way	34.3	34.5	0.2
AR	White	CenterPoint Pipeline right-of-way	34.5	41.1	6.6
AR	Cleburne	CenterPoint Pipeline right-of-way	41.1	41.5	0.4
AR	Cleburne	CenterPoint Pipeline right-of-way	43.0	44.2	1.2
AR	White	CenterPoint Pipeline right-of-way	44.2	45.0	0.8
AR	White	Road right-of-way	49.1	49.7	0.6
AR	White	Road right-of-way	50.0	50.1	0.1
AR	Woodruff	Road right-of-way	76.9	80.2	3.3
AR	Woodruff	CenterPoint Pipeline right-of-way	105.5	108.0	2.5
AR	St. Francis	CenterPoint Pipeline right-of-way	108.0	111.1	3.1
AR	St. Francis	CenterPoint Pipeline right-of-way	112.0	112.2	0.2
AR	St. Francis	CenterPoint Pipeline right-of-way	112.7	113.4	0.7
AR	St. Francis	CenterPoint Pipeline right-of-way	114.5	116.4	1.9
AR	Lee	CenterPoint Pipeline right-of-way	117.7	119.0	1.3
AR	Lee	CenterPoint Pipeline right-of-way	119.4	120.6	1.2
AR	Lee	CenterPoint Pipeline right-of-way	120.9	125.6	4.7
AR	Lee	CenterPoint Pipeline right-of-way	126.8	130.4	3.6
AR	Lee	CenterPoint Pipeline right-of-way	130.8	135.8	5.0
AR	Lee	CenterPoint Pipeline right-of-way	136.2	138.4	2.2

TABLE 4.8.1-6

Summary of Collocated Rights-of-Way

State	County	Name	Begin MP	End MP	Length of Right-of-Way Collocations (miles)
AR	Lee	CenterPoint Pipeline right-of-way	138.6	139.2	0.6
AR	Phillips	CenterPoint Pipeline right-of-way	139.2	142.5	3.3
AR	Phillips	CenterPoint Pipeline right-of-way	142.9	144.5	1.6
AR	Phillips	CenterPoint Pipeline right-of-way	145.5	145.9	0.4
AR	Phillips	CenterPoint Pipeline right-of-way	146.4	148.9	2.5
AR	Phillips	CenterPoint Pipeline right-of-way	149.3	154.5	5.2
AR	Phillips	Texas Gas Pipeline right-of-way	156.7	157.7	1.0
MS	Coahoma	Texas Gas Pipeline right-of-way	157.7	160.9	3.2
MS	Coahoma	Texas Gas Pipeline right-of-way	161.7	163.3	1.6
MS	Coahoma	Texas Gas Pipeline right-of-way	165.0	166.2	1.2
				Subtotal:	**90.5**
Greenville Lateral					
MS	Washington	Texas Gas Pipeline right-of-way	0.0	0.4	0.4
MS	Humphreys	County Road 55 right-of-way	22.9	23.4	0.5
MS	Humphreys	Road right-of-way (Name Unknown)	28.0	28.4	0.4
MS	Humphreys	Methena Road right-of-way	43.0	43.3	0.3
MS	Attala	Illinois Central Railroad right-of-way	85.3	85.8	0.5
MS	Attala	Electric Transmission Line	88.1	92.4	4.3
				Subtotal:	**6.4**
Kosciusko 36-inch Tie-in Lateral					
MS	Attala	NA	0.0	0.8	0
Kosciusko 20-inch Tie-in Lateral					
MS	Attala	NA	0.0	0.4	0
				Total	**96.9**

4.8.1.4 Aboveground Facilities

Texas Gas's proposed aboveground facilities would include one new compressor station, 29 M&R stations, 29 interconnects (tie-ins), 21 MLVs, and six pig launchers/receivers. Table 2.1.2-1 lists the type and location of all proposed aboveground facilities. The size of M&R stations would vary from 0.9 acre to 2.6 acres. The size of each MLV and launcher/receiver would be less than 0.1 acre.

Table 4.8.1-7 identifies land uses that would be affected by construction and operation of aboveground facilities. The principal land use that would be impacted by construction and operation of the compressor station and M&R stations would be agricultural land (80.6 acres). As indicated in table 4.8.1-7, other land uses that would be impacted by the aboveground facilities include upland forest (15.5 acres), open land (5.3 acres), and right-of-way (5.2 acres). Operation of the aboveground facilities would permanently convert the preconstruction land use to industrial land use.

4.8.1.5 Pipe Storage and Contractor Yards

A total of 43 contractor and pipe storage yards, totaling about 946.6 acres, would be used temporarily during Project construction. The contractor and pipe storage yards would be used to set up offices, stockpile pipe, fabricate weights, and concrete-coat joints, as necessary. Table 4.8.1-8 lists the proposed pipe storage and contractor yards. As indicated in table 4.8.1-8 the principal land uses that would be impacted by construction and operation of the pipe storage and contractor yards would be agricultural land and, to a lesser extent, industrial and open land. These yards would be temporarily impacted during construction and restored to preconstruction conditions, or better, following the completion of construction.

4.8.1.6 Access Roads

Texas Gas's use of access roads would affect about 162.5 acres of land. Of this total, about 15.1 acres would be maintained for operation of the Project. To the extent practicable, Texas Gas would use existing roads to provide access for construction, operation, and maintenance of the proposed pipeline. Roads that are paved or graveled would likely not require modification for this purpose. Routine road maintenance such as grading could be required to maintain dirt roads. Table C-8 in appendix C lists the proposed access roads and any anticipated modifications that may be required to make the roadways serviceable. Texas Gas would use existing roads to provide access for construction, operation, and maintenance of the Project facilities. Significant amounts of new land would not be necessary, and minimal existing land uses would be altered to accommodate access.

4.8.1.7 Pipeline Easements

Land use impacts associated with installation of the pipeline include disturbance of existing land uses within construction work areas along the pipeline corridor during construction as well as creation of a new permanent right-of-way for operation and maintenance of the facilities. Texas Gas would obtain an easement from landowners to construct and operate the pipeline and associated facilities. The easement would give the company the right to construct, operate, and maintain the pipeline and establish a permanent right-of-way. In return, the company would compensate the landowner for use of the land. Easement agreements between the company and the landowner typically specify compensation for loss of use during construction, loss of non-renewable or other resources, and allowable uses and restrictions on the permanent right-of-way after construction. These terms can include restrictions on the construction of aboveground structures, including house additions, garages, patios, pools, and any other object not easily removable from the right-of-way, and the planting and cultivating of trees and orchards. The areas used as temporary construction right-of-way and temporary extra workspaces would be allowed to revert to pre-construction uses with no restrictions. The acquisition of an easement is a negotiable process that would be carried out between Texas Gas and individual landowners. The details and content of these agreements are beyond the scope of this EIS.

4.8.2 Planned Residential and Commercial/Industrial Developments

Along the proposed Fayetteville Lateral, no planned developments have been filed with local planning boards within 0.25 mile of the Project corridor within Conway County (Gibson, 2007), Faulkner County (Scroggin, 2007), Woodruff County (Simmons, 2007), or Lee County (Keasler, 2007) in Arkansas, or Coahoma County (Stubbs, 2007) in Mississippi. In northern White County, near MP 55.9, a proposed 8-inch-diameter water line is currently under construction; however, this Project should be completed well before Texas Gas constructs the proposed pipeline. No other planned developments were identified in White or Cleburne Counties (Hargan, 2007). Along the proposed Greenville Lateral, no planned developments have been filed with local planning boards within 0.25 mile of the Project corridor in

TABLE 4.8.1-7

Summary of Land Use Impacts Associated with Construction and Operation of Aboveground Facilities (in acres)

County, State	Agriculture		Upland Forest		Managed Forest		Wetlands		Open Water		Open Land		Right-of-Way		Commercial/ Industrial		Residential		Total	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Fayetteville Lateral																				
Conway, AR	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	1.9	1.9	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3
Faulkner, AR	3.9	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	6.4	6.4
White, AR	15.4	15.4	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.1	0.1	0.0	0.0	0.0	0.0	18.4	18.4
Cleburne, AR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Woodruff, AR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St. Francis, AR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lee, AR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phillips, AR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coahoma, MS	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.8	1.8
Total	**22.2**	**22.2**	**2.0**	**2.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.2**	**5.3**	**5.3**	**0.2**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**29.9**	**29.9**
Greenville Lateral																				
Washington, MS	8.7	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	9.0	9.0
Sunflower, MS	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Humphreys, MS	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.5	0.5	3.1	3.1
Holmes, MS	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Attala, MS	46.9	46.9	15.5	15.5	0.0	0.0	0.2	0.2	0.0	0.0	0.5	0.5	4.8	4.8	0.0	0.0	0.0	0.0	67.9	67.9
Total	**58.4**	**58.4**	**15.5**	**15.5**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**	**0.0**	**0.6**	**0.6**	**5.2**	**5.2**	**0.0**	**0.0**	**0.5**	**0.5**	**80.4**	**80.4**
Kosciusko 36-Inch Tie-in Lateral																				
Attala, MS	0.0	0.0	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	1.9	1.9

TABLE 4.8.1-7

Summary of Land Use Impacts Associated with Construction and Operation of Aboveground Facilities (in acres)

County, State	Agriculture		Upland Forest		Managed Forest		Wetlands		Open Water		Open Land		Right-of-Way		Commercial/ Industrial		Residential		Total	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Kosciusko 20-Inch Tie-in Lateral																				
Attala, MS	0.0	0.0	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3
Project Total	80.6	80.6	20.3	20.3	0.0	0.0	0.2	0.2	0.2	0.2	5.9	5.9	5.8	5.8	0.0	0.0	0.5	0.5	113.5	113.5

Note: The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the exact sum of the addends in all cases. In addition, about 4 acres of construction impacts are within the construction ROW for the proposed pipeline route and are also included in the impact calculations identified in Table 4.8.1-2.

TABLE 4.8.1-8

Pipe Yards and Contractor Yards Used for Construction

County, State	Pipe Yard Number	Milepost	Size (acres)	Land Use
Fayetteville Lateral				
Conway, AR	1	5.6	13.4	Open
Faulkner ,AR	4	15.4	23.5	Agricultural
Cleburne, AR	5	22.8	41.2	Agricultural
Faulkner, AR	5	22.8	8.1	Agricultural
Faulkner, AR	6	29.1	11.4	Agricultural
White, AR	6	29.2	11.2	Agricultural
White, AR	18	50.2	1.5	Open
White, AR	18	50.3	22.6	Open
White, AR	17	50.4	11.4	Agricultural
White, AR	17	50.5	4.1	Agricultural
White, AR	9	57.2	18.5	Agricultural
White, AR	16	65.4	24.4	Agricultural
White, AR	16	65.4	2.9	Agricultural
White, AR	10	65.6	24.9	Agricultural
Woodruff, AR	11	88.1	34.2	Agricultural
St. Francis, AR	12	111.6	45.9	Agricultural
Lee, AR	13B	127.7	79.4	Agricultural
Lee, AR	13B	127.9	0.5	Agricultural
Lee, AR	13B	128.0	0.4	Agricultural
Lee, AR	13C	128.	0.5	Agricultural
Lee, AR	13C	128.0	0.5	Agricultural
Lee, AR	13C	128.1	0.5	Agricultural
Lee, AR	13C	128.2	62.2	Agricultural
Phillips, AR	14	151.3	0.1	Agricultural
Phillips, AR	14	151.3	26.9	Agricultural
Phillips, AR	14	151.3	0.2	Right-of-Way
Coahoma, MS	15	159.1	21.4	Agricultural
Sub Total			**491.8**	
Greenville Lateral				
Washington, MS	1	0.1	48.8	Open
Washington, MS	2	8.9	5.2	Open
Washington, MS	3	10.5	12.8	Agriculture
Humphries, MS	4	20.4	14.8	Open
Humphries, MS	5	29.4	20.6	Agriculture/Open
Humphries, MS	6	29.3	4.8	Open
Humphries, MS	7	29.6	28.0	Open

TABLE 4.8.1-8

Pipe Yards and Contractor Yards Used for Construction

County, State	Pipe Yard Number	Milepost	Size (acres)	Land Use
Humphries, MS	8	35.4	109.0	Industrial
Holmes, MS	10	51.4	17.9	Agriculture
Holmes, MS	11	52.0	7.9	Industrial
Holmes, MS	12	73.0	28.7	Industrial
Holmes, MS	14	73.0	63.3	Open
Holmes, MS	15	54.8	93.0	Agriculture/Open
Sub Total			**454.8**	
Kosciusko 36-Inch Tie-in Lateral				
Attala, MS	None	- -	- -	- -
Kosciusko 20-Inch Tie-in Lateral				
Attala, MS	None	- -	- -	- -
Project Total			**946.6**	

Washington County (Hart, 2007) or Attala County (Taylor, 2007) in Mississippi. Local planning boards in St. Francis and Phillips Counties, Arkansas, along the Fayetteville Lateral, and in Sunflower, Humphreys, and Holmes Counties, Mississippi, along the Greenville Lateral, have not commented about planned developments. The Project in these counties would pass through mainly agricultural land, and we anticipate that this land use would not change in the near future. Therefore, we believe that construction and operation of the proposed Project would not have any impact on planned residential or commercial development.

4.8.3 Recreation and Special Land Uses

Recreation and special land uses generally include federal, state, and county/city parks and forests; conservation lands; wildlife habitat management areas; hunter management areas; natural landmarks; scenic byways; designated trails; recreational rivers; and campgrounds. Major and sensitive waterbodies are addressed in section 4.3; unique, sensitive, or significant wildlife habitats are addressed in section 4.7; and historic or culturally significant areas are addressed in section 4.10.

The Project would not cross any federally or state-designated Wild and Scenic Rivers, national landmarks, trails, campgrounds, or public parks and forests. However, the Project would cross three waterbodies in Arkansas (Cadron Creek, Big Creek, and Bayou De View) and one waterbody in Mississippi (the Big Black River) that are listed on the NRI as having outstandingly remarkable values (ORVs), which potentially qualifies them for National Wild and Scenic River designation, and several recreational and special land use areas in Arkansas. The locations of these areas are indicated on figure 4.8.3-1.

Fayetteville Lateral

The proposed Fayetteville Lateral would be near one recreational area and would cross four special land use areas.

Woodruff County Fairgrounds. The Woodruff County Fairgrounds is in McCrory, Arkansas, and would be within 0.25 mile of the Fayetteville Lateral, east of the pipeline between approximate MP 85.9 and MP 86.2. The fairgrounds is on Hwy 64B between McCrory and Patterson. The Three County Fair occurs annually in the second week of September at the fairgrounds. This event draws less than 3,000 people annually (Bradford, 2007). Other activities that occur at the fairgrounds during the year include activities associated with the Woodruff County Agricultural Extension, the annual Agricultural Expo, local 4H activities, and other similar community events. Because the permanent right-of-way would not cross any portion of the fairgrounds and because the events that occur throughout the year do not result in large volumes of people or traffic accessing the fairgrounds, there would be no impact on this resource from construction and operation of the Project.

Cache River NWR. The proposed Fayetteville Lateral would cross the Cache River NWR between MP 82.0 and MP 82.8, and the Bayou De View portion of the NWR between MP 95.9 and MP 96.6. The Cache River NWR contains a variety of wetland communities, including some of the most intact and least disturbed bottomland hardwood forests in the Mississippi valley region. These unique and valuable wetlands are protected by the Ramsar Convention as "Wetlands of International Importance" (FWS, 2007a). At present, the NWR encompasses over 56,000 acres in non-contiguous tracts in Jackson, Woodruff, Monroe, and Prairie Counties, Arkansas. Recreational activities in the NWR include year-round boating and fishing, hunting, wildlife viewing, and photography (FWS, 2007a).

To minimize impacts on the Cache River NWR, Texas Gas would cross this resource by HDD. The HDD exit hole would be on private land at MP 82.3, the HDD entry hole would be on private land at MP 83.0, and the length of the HDD would be about 4,118 feet. The Project would cross under the Cache River at MP 82.7 and would avoid direct impact on the waterbody. Similarly, the Bayou De View element of the Cache River NWR would be crossed by HDD. The HDD exit hole would be on private land at MP 95.6, the HDD entry hole would be on private land at MP 96.2, and the length of the HDD would be about 2,376 feet. The Project would cross under Bayou De View at MP 95.9, avoiding direct impact on the waterbody. The proposed HDD crossings of the Cache River NWR would avoid impact on the NWR that otherwise would result from clearing a construction right-of-way through forest, forested wetland, and other habitat and would avoid disturbance of the Cache River and Bayou De View. Impacts on about 7.1 acres[4] of land along the Cache River HDD and impacts on about 4.1 acres along the Bayou De View HDD path would be avoided. Therefore, construction and operation of the Project would have minimal impact on the Cache River NWR.

NRI Waters. The NRI is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more natural or cultural ORV judged to be of more than local or regional significance. For a waterbody to be listed in the NRI, it must exhibit at least one of nine ORVs related to scenery, recreation, geology, fish, wildlife, prehistory, history, culture, and "other values," which may include hydrology, paleontology, and botany resources.

Bayou De View flows through Monroe and Woodruff Counties, Arkansas, and would be crossed by the Fayetteville Lateral between MP 95.9 and MP 96. It is eligible for NRI listing because of these ORVs: scenery, recreation, fish, wildlife, and other values that exist within the river. Big Creek flows through Cleburne, White, and Independence Counties, Arkansas, and would be crossed by the Fayetteville Lateral at MP 46. It is eligible for NRI listing because of these ORVs: scenery, recreation, and geology. Cadron Creek flows through Conway, Van Buren, Faulkner, and Cleburne Counties, Arkansas, and would be crossed by the Fayetteville Lateral between MP 13.9 and MP 14. It is eligible for NRI listing because of these ORVs: scenery, recreation, geology, fish, and wildlife.

[4] Assuming a nominal 75-foot-wide construction right-of-way.

Source:
ESRI, 2007; Texas Gas, 2007; PennWell MapSearch, 2000; US FWS, 2001;
National Wilderness Preservation System, 2005; FGDC, 2005; AR Highway &Transportation Dept, 2006

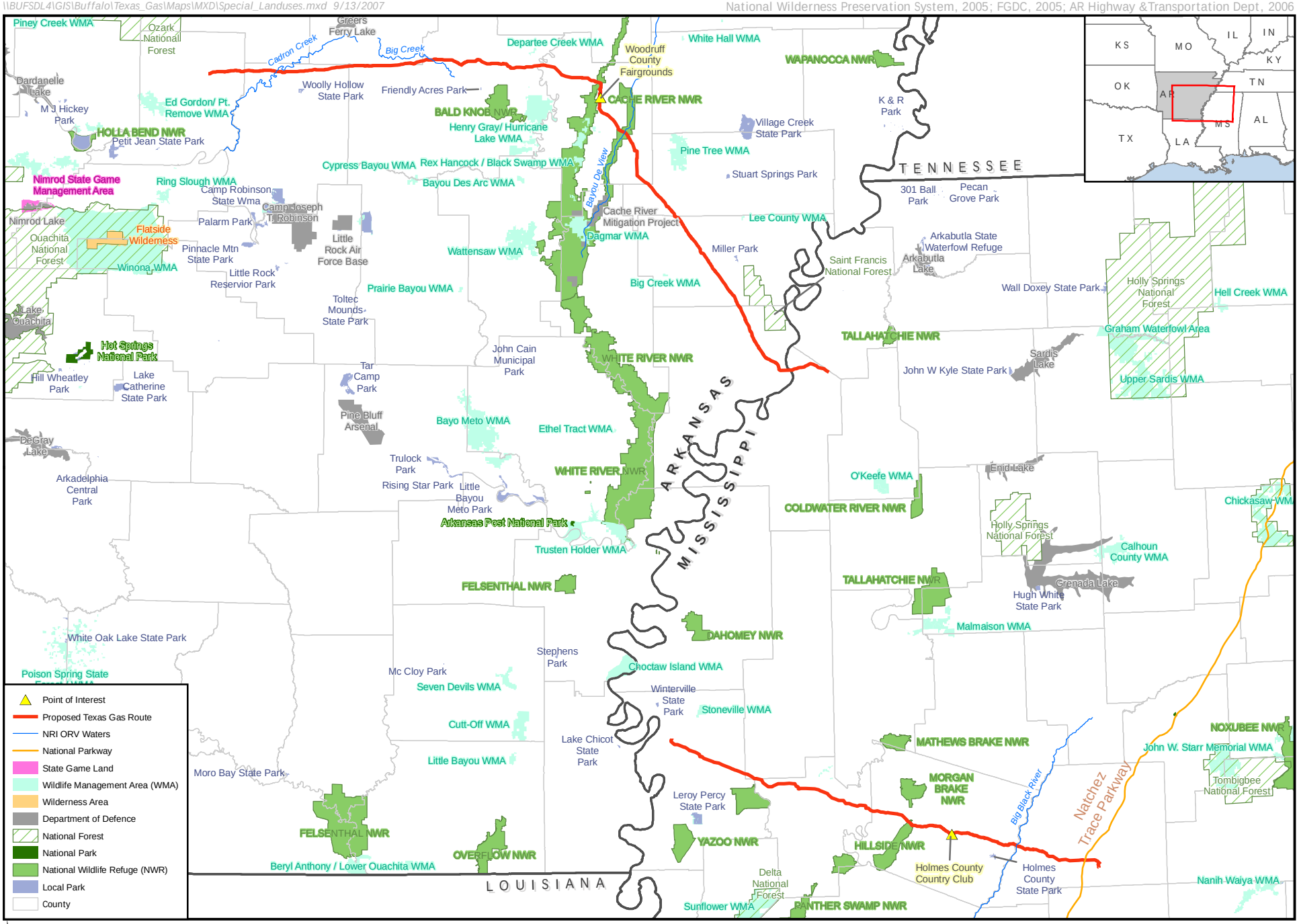

Figure 4.8.3-1
Managed Land and Special Land Use Areas
in the Project Area

Bayou De View and Big Creek would be crossed by HDD, thereby avoiding impacts on their ORVs. Cadron Creek would be crossed by open-cut at a location where the Fayetteville Lateral would be collocated with an existing Ozark pipeline. Collocation would result in a wider pipeline corridor at the Cadron Creek crossing, but it would not result in a new pipeline corridor; therefore, new impacts on this waterbody would be minimized by using this crossing location. Texas Gas would comply with the right-of-way maintenance measures in our Procedures, which limit vegetation maintenance adjacent to waterbodies to allow a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark, to permanently revegetate with native plant species across the entire construction right-of-way. We have recommended that Texas Gas coordinate with NPS and ADEQ to further minimize impacts related to construction across this waterbody. Texas Gas would implement any additional requirements the NPS and ADEQ may have to address this issue. Therefore, impacts related to construction and operation of the Fayetteville Lateral across NRI waters would be minimized to the greatest extent practicable.

Greenville Lateral

The proposed Greenville Lateral would cross three recreation and special land use areas. No recreation or special interest areas would be within 0.25 mile of the proposed Kosciusko Compressor Station site at MP 96.4.

Holmes County Country Club. Holmes County Country Club would be crossed by the Greenville Lateral between MP 63.4 and 63.5. The Holmes County Country Club management anticipates that no facilities at the property would be impacted by the Greenville Lateral. Therefore, construction and operation of the Project would have minimal impact on recreational activities at the Holmes County Country Club.

Hillside NWR. The proposed Greenville Lateral would cross the northern tip of the Hillside NWR between MP 54.1 and MP 55.9, in Holmes County. The NWR, which was named for its unique 15,572-acre location along the base of bluffs in Holmes County, provides stop-over and nesting habitat to thousands of migratory birds. The NWR was created when lands associated with a USACE flood control project were transferred to the FWS in 1975. To avoid impacts on Hillside NWR, Texas Gas would cross the NWR by HDD. The HDD exit hole would be on private land at MP 54.6, the HDD entry hole would be on private land at MP 54.0, and the length of the HDD would be about 3,326 feet. The Greenville Lateral would cross under Fannegusha Creek (MP 54.2), which flows through the NWR. The proposed HDD crossing of the Hillside NWR would avoid impacts on about 7.6 acres of land in the NWR that otherwise would result from clearing a construction right-of-way through forest, forested wetland, and other habitat. Therefore, construction and operation of the Project would have minimal impact on the Hillside NWR.

Natchez Trace Parkway. The Natchez Trace Parkway (the Parkway) is a 444-mile parkway system that connects southern portions of the Mississippi River valley, northern Alabama, and central Tennessee. Recreational opportunities associated with the parkway include scenic driving, hiking, biking, horseback riding, and camping. The proposed Greenville Lateral would cross the Natchez Trace Parkway from MP 92.8 to MP 93.0 in Attala County, Mississippi. Several alternatives were evaluated to cross the Natchez Trace Parkway, and a preferred crossing was chosen in consultation with the NPS where no developed recreational or service features were identified within 0.25 mile of the pipeline corridor. Figure 4.8.3-1 shows the proposed Greenville Lateral route relative to the Natchez Trace Parkway. Appendix F presents a detailed assessment of the Natchez Trace Parkway.

Texas Gas would use an HDD to cross the Natchez Trace Parkway to minimize and avoid direct construction impacts due to disturbance of vegetation and soil. Use of an HDD to cross the Natchez Trace Parkway would not create a new utility corridor and would not widen an existing corridor, thereby minimizing the visual impact of Project construction in this area. Construction-related dust and noise, which would be limited to a period of several days during the HDD process, would have minimal effect on recreational activities or traffic along the Natchez Trace Parkway. Texas Gas would work with the NPS on the timing of construction and other ways to minimize construction impacts

One of the primary concerns in crossing public areas is the impact that pipeline construction and operation can have on recreational activities. Disruption and noise during construction could be a nuisance to hikers, hunters, fishermen, sightseers, and campers, and could cause disturbance to wildlife, especially in protected management areas. Since pipeline construction is generally scheduled for summer, when recreational activities are typically at their peak, this impact would be unavoidable. Since the Parkway would be crossed by HDD, construction noise would be centered around the activities at the HDD entry and exit hole workspaces and would be short-term. Operation of the Project would have no effect on the Natchez Trace Parkway since there would be no surface maintenance of the permanent right-of-way at the road crossing along the path of the HDD.

NRI Waters. Big Black River would be crossed by the proposed Greenville Lateral between MP 77.7 and 77.8. This river flows through Claiborn, Warren, Hinds, Yazoo, Madison, Holmes, Attala, Carroll, and Montgomery Counties, Mississippi, and is eligible for NRI listing because it possesses ORVs related to scenery, recreation, fish, wildlife, history, and culture.

Big Black River would be crossed by HDD, thereby avoiding impacts on its ORVs. Therefore, impacts related to construction and operation of the Greenville Lateral across NRI waters would be minimized to the greatest extent practicable.

Kosciusko Tie-in Laterals

The Kosciusko 36-inch Tie-in Lateral and Kosciusko 20-inch Tie-In Lateral would not cross any recreational or special land use areas.

4.8.4 Visual Resources

Pipeline Right-of- Way

Visual impacts associated with the construction right-of-way and ATWS would include the removal of existing vegetation and exposure of bare soils, as well as tracks resulting from the use of heavy equipment to perform earthwork and grading activities, trenching, blasting, rock formation alteration or removal, and machinery and tool storage used during construction. Other visual impacts could result from the removal of large individual trees that have intrinsic aesthetic value; the removal or alteration of vegetation that could provide a visual barrier; or landscape changes. Visual impacts would be greatest where the Project would parallel or cross roads, trails, or prominent observation points, and where the pipeline right-of-way would be obvious to passing motorists or recreational users. The greatest potential visual impact would result from the removal of large specimen trees, which would take much longer than other vegetation types to regenerate and would be prevented from re-establishing on the permanently maintained 50-foot-wide right-of-way. Topographic alterations such as side hill cuts, which could be necessary for construction, would be re-contoured and re-vegetated during right-of-way restoration. The visibility of such alterations would diminish over time as the affected areas are restored and begin to blend in with the surrounding landscape.

To minimize construction impacts on visual resources, the Project would be collocated adjacent to existing rights-of-way where feasible. This alignment would minimize impacts on visual sightlines and intrinsic value by minimizing the creation of new corridors. In areas where right-of-way collocation is not feasible for engineering and/or construction reasons, Texas Gas would align the Project to avoid aesthetic features, including large, mature trees, to the extent practicable. Further, much of the area where new pipeline corridors are proposed would be in agricultural or open land use areas, so minimal tree clearing would be needed for pipeline construction. Clearing trees to create utility corridors has a long-term to permanent impact on visual resources due to this alteration of the landscape. Therefore, construction and operation of the proposed Project pipeline facilities would have minimal impact on visual resources.

Aboveground Facilities

Texas Gas would construct 19 M&R stations, 11 MLVs, two pig launchers, and two pig receivers along the proposed Fayetteville Lateral. In addition, Texas Gas would construct one new compressor station (at MP 96.4), 10 M&R stations, 10 MLVs, one pig launcher, and one pig receiver along the proposed Greenville Lateral. These aboveground structures would be permanent and remain in operation throughout the life of the pipelines.

The impacts on visual resources resulting from construction and operation of the M&R stations, MLVs, and launcher and receiver assemblies would be minimal due to the small size of each facility. M&R stations would range in size from about 0.9 acre up to 2.6 acres. Each MLV and each launcher/receiver would be less than 0.1 acre in size. Landscaping would be added where feasible around the new M&R stations, MLVs, and launcher and receiver assemblies to further help these facilities blend in to the surrounding landscape.

The Kosciusko Compressor Station would be at the eastern end of the Greenville Lateral, and would impact about 65 acres during operation. The compressor station would be surrounded primarily by forest and agricultural land and would be adjacent to an existing Texas Eastern compressor station. Visual impacts associated with this facility would not be considered substantial due to the topography of the area, which consists of vegetated rolling hills, which provide natural screening. Construction of the facility would have limited visual effects on off-site resources or land uses, as only a limited number of potential viewers would have a direct line of sight of the facility and would notice the change in land use from forest and agricultural land to developed land due to its remote location. Landscaping around the new compressor station would further help diminish its presence and would be implemented as feasible. Therefore, construction and operation of the proposed aboveground facilities would have a permanent impact on visual resources, but this impact would be minimized by vegetative screening, topography, and remote location.

4.8.5 Hazardous Waste

Fayetteville Lateral

Review of published federal and state databases identified one Resource Conservation and Recovery Act (RCRA) small quantity generator (SQG) north of MP 128 and one underground storage tank (UST) north of MP 58, about 1,500 feet and 900 feet, respectively, from the proposed Fayetteville Lateral corridor. No violations have been reported for either site. Therefore, we believe that the potential for contamination from these sites to impact the Project is low.

Greenville Lateral

The Greenville Lateral would be connected to the upstream end of the Greenville Compressor Station at MP 0.0. Texas Gas's existing mainline pipeline system at the Greenville Compressor Station is currently identified as regulated for PCBs. However, previous monitoring of pipeline fluids at this compressor station indicated PCB concentrations were less than 10 parts per million (ppm) for twelve consecutive quarterly monitoring events and never exceeded the EPA standard of 50 ppm. The Greenville Compressor Station would be downstream of the proposed Greenville Lateral tie-in. Therefore, we do not believe PCB contamination to pose a significant risk at this location for the proposed Project.

The existing Texas Eastern Kosciusko Compressor Station, a former National Priorities List (NPL) site, would be near the terminus of the Greenville Lateral and Texas Gas's proposed Kosciusko Compressor Station. While PCB contamination has been identified at Texas Eastern's facility, it would be down gradient from Texas Gas's proposed compressor station. Therefore, we do not believe that PCB contamination to pose a significant risk at this location for the proposed Project.

Kosciusko 36-inch and 20-inch Tie-in Laterals

The Kosciusko 36-inch Tie-in Lateral would cross Little Conehoma Creek, which was previously remediated for PCBs by Texas Eastern. The site was removed from the NPL in 1998, but it is still under state jurisdiction. Files reviewed at the MDEQ indicated that sediments in the creek had been remediated to less than 1 mg/kg PCBs, while soils along stream banks had been remediated to less than 5 mg/kg. Texas Gas sampled surface soil, stream sediment, and subsurface soil to characterize the current distribution of PCBs in the area of the Little Conehoma Creek crossing. All PCB concentrations were less than 1 mg/kg. Based on available information, we do not believe that PCB levels in Little Cohoma Creek are significant. In the event that petroleum-stained soil was identified during excavation in the vicinity of Little Conehoma Creek, it would be segregated, properly characterized for disposal, and managed appropriately in accordance with all applicable regulations and handling protocols. Since Texas Gas would have appropriately trained environmental inspectors on site during construction to implement these protocols if they are needed, and since Texas Eastern completed site remediation, we conclude that possible PBC contamination would not be a significant risk at this location for the propose Project.

4.9 SOCIOECONOMICS

Several potential socioeconomic effects may result from construction and operation of the proposed Project. Some of these potential effects are related to the number of local and non-local workers who would work on the construction-phase of the Project, payrolls and local expenditures, and impacts on population, public services, and housing during the construction period. Other potential effects related to construction include increased traffic or disruption of normal traffic patterns in the Project vicinity and increased expenditures for construction materials by Texas Gas. Potential economic impacts associated with operation of the Project include increased property tax revenue, increased job opportunities and income, and ongoing local expenditures by the operating company.

4.9.1 Region of Influence

The Fayetteville Lateral would cross eight counties in Arkansas (Conway, Faulkner, Cleburne, White, Woodruff, St. Francis, Lee, and Phillips) and Coahoma County in Mississippi. The Greenville Lateral would cross five counties in Mississippi (Washington, Sunflower, Humphreys, Holmes, and Attala). The proposed compressor station and tie-in laterals also are located in Attala County. For the purposes of our socioeconomic analysis, we define these counties as the region of influence for the proposed Project.

4.9.2 Population

Table 4.9.2-1 provides a summary of the population characteristics for the counties that would be affected by the proposed Project.

TABLE 4.9.2-1

Population Summary for Counties Crossed by the Proposed Project

County, State	2000 Population a/	2000 Population Density (persons/square mile) b/	2006 Population Estimate c/
Fayetteville Lateral			
Cleburne, AR	24,046	43.5	25,485
Conway, AR	20,336	36.6	20,694
Faulkner, AR	86,014	132.9	100,685
Lee, AR	12,580	20.9	11,379
Phillips, AR	26,445	38.2	23,331
St. Francis, AR	29,329	46.3	27,535
White, AR	67,165	65.0	72,560
Woodruff, AR	8,741	14.9	7,905
Coahoma, MS	30,622	55.3	28,420
Fayetteville Lateral Total	**305,278**	**50.4**	**317,994**
Greenville Lateral			
Attala, MS	19,661	26.7	19,644
Holmes, MS	21,609	28.6	20,866
Humphreys, MS	11,206	48.5	10,393
Sunflower, MS	34,369	49.5	31,833
Washington, MS	62,977	87	58,007
Greenville Lateral Total	**149,822**	**48.1**	**140,743**

Sources:

a/ U.S. Census Bureau, 2000a.

b/ U.S. Census Bureau, 2000b.

c/ U.S. Census Bureau, 2007.

The counties along the proposed Fayetteville Lateral had a total estimated population of 317,994 for the year 2006 (U.S. Census Bureau, 2007). This represents an increase of 12,716, or 4.17 percent, since the year 2000. Faulkner County is the most densely populated county affected by the proposed Fayetteville Lateral, with a population density of nearly 133 people per square mile in the year 2000, more than double that of Arkansas as a whole (51.3 people per square mile). The city of Searcy in Faulkner County, and the city of Conway in White County are the largest population centers in the Fayetteville Lateral region of influence. However, the proposed Fayetteville Lateral route is located away from both the cities of Searcy and Conway. The other counties along the proposed Fayetteville Lateral are comprised of scattered small towns and agricultural communities.

The counties that would be crossed by the proposed Greenville Lateral had an estimated population of 140,743 in 2006 (U.S. Census Bureau, 2007). This represents a decrease of 9,079, or 6.06 percent, since

the year 2000. Washington County is the most densely populated county crossed by the proposed Greenville Lateral, with a population density of 87 people per square mile in the year 2000, which is slightly greater than the state average of 60.6 people per square mile. The City of Greenville, in Washington County, is the largest population center in the Greenville Lateral region of influence.

The population within the region of influence would increase temporarily during construction, which would occur between June 2008 and January 2009. The peak construction workforce would be 1,800 workers, of which an estimated 90 (5 percent) would be hired locally. Construction of the pipeline and its associated facilities would be conducted simultaneously using several spreads and require varied labor skills. The Fayetteville Lateral would be constructed in four spreads, with a peak employment of 225 workers in each spread, and another spread involving 450 workers would construct the Mississippi River crossing; the Greenville Lateral would be constructed in two spreads, with a peak employment of 225 workers in each spread. These workers would be distributed along the length of the proposed Project route and throughout the region of influence, minimizing the potential population-level and demographic effects on any individual county. In addition, given the short duration estimated for construction of the pipeline facilities (June 2008 to January 2009), it is unlikely that workers would relocate to the Project area with their families. Based on the construction workforce data presented, the only population impact that would result from the Project would be a minor, temporary population increase confined to the period of construction.

Following construction of the Project, Texas Gas would add about four full-time positions to maintain and operate the new pipeline and aboveground facilities. These positions would be filled by hiring either current local residents or non-local personnel. This small increase in permanent residents would not have an adverse impact on the overall population of the area.

4.9.3 Employment and Economy

The civilian labor force within the 14-county region of influence of the Project totaled 194,990 persons for the years 2006/2007. Current economic and employment conditions in the counties along the Project are presented in table 4.9.3-1.

The major employment sectors along both routes include manufacturing, educational, health and social services. The average unemployment rate for the Fayetteville Lateral region of influence (10.7 percent) is almost double the 2006/2007 Arkansas average of 5.8 percent. The average unemployment rate along the Greenville Lateral (11.5 percent) is also higher than the Mississippi state average of 7.0 percent.

Texas Gas expects to use a predominately non-local workforce for construction of both laterals. Because of the specialized nature of gas pipeline construction, construction personnel would be hired by one or more gas pipeline contractors. Most of the personnel would be part of the contractors' regular crews and hired from outside the Project area. It is anticipated that only about 5 percent of the construction workforce would be hired from within the Project area, comprising about 471 worker-months. There may be increased local economic activity in the hospitality and transportation sectors due to construction activity. The relatively high unemployment rate in both Project areas suggests that any employment in these sectors could be accommodated from within the existing employed workforce. The local jobs and any indirect employment from the Project would represent a temporary and minimal increase in employment opportunities within the region of influence.

TABLE 4.9.3-1

Economic and Employment Conditions

County, State	2000 Per Capita Income (U.S. dollars) a/	2000 Civilian Labor Force (persons) b/	2006/2007 Civilian Labor Force (persons) c/	2000 Unemployment Rate (percent) d/	20006/2007 Unemployment Rate (percent) c/, e/	2000 Major Employment by Industry (percent) f/
Fayetteville Lateral						
Cleburne, AR	$17,250	10,237	11,375	4.9	6.1	Manufacturing (22.3)
Conway, AR	$16,056	9,154	9,750	6.6	5.2	Manufacturing (20.7)
Faulkner, AR	$17,988	45,556	52,075	6.7	4.6	Educational, health and social services (22.6)
Lee, AR	$10,983	4,133	3,375	13.2	10.9	Educational, health and social services (22.3)
Phillips, AR	$12,288	10,062	8,700	11.3	9.9	Educational, health and social services (23.9)
St. Francis, AR	$12,483	11,201	10,625	11.3	9.6	Educational, health and social services (18.4)
White, AR	$15,890	32,836	32,250	11.3	7.7	Educational, health and social services (20.3)
Woodruff, AR	$13,269	3,775	3,450	8.0	13.2	Educational, health and social services (18.9)
Coahoma, MS	$12,558	11,257	11,600	10.1	11.6	Educational, health and social services (23.2)
Fayetteville Lateral Total County	**$11,342**	**138,211**	**143,200**	**12.81**	**10.71**	**N/A**
Greenville Lateral						
Attala, MS	$13,782	13,782	7,230	7.0	8.6	Manufacturing (21.2)
Holmes, MS	$10,683	7,599	7,080	17.3	12.8	Manufacturing (24.6)
Humphreys, MS	$10,926	4,126	4,020	11.4	13.5	Manufacturing (22.3)
Sunflower, MS	$11,365	11,899	11,070	12.8	12.4	Educational, health and social services (21.7)
Washington, MS	$13,430	25,765	22,390	11.9	11	Manufacturing (19.2)
Greenville Lateral Total County	**$12,419**	**63,171**	**51,790**	**12.2**	**11.5**	**N/A**

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Sources:

a/ U.S. Census Bureau, 2000c.

b/ U.S. Census Bureau, 2000d.

c/ U.S. Census Bureau, 2000e.

d/ U.S. Department of Labor, n.d.

e/ ADWS, 2007.

f/ MDES, 2006.

During the operations phase, it is estimated that four permanent employees would be hired to maintain the pipeline right-of-way and the compressor and M&R stations. Two of these employees would be employed in Arkansas and two would be employed in Mississippi. These employees would be hired from either the existing local workforce or from outside the area. Because of the short duration of the construction period and the small staff hired to maintain the pipeline, no permanent decrease in the unemployment rate would be expected as a result of the Project.

Construction of the Project would increase economic activity within the region of influence through the sum of three effects: (1) the direct effect, i.e., the hiring of local construction workers and purchases of goods and services from local businesses; (2) the indirect effect, i.e., the additional demands for goods and services, such as replacing inventory from the firms that sell goods and services directly to the Project; and (3) the induced effect, i.e., the spending of disposable income by the construction workers at local businesses, which in turn order new inventory from their suppliers. The resulting total, temporary increase in economic activity resulting from the sum of these three effects would provide a positive economic impact for the region.

4.9.4 Local Taxes and Government Revenue

Tax revenues from several sources would accrue to state and local governments during construction and operation of the Project. During construction, tax revenue would accrue due to sales taxes on local purchases and, in the case of Mississippi, to a state contractor's tax. Once the Project is completed, property taxes would be assessed based on the value of the pipeline and related facilities.

4.9.4.1 Sales and Use Taxes

Purchases of non-labor goods and services within the region during construction of the pipeline and related facilities would generate a significant amount of tax revenue in both Arkansas and Mississippi. The total amount of sales and use taxes generated during construction would depend on the specific types of non-labor goods purchased but would typically be associated with the purchase of vehicle and construction equipment, fuel, and other miscellaneous expenditures Texas Gas estimates that the Project would generate for state and local governments a total of $1,723,000 from local purchases: $912,000 in Arkansas and $811,000 in Mississippi. In addition, while not included in this total, non-local workers would be assumed to spend part of their payroll income for local temporary lodging and food, which would generate, by induced effect, additional local sales tax revenue.

4.9.4.2 Special Contractor Tax

The State of Mississippi levies a 3.5 percent tax on the value of all major construction projects during the first year of construction. Based on the estimated $322 million cost of the proposed Greenville Lateral plus the cost of the portion of the proposed Fayetteville Lateral that would be located in Coahoma County, Mississippi, this tax would provide a payment of $12.2 million to the State of Mississippi.

4.9.4.3 Property Tax Revenues

Construction and operation of the Project would generate additional revenues for the governmental entities with tax jurisdiction over the facilities associated with the Project (see table 4.9.4-1). Based on a total assessed value of $828,379,000 for both the Fayetteville and Greenville Laterals and their associated facilities, the Project would generate about $8,175,000 in property tax revenue per year. It is estimated that about $2,510,576 per year in Arkansas and $5,663,951 per year in Mississippi would be paid in property taxes to the counties located along the pipeline routes. This calculation assumes that the annual

TABLE 4.9.4-1

Estimated Property Tax Revenues

County	Percentage of Route (percent)	Estimated Right-of-Way Value in County	Estimated M&R Value in County	Estimated Compressor Value in County	Total Value In County	Total Annual Property Tax Revenue
Fayetteville Lateral						
Cleburne, AR	1.4	$6,706,000		--	$6,706,000	$ 35,046
Conway, AR	4.7	$22,782,000	$3,081,000	--	$25,863,000	$ 135,160
Faulkner, AR	12.9	$62,608,000	$6,161,000	--	$68,769,000	$ 359,387
Lee, AR	13.7	$66,473,000		--	$66,473,000	$ 347,388
Phillips, AR	11.1	$54,204,000		--	$54,204,000	$ 283,270
St. Francis, AR	5.2	$25,096,000		--	$25,096,000	$ 131,152
White, AR	22.9	$111,658,000	$9,242,000	--	$120,900,000	$ 631,823
Woodruff, AR	23.1	$112,390,000		--	$112,390,000	$ 587,350
Coahoma, MS	5.1	$24,715,000	$1,027,000	--	$25,742,000	$ 418,951
Fayetteville Lateral Total County	**100.0**	**$486,631,600**	**$19,511,000**	**--**	**$506,143,000**	**$2,929,527**
Greenville Lateral						
Attala, MS	20.4	$55,379,294	$5,296,000	$37,388,000	$98,063,000	$1,596,000
Holmes, MS	32.4	$87,938,980		--	$87,939,000	$1,431,000
Humphreys, MS	26.4	$71,798,281	$ 2,648,000	--	$74,446,000	$1,212,000
Sunflower, MS	2.9	$7,792,061		--	$7,792,000	$ 127,000
Washington, MS	17.9	$48,700,384	$5,296,000		$53,996,000	$ 879,000
Greenville Lateral Total County	**100.0**	**$271,609,000**	**$13,239,110**	**$37,388,000**	**$322,236,000**	**$5,245,000**
Arkansas Total	**--**	**$461,916,600**	**$18,484,000**	**--**	**$480,401,000**	**$2,510,576**
Mississippi Total	**--**	**$296,324,000**	**$14,266,110**	**$37,388,000**	**$347,978,000**	**$5,663,951**
Total		**$758,241,000**	**32,750,000**	**$37,388,000**	**$828,379,000**	**$8,175,000**

Source: Texas Gas, 2007.

tax revenues produced by the pipeline system would depend on the assessed value and the tax rates in the jurisdictions crossed by the pipelines.

4.9.4.4 Impacts on Government Revenues

During construction of the Project, public services, including police services, emergency medical services, and permitting and inspections, would be required from local government entities. In addition, there may be incurred costs due to uncompensated damages to local and state roads and highways and energy costs associated with traffic delays due to construction activities. Given the length of the Project and the number of affected local governments, the incremental cost to provide these additional public service and transportation infrastructure requirements cannot be easily quantified. Local government revenues associated with construction and operation of the Project, including the direct, indirect, and induced economic impacts from workforce wages, sales, and use taxes; special contractor taxes; and property taxes would generate a projected $1.7 million in sales taxes, and $12.2 million from Mississippi's Special Contractor's Tax. In addition, it is estimated that the Project would generate about $8.1 million in property taxes per year for the municipalities located along the Project route. While a definite expense cannot be estimated for the costs incurred by local governments for providing the services needed to facilitate the Project, it is assumed that those costs are less than the revenues that would be generated by local governments as a result of the Project.

4.9.5 Housing

Table 4.9.5-1 presents housing statistics for the counties along the proposed Project route. There were 127,367 housing units in the Fayetteville Lateral area in 2000, of which almost 12 percent were vacant. There were 55,935 housing units in the Greenville Lateral area in 2000, of which almost 10 percent were vacant.

In addition table 4.9.5-2 describes the temporary housing conditions in the counties that would be crossed by the proposed Project. Based on the most current data, there are 44 hotel/motels within the nine counties along the proposed Fayetteville Lateral. The majority of these are in the larger cities and towns along the western portion of the Fayetteville Lateral (cities of Conway and Searcy). The rest are in Mariana, Forrest City, and West Helena along the eastern portion of the pipeline route. There are only a limited number of hotel/motel rooms available in Attala, Sunflower, and Washington Counties, Mississippi (12 hotels/motels) along the proposed Greenville Lateral. The cities of Winona and Greenwood (Carroll County), which are about 25 to 30 miles north of the Greenville Lateral, have 12 additional hotels/motels.

Construction and operation of the proposed Project would not be expected to have significant direct or indirect impacts on housing stocks. Housing impacts would vary from community to community, depending on the number of non-local workers that temporarily reside in each community, the duration of their stay, and the size of the community. Although these factors are too indeterminate and variable to accurately predict the magnitude of impact, the effects would be short term and, therefore, are not expected to be significant.

TABLE 4.9.5-1

Existing Housing Conditions in Affected Counties (2000)

State, County	Total Housing Units a/	Occupied Housing Units b/	Vacant Housing Units c/	Homeowner Vacancy Rate (percent) d,e,f/
Fayetteville Lateral				
Cleburne, AR	13,732	10,190	3,542	3.1
Conway, AR	9,028	7,967	1,061	1.9
Faulkner, AR	34,546	31,882	2,664	2.6
Lee, AR	4,768	4,182	586	2.4
Phillips, AR	10,859	9,711	1,148	2.9
St. Francis, AR	11,242	10,043	1,199	2.1
White, AR	27,613	25,148	2,465	2.8
Woodruff, AR	4,089	3,531	558	2.1
Coahoma, MS	11,490	10,553	937	1.8
Fayetteville Lateral Total	**127,367**	**113,207**	**14,160**	**2.4**
Greenville Lateral				
Attala, MS	8,639	7,567	1,072	1.7
Holmes, MS	8,439	7,314	1,125	1.5
Humphreys, MS	4,138	3,765	373	0.7
Sunflower, MS	10,338	9,637	701	1.6
Washington, MS	24,381	22,158	2,223	1.6
Greenville Lateral Total	**55,935**	**50,441**	**5,494**	**1.4**

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Sources:

a/ U.S. Census Bureau. 2000f.

b/ U.S. Census Bureau. 2000g.

c/ U.S. Census Bureau. 2000h.

d/ U.S. Census Bureau. 2000i.

e/ U.S. Census Bureau. 2000j.

f/ U.S. Census Bureau. n.d. (1)

TABLE 4.9.5-2

Existing Temporary Housing Conditions in Affected Counties

State, County	Rental Vacancy Rate (percent) a,b,c/	Hotel/Motels d,e/	Vacant Housing Units for Rent f/	Mobile Home Spaces g/
Fayetteville Expansion Lateral				
Cleburne, AR	10.4	8	2,169	232
Conway, AR	10.0	3	1,544	1,757
Faulkner, AR	8.7	10	956	5,795
Lee, AR	11.1	3	190	698
Phillips, AR	10.5	9	498	1,049
St. Francis, AR	11.2	8	464	1,733
White, AR	9.7	8	731	5,405
Woodruff, AR	7.4	1	98	500
Coahoma, MS	4.9	2	231	996
Fayetteville Lateral Total	**9.9**	**44**	**6,150**	**12,760**
Greenville Lateral				
Attala, MS	6.6	3	120	1,698
Holmes, MS	3.5	NA	71	2,265
Humphreys, MS	6	NA	92	514
Sunflower	5.2	4	203	751
Washington, MS	8.1	5	794	2,102
Arkansas	9.6	NA	33,740	174,831
Mississippi	9.2	NA	29,486	192,749
Greenville Lateral Total	**6.8**	**12**	**1,280**	**7,330**

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Sources:

a/ U.S. Census Bureau, 2000k.

b/ U.S. Census Bureau, 2000l.

c/ U.S. Census Bureau, n.d. (2)

d/ Hotels Travel, 2007.

e/ Google Maps, 2007.

f/ U.S. Census Bureau. 2000m.

g/ U.S. Census Bureau. 2000n.

Because the workforce for the Project would be largely comprised of non-local contract workers and the work would be completed in less than a year, worker housing would likely consist of existing temporary housing facilities. With most workers likely returning to their out-of-area homes on weekends and holidays, the housing demand would likely focus on motels. Some contract construction workers use travel trailers and thus would require camp sites or trailer park spaces. Workers who would be employed for several months might use rental housing, but given the fairly short duration of construction, this would involve a limited number of units.

No other known major construction projects or major tourist events that might compete for temporary housing units would occur within the Project area during the anticipated July 2008 to March 2009 construction period. At present, it is reasonable to assume that the housing facilities available near the Project would be able to accommodate the expected workforce. No long-term impacts on local housing would be anticipated once the Project is completed and operational.

4.9.6 Public Services

The Project areas of both the Fayetteville and Greenville laterals have well-developed infrastructures capable of providing health, schooling, police, fire, and emergency services. Table 4.9.6-1 identifies the number of full-time police, fire, and medical departments or facilities in each of the Project areas. Since the Project would not result in an increase in local populations or any subsequent growth in school-aged populations, educational services have not been included in the examination of public services.

TABLE 4.9.6-1

Existing Public Services and Facilities in Affected Counties

State/County	Police/Sheriff Departments a/	Fire Departments a/	Medical Facilities a, b, c/
Fayetteville Expansion Lateral			
Cleburne, AR	3	7	1
Conway, AR	2	9	1
Faulkner, AR	4	14	2
Lee, AR	2	3	0
Phillips, AR	5	8	2
St. Francis, AR	3	4	1
White, AR	7	19	2
Woodruff, AR	4	3	0
Coahoma, MS	4	2	2
Fayetteville Lateral Total	**34**	**69**	**11**
Greenville Expansion Lateral			
Attala, MS	3	3	1
Holmes, MS	8	0	1
Humphreys, MS	4	1	1
Sunflower, MS	8	2	2
Washington ,MS	6	5	2
Greenville Lateral Total	**29**	**11**	**7**

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Source:

a/ Capitol Impact, 2007.

b/ Mississippi Hospital Association, 2007.

c/ Arkansas Hospital Association, 2007.

Minor temporary impacts on public services and facilities would likely occur during construction, but not during operation, of the proposed Project. The majority of the Project area is lightly populated and relies on nearby population centers for public services and infrastructure. However, the entire area is covered by emergency "911" service. The cities of Clarksdale, Helena, Forrest City, Searcy, Heber Springs, Conway, Greenville, Winona, Greenwood, Yazoo City, and Louisville are all within about 20 to 30 miles of the proposed Project area and have a wide array of public services and infrastructure. Texas Gas would work directly with local law enforcement, fire departments, and emergency medical services to coordinate effective emergency response. Further, under 49 CFR 192.615, Texas Gas would be required to establish an Emergency Response Plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

Because the non-local workforce would be small relative to the current population of the area, construction of the Project would result in only minor temporary, or no impact to local community facilities and services such as police, fire, medical, and waste disposal services. Local communities have adequate infrastructure and community services to meet the needs of the small increase of non-local workers that would be required for the Project. Other construction-related demands on local agencies could include increased enforcement activities associated with issuing permits for vehicle load and width limits, local police assistance during construction to facilitate traffic flow, and emergency medical services to treat injuries resulting from construction accidents.

We conclude that construction and operation of the proposed Project would not result in significant impacts on local public services in the Project area.

4.9.7 Transportation/Traffic Impacts

Short-term impacts on roads, highways, and railroads are anticipated during construction, but not operation, of the proposed Project. Most roads and railroads would be crossed by boring beneath them. Boring typically requires additional temporary workspace areas on both sides of the crossing for excavating bore pits while the road or railroad remains in operation. Therefore, little or no disruption of traffic would be expected at road or railroad crossings that are crossed using boring methods.

Smaller or unpaved rural roads may be open-cut where permitted by local authorities or landowners. The open-cut crossing method might require temporary closure of a road and establishment of detours. If no reasonable detour is feasible, at least one lane of a road would be kept open to traffic, except for brief periods when it is essential to close the road to install the pipe. Texas Gas would avoid road closings during peak traffic hours. Open-cut crossings of roads would typically be completed in 1 to 2 days.

To maintain safe conditions, Texas Gas would direct its construction contractors to comply with vehicle weight and width restrictions and to remove soil that is left on road surfaces by the crossing of construction equipment. In addition, when it is necessary for equipment to move across paved roads, mats or other appropriate measures would be used to prevent damage to the road surface. Contractors would employ flagmen at high-traffic roadway crossings. At all road crossings, appropriate construction notification signage would be displayed. In limited instances, detours or obstructions in traffic flow due to the presence of large vehicles or construction of pipeline road crossings may require short-term assistance from local police. Significant project-related demands on local police workloads would not be expected.

The movement of construction equipment and materials from contractor and pipe storage yards to the construction work area would result in an additional short-term impact on the transportation network. Several construction-related trips would be made each day (to and from the job site) on each spread. This

level of traffic would remain fairly constant throughout the construction period, and would typically occur at early morning and evening hours.

Road congestion caused by construction workers commuting to the job site could be significant during the peak months of Project construction. This could result in significant congestion if each of the several hundred workers used a personal vehicle to travel to the work site and if most of this travel took place during peak traffic hours. However, pipeline construction work would be scheduled to take advantage of daylight hours; therefore, most workers would commute to and from the sites during off-peak hours. This impact also could be limited because temporary workers would be concentrated in the relatively few nearby population centers offering temporary lodgings. Construction workers often carpool from these centers to the job site, greatly reducing the peak traffic impacts. Furthermore, workers would be distributed along the length of the construction spread, which would tend to reduce the impact on traffic at any one location. Therefore, the Project should not add significantly to road congestion.

Minimal traffic would be associated with operation and maintenance of the right-of-way, compressor station, and auxiliary facilities associated with the Fayetteville and Greenville laterals, since only a limited number of permanent workers would be employed during the operational phase. Therefore, the Project would not have any measurable impacts on road congestion during operation.

4.9.8 Property Values

Individuals frequently comment about project impacts on property values. These concerns generally center on four topics: devaluation of property if encumbered with a pipeline easement; identification of the party responsible for property taxes within a pipeline easement; Project effects on landowner insurance premiums; and the potential for reduced property values associated with lost timber and agricultural production.

The impact that a project may have on the value of any land parcel depends on many factors, including the size of the parcel, the parcel's current value and land use, and the value of other nearby properties. Subjective valuation is generally not considered in appraisals, but this is not to say that the Project would not affect resale values. Potential purchasers may make a decision based on landowner insurance premiums; and the potential for reduced property values associated with lost timber and agricultural production.

Landowners are responsible for all property taxes levied against parcels and this responsibility would be independent of the existence of any Project-related pipeline easement. However, if a landowner felt that the proposed Project, should it be constructed, reduced the value of their property, he or she would appeal the assessment and subsequent property taxation to the local property taxation agency. If the parcel were reappraised, the landowner would then be responsible for property taxes based upon an appraisal that directly incorporated the easement.

As described in section 4.8, construction and operation of the proposed Project would result in a temporary loss of timber and agricultural productivity and a permanent conversion of some lands used for forestry operations to maintained right-of-way. Texas Gas would compensate landowners at fair market value for any adverse impacts on property values resulting from the Project, and during easement negotiations, compensation for any loss of current or future agricultural and timber production would be considered.

4.10 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires the FERC to take into account the effect of its undertakings (including the issuance of certificates) on properties listed, or eligible for listing, in the NRHP and to afford the ACHP an opportunity to comment on the undertaking. Texas Gas, as a non-federal party, is assisting the FERC in meeting its obligations under Section 106 and the implementing regulations in 36 CFR 800 by preparing the necessary information, analyses, and recommendations.

Construction and operation of the proposed Project could potentially affect historic properties (i.e., cultural resources listed, or eligible for listing, in the NRHP). These historic properties could include prehistoric or historic archaeological sites, districts, building, structures, and objects, as well as locations with traditional value to Native Americans or other groups. Such historic properties generally must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and must meet one or more of the criteria specified in Title 36 CFR 60.4.

4.10.1 Cultural Resource Surveys

Texas Gas performed Phase I cultural resource investigations for the Fayetteville and Greenville Laterals. For archaeological resources, a 300-foot-wide corridor was surveyed for the pipelines. In addition, compressor stations, access roads, temporary workspaces, and pipe storage and contractor yards were surveyed. For architectural resources, areas adjacent to and within the line-of-sight of the 300-foot-wide corridor for the pipelines and the construction/operation footprints for related facilities were surveyed. Two pipe storage yards remain to be surveyed for the Fayetteville Lateral in Arkansas. The Phase I cultural resources investigations also included geomorphologic surveys. The reports for these surveys were provided to the FERC and the Arkansas and Mississippi State Historic Preservation Offices (SHPOs). Texas Gas also prepared an HDD Contingency Plan for Cultural Resources for sites that would be avoided by the HDD method.

In Arkansas, 185 cultural resources were identified along the Fayetteville Lateral, including 110 archaeological sites and 75 historic architectural resources (including one cemetery—historic architectural resource 38) (Haag and Bergman 2007). Of these, 38 were recommended as potentially eligible for the NRHP (36 archaeological sites and historic architectural resources 46 and 71), and 147 were recommended as not eligible for the NRHP (74 archaeological sites and 73 historic architectural resources). Of the 38 potentially NRHP-eligible cultural resources, 37 would be avoided by realignments, deviations, or through the use of HDD crossing methods; seven of these 37 cultural resources would be further protected by placing site boundaries on construction mapping, placing orange protective fencing around site boundaries, and monitoring by an Environmental Inspector during work activities. In addition, the cemetery would be avoided by a realignment and is currently approximately 1,300 feet from the proposed pipeline centerline. One archaeological site, Site 20E-1, cannot be avoided, and Phase II NRHP-eligibility testing was recommended for this site. Texas Gas is currently conducting Phase II testing at Site 20E-1. Once testing is completed, Texas Gas would file a report with the Arkansas SHPO and the FERC.

Although no buried cultural resources were identified during the geomorphologic survey of the Fayetteville Lateral corridor, a total of 87 areas with the potential to contain buried cultural resources were identified; 46 of these are located along the proposed pipeline alignment. Texas Gas would conduct archaeological monitoring during work activities in these sensitive areas.

In a letter dated August 21, 2007, the Arkansas SHPO commented on the Phase I survey report for the Arkansas portion of the Fayetteville Lateral. The SHPO requested additional information and revisions to the report and agreed with the recommendations that architectural resources 46 and 71 were eligible for

inclusion in the NRHP; however, the SHPO also indicated that architectural resources 38 (the above-mentioned cemetery) and 39 were eligible for inclusion in the NRHP. The SHPO recommended that these four architectural resources be avoided and protected during Project implementation. Texas Gas has not yet provided a revised report or addressed the SHPO's comments regarding avoidance and protection of the four historic architectural resources.

In Mississippi, 201 cultural resources were identified along the Fayetteville and Greenville Laterals, including 180 archaeological resources and 21 historic architectural resources (Goodwin and Bergman, 2007). On the Fayetteville Lateral, 20 archaeological resources and three historic architectural resources were identified, with two of the archaeological resources recommended as potentially NRHP-eligible. On the Greenville Lateral, of 178 cultural resources, 21 were listed, eligible for listing, or recommended as potentially eligible for the NRHP (16 archaeological sites, one cemetery [22Ho1188], and four historic architectural resources, including the Natchez Trace, a potentially NRHP-eligible historic property administered by the NPS that is in the process of being nominated to the NRHP); one was undetermined (22Ho1189, a historic cemetery); and 156 were recommended as not eligible for the NRHP (144 archaeological sites and 12 historic architectural resources, including two cemeteries). All of the 23 NRHP-listed, -eligible, or potentially eligible cultural resources (including the Natchez Trace and 22Ho1188) and the one undetermined cemetery would be avoided by realignments, deviations, or the use of HDD crossing methods; seven of these 24 cultural resources would be further protected by placing site boundaries on construction mapping, placing orange protective fencing around site boundaries, and monitoring by an Environmental Inspector during work activities. In addition, the two cemeteries recommended as not eligible for the NRHP would be avoided. The NPS has reviewed the Phase I survey report and found it meets their requirements, and it has approved the HDD crossing of the Natchez Trace Parkway historic property. We are currently awaiting the SHPO's comments on the Phase I survey report.

Although no buried cultural resources were identified during the geomorphologic survey of the Greenville Lateral corridor, a total of 115 areas with the potential to contain buried cultural resources were identified; 72 of these are located along the proposed pipeline alignment. Texas Gas would conduct archaeological monitoring during work activities in these sensitive areas.

Texas Gas consulted the Mississippi SHPO regarding the work at the existing Greenville Compressor Station. Texas Gas has not yet provided the SHPO's comments.

4.10.2 Unanticipated Discoveries Plan

Texas Gas prepared a Plan for the Unanticipated Discovery of Historic Properties and Human Remains during construction. We requested revisions to the plan, and Texas Gas has provided a revised plan.

4.10.3 Native American Consultation

Texas Gas contacted the Alabama-Quassarte Tribal Town (Creek Nation of Indians), the Absentee Shawnee Tribe, the Caddo Nation, the Cherokee Nation of Oklahoma, the Choctaw Nation of Oklahoma, the Delaware Nation, the Eastern Shawnee Tribe of Oklahoma, the Kialegee Tribal Town, the Mississippi Band of Choctaw Indians, and the Muscogee (Creek) Nation of Oklahoma (letters dated November 10, 2006) to request their consultation on the proposed undertaking and to elicit any concerns about the proposed Project in Arkansas. Follow-up contact with each tribe was conducted on April 30, 2007. The following responses have been received to date: the Alabama-Quassarte Tribal Town (Creek Nation of Indians) indicated that they will not be providing comments on the Project; the Absentee Shawnee Tribe of Oklahoma indicated that they will not be providing comments on the Project as it is not located in counties of interest to the Absentee Shawnee Tribe; the Cherokee Nation of Oklahoma requested a copy

of the notification of the Project with a list of Arkansas Project area counties (they have no interest in the Mississippi portion of the Project); the Choctaw Nation of Oklahoma requested a copy of the notification of the Project, indicated they have an interest in projects in Arkansas and Mississippi, and requested a copy of the Phase I cultural resource investigation report when it is completed; the Delaware Nation is researching their files for the notification of the Project; the Eastern Shawnee Tribe of Oklahoma indicated they would be providing a response; and the Kialegee Tribal Town indicated that they received notification of the Project, although they did not provide a response.

Texas Gas also contacted the Mississippi Band of Choctaw Indians, the Jena Band of Choctaw Indians, the Quapaw Tribe of Oklahoma, the Tunica-Biloxi Tribe of Louisiana, the Chickasaw Nation, the Seminole Nation of Oklahoma, the Shawnee Tribe of Oklahoma, the Thlopthlocco Tribal Town, the United Keetoowah Band of Cherokee Indians in Oklahoma, and the Wichita and Affiliated Tribes (letters dated November 10, 2006) to request their consultation on the proposed undertaking and to elicit any concerns about the proposed Project in Mississippi. Follow-up contact with each tribe was conducted on April 30, 2007. The following responses have been received to date: the Chickasaw Nation requested an additional copy of the notification; the Jena Band of the Choctaw Indians requested a copy of the notification of the Project; the Shawnee Tribe of Oklahoma requested a copy of the notification of the Project, provided tribal consultation procedures, and requested a copy of the SHPO review letter for both the Fayetteville and Greenville Laterals, the cultural resources investigation report, and a fee to cover the consultation process; the Thlopthlocco Tribal Town requested a copy of the notification of the Project; the United Keetoowah Band of Cherokee Indians in Oklahoma provided "no interest" and "no objection" responses, but also requested to be contacted if any remains, artifacts, or other items are inadvertently discovered; and the Wichita and Affiliated Tribes indicated no interest in the Project occurring in Arkansas and Mississippi.

4.10.4 Compliance with the NHPA

The Arkansas SHPO has requested additional information and revisions to the Phase I survey report for Arkansas; the Mississippi SHPO has not yet commented on the Phase I survey report or the Greenville Compressor Station in Mississippi. In addition, two pipe storage yards in Arkansas remain to be surveyed. Consequently, we have not completed the process of complying with Section 106 of the NHPA. When additional information is provided and the surveys are completed, the FERC, in consultation with the Arkansas and Mississippi SHPOs, the NPS (for the Natchez Trace Parkway historic property), and other consulting parties, as appropriate, will determine whether construction of the proposed Project would affect any properties listed, or eligible for listing, in the NRHP. If a property would be adversely affected, mitigation would be proposed.

To ensure that the FERC's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

- **Texas Gas defer construction of the pipelines, compressor stations, meter stations, and use of all staging, storage, and temporary work areas and new or to-be-improved access roads until:**

    a. **Texas Gas addresses the Arkansas SHPO's comments on the Arkansas Phase I survey report, including addressing the SHPO's comments regarding avoidance and protection of historic architectural resources 38, 39, 46 and 71, and files a revised Phase I report and the Arkansas SHPO's comments on the report;**
    b. **Texas Gas files a Phase II NRHP-eligibility testing report for Site 20E-1 in Arkansas and the SHPO's comments on the report;**

c. Texas Gas files the Mississippi SHPO's comments on the Mississippi Phase I survey report;
d. Texas Gas files the Mississippi SHPO's comments on the existing Greenville Compressor Station;
e. Texas Gas files a Phase I survey report for the two pipe storage yards on the Fayetteville Lateral in Arkansas, any newly identified areas requiring survey, and the SHPOs' comments on the report(s);
f. Texas Gas provides interested Native American tribes with any requested information;
g. the ACHP is afforded an opportunity to comment if historic properties would be adversely affected;
h. Texas Gas files any required treatment/mitigation plans and the SHPO's and NPS', as appropriate, comments on the plans; and
i. the Director of OEP reviews and approves all reports and plans and notifies Texas Gas in writing that it may proceed with treatment/mitigation or construction.

All material filed with the Commission <u>containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION—DO NOT RELEASE."</u>

4.11 AIR QUALITY AND NOISE

4.11.1 Air Quality

Air quality would be affected by construction and operation of the proposed Project. Though air emissions would be generated by operation of equipment during construction of the pipeline and aboveground facilities proposed by Texas Gas, most air emissions associated with the proposed Project would result from the long-term operation of the proposed compressor station.

Texas Gas proposes to construct the Kosciusko Compressor Station in Attala County, Mississippi. At the station, Texas Gas would install two Caterpillar G3612 natural-gas-fired reciprocating engines, each rated at 3,550 brake horsepower (bhp), two Caterpillar G3606 natural-gas-fired reciprocating engines, each rated at 1,775 bhp, one 500 bhp emergency generator, one fuel gas heater, and five storage tanks.

4.11.1.1 Existing Air Quality

The proposed Project would be constructed in portions of Conway, Faulkner, Cleburne, White, Woodruff, St. Francis, Lee, and Phillips Counties, Arkansas, and Coahoma, Greenville, Washington, Sunflower, Humphreys, Holmes, and Attala Counties, Mississippi. These counties are characterized by temperate and subtropical climates, with hot and humid summers. The area typically receives ample precipitation throughout the year, with an average annual precipitation of 55.95 inches. The Project area has average annual temperatures of 60 to 54 degrees Fahrenheit.

Mississippi is frequently subjected to severe weather, and tropical cyclones (hurricanes) are not unusual for the Project area. According to the National Oceanographic and Atmospheric Administration (NOAA) Storm Events Database, numerous tornados, hurricanes, and tropical storms have occurred in the Project area.

The Clean Air Act (CAA) designates six pollutants as criteria pollutants for which the National Ambient Air Quality Standards (NAAQS) are promulgated. The NAAQS for sulfur dioxide (SO_2), nitrogen

dioxide (NO_2), particulate matter (PM) with an aerodynamic diameter less than 10 microns (PM_{10}) or with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), carbon monoxide (CO), ozone (O_3), and lead (Pb) were set to protect human health (primary standards) and human welfare (secondary standards). State air quality standards cannot be less stringent than the NAAQS. The NAAQS are codified in 40 CFR Part 50 and are summarized in table 4.11.1-1.

TABLE 4.11.1-1

National Ambient Air Quality Standards

Pollutant	Averaging Period	Primary NAAQS µg/m³ (ppm)	Secondary NAAQS µg/m³ (ppm)
NO_2	Annual a/	100 (0.053)	100 (0.053)
SO_2	Annual a/	80 (0.03)	None
	24-hour b/	365 (0.14)	None
	3-hour b/	None	1,300 (0.5)
PM_{10}	24-hour c/	150	None
$PM_{2.5}$	Annual d/	15	15
	24-hour e/	35	35
CO	8-hour b/	10,000 (9)	10,000 (9)
	1-hour b/	40,000 (35)	40,000 (35)
O_3	8-hour f/	157 (0.8)	157 (0.8)
Pb	Quarterly a/	1.5	1.5

a/ Not to be exceeded.

b/ Not to be exceeded more than once per year.

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

d/ To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

e/ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).

f/ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

The NAAQS are used in conjunction with ambient monitoring data to determine whether air quality is better than the standards, known as attainment, or worse than the standards, known as nonattainment. Nonattainment areas are required to prepare air quality plans that include strategies for achieving attainment. The control strategy may include stationary source measures, mobile source measures, and transportation control measures. Newly constructed sources of air pollutant emissions may be required to install expensive air pollution controls.

Air Quality Control Regions and Attainment Status

Air quality control regions (AQCRs) are areas established for air quality planning purposes in which implementation plans describe how ambient air quality standards will be achieved and maintained. AQCRs were established by the EPA and local agencies, in accordance with Section 107 of the CAA, as a means to implement the CAA and comply with the NAAQS through State Implementation Plans. The AQCRs are intra- and interstate regions such as large metropolitan areas where improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Each AQCR, or

a portion thereof, is designated based on compliance with the NAAQS. AQCR designations fall under three categories as follows: "attainment" (areas in compliance with the NAAQS); "nonattainment" (areas not in compliance with the NAAQS); or "unclassified", which refers to areas with insufficient data to make a determination. The counties in which the proposed Project would be located are designated as "attainment" or "unclassified" for all criteria pollutants.

Air Quality Monitoring

The EPA and state and local agencies have established a network of ambient air quality monitoring stations to measure and track the background concentrations of the criteria pollutants across the United States. To characterize the background air quality in the regions surrounding the proposed compressor station, data from a number of existing representative air quality monitoring stations were obtained. These monitoring stations are located near the proposed compressor station site and provide information on regional ambient air quality conditions. For some criteria pollutants, ambient air quality monitoring data in the vicinity of the proposed compressor stations were not available; therefore, the best available data were used to represent the air quality at those stations. A summary of the regional background air quality concentrations for the compressor station is presented in table 4.11.1-2.

4.11.1.2 Regulatory Requirements

Federal Regulations

The CAA, 42 USC 7401 et seq., amended in 1977 and 1990 and codified at 40 CFR Parts 50-99, are the basic federal statutes and regulations governing air pollution. The provisions of the CAA that are potentially relevant to the proposed Project include the following:

- New Source Review (NSR)/Prevention of Significant Deterioration (PSD),
- New Source Performance Standards (NSPS),
- National Emission Standards for Hazardous Air Pollutants (NESHAP),
- Title V operating permits, and
- General Conformity.

New Source Review/Prevention of Significant Deterioration

NSR refers to the preconstruction permitting programs under Parts C and D of the CAA that must be satisfied before construction can begin on new major sources or major modifications are made to existing major sources located in attainment or unclassified areas. This review may include a PSD review. This review process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels codified in the federal regulations. For sources located in nonattainment areas, the Nonattainment New Source Review (NNSR) program is implemented for the pollutants for which the area is classified as nonattainment. The proposed Project would be located in attainment areas. Consequently, NNSR is not applicable to the proposed Project.

TABLE 4.11.1-2

Existing Ambient Air Quality Data

Pollutant	Monitoring Site	Site ID	Year	Averaging Period	Concentration $\mu g/m^3$ (ppm)
$PM_{2.5}$	Jackson, MS	280490010	2004	24-hour	31
				Annual	12.2
			2005	24-hour	48
				Annual	13.1
			2006	24-hour	29
				Annual	12.1
PM_{10}	Tupelo, MS	280810005	2004	24-hour	32
				Annual	18
	Pascagoula, MS	280590006	2005	24-hour	31
				Annual	18
			2006	24-hour	70
				Annual	23
SO2	Jackson, MS	280490018	2004	3-hour	(0.028)
				24-hour	(0.006)
				Annual	(0.001)
			2005	3-hour	(0.016)
				24-hour	(0.006)
				Annual	(0.001)
	Pascagoula, MS	280590006	2006	3-hour	(0.037)
				24-hour	(0.012)
				Annual	(0.002)
O3	Jackson, MS	280490010	2004	1-hour	(0.081)
				8-hour	(0.072)
			2005	1-hour	(0.088)
				8-hour	(0.079)
			2006	1-hour	(0.097)
				8-hour	(0.085)
NO2	480 Mill Pond Road near Slayden, MS	280930001	2004	Annual	(0.002)
			2005	Annual	(0.004)
	Pascagoula, MS	280590006	2006	Annual	(0.007)
CO	Jackson, MS	280490018	2004	1-hour	(4.6)
				8-hour	(3.0)
			2005	1-hour	(3.6)
				8-hour	(3.3)
	Little Rock, AR		2006	1-hour	(3.1)
				8-hour	(2.6)

The PSD regulations apply to proposed new major sources or major modifications to existing major sources located in an attainment area. The PSD regulations (40 CFR 52.21) define a "major source" as any source type belonging to a list of named source categories that emit or have the potential to emit (PTE) 100 tons per year (tpy) or more of any regulated criteria pollutant. A major source under PSD also can be defined as any source not on the list of named source categories with the potential to emit criteria pollutants in amounts equal to or greater than 250 tpy. Modifications to existing major sources have lower emission thresholds, called "significant emission increases;" amounts over these thresholds trigger PSD review. The proposed Project would not include facilities or operations included on the list of named source categories to which the 100-tpy trigger applies. In addition, the proposed Project would not include any existing major sources under the PSD program; therefore, the proposed new Kosciusko Compressor Station is subject to the 250-tpy threshold.

The PSD review evaluates existing ambient air quality and the potential impacts of the proposed source on ambient air quality (noting in particular whether the source would contribute to any violation of the NAAQS) and reviews the best available control technology (BACT) in order to minimize emissions. The PSD regulations contain restrictions on the degree of ambient air quality deterioration that would be allowed. These increments for criteria pollutants are based on the PSD review classification of the area.

The new Kosciusko Compressor Station would not exceed emissions of 250 tpy of any criteria pollutant (see table 4.11.1-3). Therefore, PSD permitting is not applicable to the proposed Project.

Air Quality Control Regions and PSD

AQCRs are categorized as Class I, Class II, or Class III. Class I areas are designated specifically as pristine natural areas or areas of natural significance and have the lowest increment of permissible deterioration, which essentially precludes development near these areas. Class III designations, intended for heavily industrialized zones, can be made only on request and must meet all requirements outlined in 40 CFR 51.166. The remainder of the United States is classified as Class II. Class II areas are designed to allow moderate, controlled growth. The proposed Project would be located in a Class II area. No Class I areas are located within 62 miles of the proposed compressor station location.

New Source Performance Standards

The NSPS, codified in 40 CFR 60, establish requirements for new, modified, or reconstructed units in specific source categories. NSPS requirements include emission limits, monitoring, reporting, and record keeping. The following NSPS requirements were identified as potentially applicable to the specified sources at the compressor station.

Subpart Kb of 40 CFR 60, Standards of Performance for Volatile Organic Liquid Storage Vessels, lists affected emission sources as storage vessels containing volatile organic liquids. Regulatory applicability is dependent on the construction date, size, and vapor pressure of the storage vessel and its contents. Subpart Kb applies to new tanks, unless otherwise exempted, that have a storage capacity between 75 cubic meters ($m^{3)}$ (19,813 gallons) and 151 m^3 (39,890 gallons) and contain volatile organic compounds (VOCs) with a maximum true vapor pressure greater than or equal to 15.0 kilopascals (kPa). Subpart Kb also applies to tanks that have a storage capacity greater than or equal to 151 m^3 and contain VOCs with a maximum true vapor pressure greater than or equal to 3.5 kPa. The proposed compressor station would be equipped with tanks with capacities of 4,200 gallons or less, which is below the regulated capacity. Therefore, the proposed Project would not be subject to NSPS Subpart Kb standards.

TABLE 4.11.1-3

Compressor Station Operation Emission Source Information

Emission Unit	Rating	Units	Operating Hours	Annual Potential Emissions (tpy)						
				NO_X	CO	VOCs	SO_2	PM_{10} /$PM_{2.5}$	Formaldehyde	Total HAPs
Engine No. 1 G3606	1,775	bhp	8,760	12.00	2.57	1.85	0.031	0.53	0.69	1.68
Engine No. 2 G3606	1,775	bhp	8,760	12.00	2.57	1.85	0.031	0.53	0.69	1.68
Engine No. 3 G3612	3,550	bhp	8,760	24.00	5.14	3.70	0.062	1.05	1.37	3.36
Engine No. 4 G3612	3,550	bhp	8,760	24.00	5.14	3.70	0.062	1.05	1.37	3.36
Emergency Generator	500	bhp	500	0.55	0.47	0.12	5.9E-04	0.01	0.053	0.072
Fuel Gas Heater	1	MMBtu/ hr	8,760	0.43	0.36	0.024	0.003	0.033	3.2E-04	3.5-E-04
Tank TK01	4,200	gallons	8,760	—	—	0.013	—	—	—	—
Tank TK02	4,200	gallons	8,760	—	—	3.9E-10	—	—	—	—
Tank TK03	2,100	gallons	8,760	—	—	1.3E-10	—	—	—	—
Tank TK04	2,100	gallons	8,760	—	—	1.3E-09	—	—	—	—
Tank TK05	4,200	gallons	8,760	—	—	3.9E-10	—	—	—	—
Total				**72.98**	**16.25**	**11.26**	**0.19**	**3.20**	**4.17**	**10.15**

On June 12, 2006, the EPA proposed a new NSPS (40 CFR 60 Subpart JJJJ) for stationary spark ignition (SI) internal combustion engines. The proposed compressor stations contain natural-gas-fired compressor engines and/or emergency generators that may be potentially subject to 40 CFR 60 Subpart JJJJ. The proposed standard for stationary SI engines applies to all new, modified, and reconstructed stationary SI engines regardless of size. The pollutants to be regulated by the proposed NSPS for stationary SI engines are NO_X, CO, and non-methane hydrocarbons (NMHC). Texas Gas has indicated it would fully comply with the requirements in the proposed Sub JJJJ NSPS.

National Emission Standards for Hazardous Air Pollutants

The NESHAP, codified in 40 CFR Parts 61 and 63, regulates hazardous air pollutant (HAP) emissions. Part 61 was promulgated prior to the 1990 Clean Air Act Amendments (CAAA) and regulates only eight types of hazardous substances (asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride).

The 1990 CAA established a list of 189 HAPs, resulting in the promulgation of Part 63. Part 63, also known as the Maximum Achievable Control Technology (MACT) standards, regulates HAP emissions from major sources of HAP emissions and specific source categories that emit HAPs. Part 63 defines a major source of HAPs as any source that has the potential to emit 10-tpy of any single HAP or 25 tpy of HAPs in aggregate. MACT standards are intended to reduce emissions of air toxics or HAPs through installation of control equipment rather than enforcement of risk-based emission limits.

The reciprocating engines would potentially be subject to 40 CFR Part 63 Subpart ZZZZ if the station is a major source of HAPs or if the engine rating is greater than 500 hp, regardless of the size. In addition, all area sources would be subject to Subpart ZZZZ, regardless of the engine size. The proposed units would meet the requirements of this subpart.

Title V Operating Permits

The Title V permit program, as described in 40 CFR 70, requires sources of air emissions with criteria pollutant emissions that reach or exceed major source levels to obtain federal operating permits. These permits list all applicable air regulations and include a compliance demonstration for each applicable requirement. The major source threshold level in attainment areas is 100 tpy of NO_X, SO_2, CO, PM_{10}, $PM_{2.5}$, and VOC. None of the criteria pollutants would be emitted at the 100-tpy level at the Kosciusko Compressor Station; therefore, Title V permits would not be required.

General Conformity

40 CFR parts 51 and 93 define the requirements for determining conformity for federal actions to state or federal implementation plans. A conformity analysis is required for each criteria pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area caused by a federal action would equal or exceed any of the rates specified in the applicable implementation plan. The proposed Project would not be located in any nonattainment areas; therefore, the general conformity requirements do not apply to the proposed Project.

State Regulations

In addition to the federal regulations described above, the compressor station also would be subject to certain state air quality regulations. Subject to EPA approval, the MDEQ manages the statewide air permitting, compliance, and enforcement programs. These regulations may apply to new or existing sources. The Kosciusko Compressor Station would be authorized under MDEQ's construction and

operating permit. The following Mississippi Air Pollution Control regulations were evaluated for their applicability.

APC-S-1 Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants

APC-S-1 includes specifications for specific pollutants, hazardous air pollutants, certain specific sources of pollutants, notification of emission events, and stack heights. Section 3 contains criteria for sources of particulate matter, including opacity limitation, open burning prohibition, and nuisance prohibition. Section 4 contains criteria for SO_2 emissions. APC-S-1 also incorporates by reference the federal NSPS program. The compressor station's MDEQ permit would require compliance with all applicable federal and state air regulations.

APC-S-2 Permit Regulation for the Construction and/or Operations of Air Emissions Equipment

APC-S-2 contains the requirements for obtaining permits prior to constructing new equipment and for obtaining state permits to operate, including public notice and participation requirements. The Project would obtain the required permits prior to commencing construction.

APC-S-3 Prevention of Air Pollution Emergency Episodes

APC-S-3 defines air pollution alerts, warnings, and emergencies and establishes requirements for operators of certain sources to prepare plans for responding to these three levels of air pollution episodes. The Project would prepare an Emission Control Action Program in accordance with Section 4.

APC-S-4 Ambient Air Quality Standards

APC-S-4 incorporates, by reference, the Primary and Secondary NAAQS, 40 CFR Part 50. In addition, it states that no odorous substances shall be released into the ambient air in concentrations that could adversely affect human health and well-being, affect plant or animal life, or interfere with the use or enjoyment of property.

APC-S-5 Prevention of the Significant Deterioration (PSD) of Air Quality

APC-S-5 incorporates, by reference, the PSD of Air Quality Program, 40 CFR 52.21. The Project would not be a PSD source.

APC-S-6 Air Emissions Operating Permit Regulations for the Purposes of Title V of the Clean Air Act

APC-S-6 defines the requirements for Title V permits, including major source categories and levels, permit applications, issuance, fees, and insignificant activities. The Project is not subject to Title V.

APC-S-8 Air Toxics Regulations

APC-S-8 regulates, on a case-by-case basis, MACT applicable to facilities affected by the requirements of Section 112(g) of the CAA, Subpart B of 40 CFR Part 63. The Project would not be a major source of HAPs and would not be subject to this regulation.

4.11.1.3 Air Quality Impacts and Mitigation

Construction Emissions

Construction of the pipeline and access roads would generate air emissions during grading, trenching, backfilling, and operation of construction vehicles along unpaved areas. The proposed Project would use existing roads to the extent practicable. Some roads used for access would be improved during construction by widening or adding drain pipes, gravel, or grading; and some new roads and road extensions would be constructed. Some roads would remain after construction to provide permanent access to the pipeline for maintenance purposes. These activities could generate dust and particulate emissions from earth-moving activities and construction equipment engine exhaust.

Construction of the compressor station would be performed with mobile equipment similar to that typically used for pipeline and road construction. Construction would be expected to cause a minor and temporary impact on local ambient air quality as a result of fugitive dust and combustion emissions generated by construction equipment. Criteria pollutant emissions during operation of the fossil-fueled construction equipment would occur from combustion products resulting from the use of gasoline and diesel fuels, primarily NO_2, CO, VOCs, PM_{10}, small amounts of SO_2, and small amounts of HAPs (e.g., formaldehyde, benzene, toluene, and xylene) produced by the construction equipment engines. Pipeline construction would be a constantly moving process, and impacts would occur only in the vicinity of active construction in the pipeline corridor. Construction of the Kosciusko Compressor Station would likely take a few months, with impacts occurring only in the vicinity of the compressor station site. Table 4.11.1-4 lists the estimated emissions from construction equipment activities for the compressor station. Impacts from construction equipment would be temporary and would be expected to result in an insignificant impact on air quality.

Texas Gas would employ proven construction practices to control fugitive dust emissions during construction. All areas disturbed by construction would be stabilized; therefore, fugitive dust emissions during construction would be minor and of short duration. Dust suppression activities (e.g., watering) would be used as necessary to minimize these potential impacts. Should open burning occur during construction, requirements of contractors would include: on-site equipment to prevent the spread of fire, a specified level of attention required by contractor personnel during burning, acquisition of all required permits, and compliance with all state and local regulations, including APC-S-1, Section 3.7.

Operations Emissions

The four natural-gas-fired reciprocating internal combustion engines used to provide the necessary gas compression, which are assumed to operate 8,760 hours at 100 percent load, would be equipped with state-of-the-art NO_X low-emission combustion (LEC) control technology integral to their design. These engines also would be equipped with oxidation catalyst systems to reduce emissions of CO, NMHC, and hazardous air pollutants such as formaldehyde.

TABLE 4.11.1-4

Compressor Station Construction Emission Source Information

Emission Source	Annual Potential Emissions (tpy)					
	NO_X	CO	SO_2	PM_{10} /$PM_{2.5}$	VOC	Total HAPs
E-1 100-ton Crane	0.133	0.029	0.009	0.009	0.011	1.14E-04
E-2, 20-ton Cherry Picker	0.316	0.068	0.021	0.022	0.025	2.71E-04
E-3 20-ton Cherry Picker	0.316	0.068	0.021	0.022	0.025	2.71E-04
E-4 330 Backhoe	0.316	0.068	0.021	0.022	0.025	2.71E-04
E-5 330 Backhoe	0.316	0.068	0.021	0.022	0.025	2.71E-04
E-6 330 Backhoe	0.316	0.068	0.021	0.022	0.025	2.71E-04
E-7 D6 Bulldozer	0.215	0.046	0.014	0.015	0.017	1.84E-04
E-8 D6 Bulldozer	0.215	0.046	0.014	0.015	0.017	1.84E-04
E-9 D6 Bulldozer	0.215	0.046	0.014	0.015	0.017	1.84E-04
E-10 D6 Bulldozer	0.215	0.046	0.014	0.015	0.017	1.84E-04
E-11 Side Boom	0.186	0.040	0.012	0.013	0.015	1.59E-4
E-12 Side Boom	0.186	0.040	0.012	0.013	0.015	1.59E-4
E-13 Forklift	0.253	0.055	0.017	0.018	0.020	2.17E-04
E-14 Generator	0.298	0.064	0.020	0.021	0.024	2.55E-04
E-15 Welding Rig	0.093	0.020	0.006	0.007	0.007	7.96E-05
E-20 Welding Rig	0.093	0.020	0.006	0.007	0.007	7.96E-05
Painting	—	—	—	0.054	—	0.023
Open Burning	0.28	9.8	—	1.19	1.33	—
Fugitive Dust	—	—	—	**1.35**	—	—
Total	**3.96**	**10.59**	**0.24**	**2.85**	**1.62**	**0.03**

Each compressor station would include an emergency shut down (ESD) system, pursuant to DOT requirements. Activation of the ESD system would vent the piping (expel the natural gas) to the atmosphere in case of an emergency. The ESD would be used only in the event of an emergency. Compressor unit blowdowns would occur as needed to relieve pressure when a unit is taken offline. Natural gas blowdowns are not part of routine operation.

Table 4.11.1-3 lists the anticipated emissions of criteria pollutants and HAPs from the operation of the compressor station. Texas Gas modeled the proposed emission sources at the compressor station using the SCREEN3 model, which is the EPA-approved model for most screening-level analyses. The SCREEN3 dispersion model (version 96043) is used to estimate pollutant concentrations in simple and complex terrain. It also can estimate the near-field effect of building downwash on stack emissions for both cavity and wake regions surrounding a facility. Results of the modeling analysis are presented in Table 4.11.1-5. When the maximum impacts for each emission source at the facility are conservatively assumed to occur at the same location, the total facility impact is below the NAAQS. Actual impacts would be expected to be significantly lower, since SCREEN3 is a conservative model, worst-case meteorological conditions were used, and the maximum impact for each source could be expected to occur at different locations.

TABLE 4.11.1-5

Project Impacts

	Engine No. 1 G3606 Impact ($\mu g/m^3$)	Engine No. 2 G3606 Impact ($\mu g/m^3$)	Engine No. 3 G3612 Impact ($\mu g/m^3$)	Engine No. 4 G3612 Impact ($\mu g/m^3$)	Emergency Generator Impact ($\mu g/m^3$)	Fuel Gas Heater Impact ($\mu g/m^3$)	Total Facility Impact ($\mu g/m^3$)	EPA NAAQS Standard ($\mu g/m^3$)
Maximum Impact using 1 gm/sec emission rate	417.2	417.2	157.3	157.3	2395	938.5	Not applicable	Not applicable
NO_2								
Annual maximum using proposed Project emission rates	11.52	11.52	8.69	8.69	53.11	0.93	96.63	100
CO								
1-hour maximum using proposed Project emission rates	31.01	31.01	23.28	23.28	564.31	9.70	682.59	40000
8-hour maximum using proposed Project emission rates	21.71	21.71	16.30	16.30	395.01	6.788	477.8	10000

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a/ 8-hour and annual impacts calculated using scaling factors of 0.7 and 0.08, respectively, per EPA guidance (EPA, 1992). Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, October 1992, EPA-454/R-92-019. U.S. Environmental Protection Agency, Research Triangle Park, NC).

4.11.2 Noise

Noise would affect the local environment during both construction and operation of the proposed Project. At any location, both the magnitude and frequency of ambient noise may vary considerably over the course of the day and throughout the week due, in part, to changing weather conditions and the effects of seasonal vegetative cover. Two measures used by federal agencies to relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level ($L_{eq(24)}$) and the day-night sound level (L_{dn}). The $L_{eq(24)}$ is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The L_{dn} is the $L_{eq(24)}$ with 10 decibels on the A-weighted scale (dBA) added to sound levels between the hours of 10 P.M. and 7 A.M. to account for people's greater sensitivity to sound during nighttime hours. The A-weighted scale is used because human hearing is less sensitive to low and high frequencies than mid-range frequencies. People's threshold for perception of a change in noise level is considered to be 3 dBA.

4.11.2.1 Regulatory Requirements

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has determined that an L_{dn} of 55 dBA protects the public from indoor and outdoor activity noise interference. We have adopted this criterion and used it to evaluate the potential noise impact from operation of the compressor facilities.

No applicable state, county, or local noise regulations were identified for the project area.

4.11.2.2 Existing Noise Levels

Impacts are determined at receptors known as noise-sensitive areas (NSAs). NSAs include residences, schools and day-care facilities, hospitals, long-term care facilities, places of worship, libraries, and parks and recreational areas (e.g., wilderness areas) valued specifically for their solitude and tranquility.

The Kosciusko Compressor Station would be located in Attala County, Mississippi. Three NSAs were identified within a 1-mile radius of the proposed Kosciusko Compressor Station site. Texas Gas conducted an ambient noise monitoring survey on March 13 and March 14, 2007 at the three NSA locations to establish baseline noise levels in the area. Existing noise sources in the area during the day included the existing Texas Eastern compressor station, local traffic, birds and insects, barking dogs, and rustling leaves. L_{dn} noise levels were calculated for each of the two noise monitoring days using the short-term noise measurements. The L_{dn} levels at each location are summarized in table 4.11.2-1 and were used as the baseline noise levels for this analysis.

TABLE 4.11.2-1

Ambient Existing Noise at NSAs

NSA	Distance to Station (feet)	Existing Noise Level (dBA)		
		L_{eq} (day)	L_{eq} (night)	L_{dn}
NSA3-1	1,800	50	44	52
NSA3-2	3,300	48	42	50
NSA3-3	4,350	46	33	45

4.11.2.3 General Impacts and Mitigation

Construction Noise

Construction of the proposed Project is expected to be typical of other pipeline projects in terms of schedule, equipment used, and types of activities. Construction would increase sound levels in the vicinity of proposed Project activities, and the sound levels would vary during the construction period, depending on the construction phase. Pipeline construction generally would proceed at rates ranging from several hundred feet to 1 mile per day. However, due to the assembly-line method of construction, construction activities in any one area could last from several weeks to several months on an intermittent basis. Construction-related noise at the compressor station would be concentrated in the vicinity of the construction activity. Construction equipment would be operated on an as-needed basis during those periods and would be maintained to manufacturers' specifications to minimize noise impacts.

Nighttime noise levels would normally be unaffected because most pipeline construction would take place only during daylight hours. The possible exceptions would be at the HDD sites (e.g., at the crossings of waterbodies and highways). At HDD locations, drilling equipment may operate on a 24-hour-per-day basis. In addition to the EPA's 55 dBA standard, noise level changes are categorized as follows: a 3-dBA increase is considered noticeable, a 6-dBA increase is considered clearly noticeable, and a 9-dBA increase is considered significantly noticeable. An acoustical assessment was prepared for all NSAs within 1 mile of HDD locations to determine existing sound levels at each site and the projected levels from HDD activity. Since it is not known at this time precisely what type or model of HDD would be used, as a conservative measure for this analysis, future noise levels were based upon use of a Ditch Witch JT8020 Mach 1 Directional Drill (constructed by the Charles Machine Works, Inc.). This HDD rig

is the largest and most powerful offered by this leading manufacturer and would be appropriate for a project of this scale.

The results of the noise prediction for the proposed HDD drill sites indicate that, of the 21 unique HDD drill sites, nine had potential NSAs within a 0.5-mile screening distance. The closest receptor to a planned HDD site is 600 feet. Of the nine potential NSAs, two had predicted noise levels that would exceed 55 dBA L_{dn} (HDD sites 23 and 25). Potential impacts at these two sites are shown in table 4.11.2-2. Twenty-four hour drilling operations is usually reserved for long drill distances, typically those over 2,000 feet in length. Locations with shorter drill lengths would probably not require nighttime operations and, therefore, would have a lower L_{dn} value. The two NSA locations with predicted levels above 55 dBA L_{dn} would have drill lengths less than 1,500 feet and may not require 24-hour drilling. However, because construction activities associated with HDDs have the potential for significant short-term noise level impacts, **we recommend that**

- **For the HDD locations listed in table 4.11.2-2 with projected noise levels above 55 dBA L_{dn} at the closest NSA, Texas Gas file noise mitigation plans with the Secretary for review and approval by the Director of OEP, prior to construction. The noise mitigation plan should include either a commitment to daytime drilling only or provide mitigation measures to reduce noise levels at the NSAs.**

Table 4.11.2-2

Projected Noise Impact at NSAs for HDD Sites 23 and 25

HDD Site	Ambient Noise Levels (L_{dn})	Noise Levels due to HDD Activity (L_{dn})	Total Projected Noise Level (L_{dn})	Increase over Ambient (dBA)
23	50.7	60	60.5	9.8
25	53.3	65	65.3	12.0

Operational Noise

During operation of the proposed Project, potential noise impacts would be limited to the vicinity of the new compressor station. Principal noise sources would include the air inlet, exhaust, and casing of the turbines. Secondary noise sources would include yard piping and valves. Noise from the relief valves, blowdown stacks, and emergency electrical generation equipment would be infrequent.

The compressor station would include design measures to minimize sound generation. Silencers or mufflers would be installed on the exhausts, and silencers would be installed on the air intakes. The walls of the compressor building would be comprised of acoustical panels.

Texas Gas calculated the expected increases in noise levels associated with operation of the compressor station based on the proposed total power rating for the Kosciusko Compressor Station (10,650 hp) and the distance to the NSAs. The projected operational noise levels, as determined by Texas Gas are presented in table 4.11.2-3.

TABLE 4.11.2-3

Noise Quality Analysis, Kosciusko Compressor Station

NSA	Distance to Station (feet)	Existing Noise Level (dBA)			Future Noise Level (dBA)		
		L_{eq} (day)	L_{eq} (night)	L_{dn}	Additional L_{dn}	Total L_{dn}	Increase
NSA3-1	1,800	50	44	52	39	52	0
NSA3-2	3,300	48	42	50	25	50	0
NSA3-3	4,350	46	33	45	22	45	0

In summary, the calculated noise levels anticipated from operation of the compressor station would be below the FERC level of 55 dBA L_{dn} at all of the nearby NSA locations, and there would be no increase over existing L_{dn} levels. However, to ensure that noise levels from operation of the Kosciusko Compressor Station would not adversely impact surrounding areas, **we recommend that**

- **Texas Gas make all reasonable efforts to ensure its predicted noise levels from the Kosciusko Compressor Station are not exceeded at nearby NSAs and file with the Secretary noise surveys showing this no later than 60 days after placing the Kosciusko Compressor Station in service. However, if the noise attributable to operation of the Kosciusko Compressor Station at full load exceeds an L_{dn} of 55 dBA at any nearby NSAs, Texas Gas shall file a report on what changes are needed and shall install additional noise controls to meet the level within 1 year of the in-service date. Texas Gas shall confirm compliance with this requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

4.12 CUMULATIVE IMPACTS

Cumulative impact results when impacts associated with a proposed project are superimposed on, or added to, impacts associated with past, present, or reasonably foreseeable future projects within the area affected by the proposed project. Although the individual impacts of the separate projects may be minor, the effects from the projects taken together could be significant.

The purpose of this cumulative impact analysis is to identify and describe cumulative impacts that would potentially result from implementation of the proposed Project. This cumulative impact analysis generally follows the methodology set forth in relevant guidance (CEQ, 1997; EPA, 1999). Under these guidelines, inclusion of other projects within the analysis is based on identifying commonalities of impacts from other projects to potential impacts that would result from the proposed Project. For an action to be included in the cumulative impacts analysis, it must:

- impact a resource area potentially affected by the proposed Project;
- cause this impact within all, or part of, the proposed Project area; or
- cause this impact within all, or part of, the time span for the potential impact from the proposed Project.

For the purposes of this cumulative impact analysis, we consider the Project area to be the counties traversed by the proposed Project. The effects of more distant projects are not assessed because their

impact would be localized in their project areas and would not contribute significantly to the cumulative impact in the proposed Project area.

The actions considered in this cumulative impact analysis may vary from the proposed Project in nature, magnitude, and duration. The actions included in this analysis are based on likelihood of completion, and only projects with either ongoing impacts or that are "reasonably foreseeable" future actions were evaluated. The anticipated cumulative impacts of the proposed Project and other actions are presented below.

This section describes the estimated impact associated with the Project and one other proposed interstate natural gas pipeline project and the overall impact that could be expected to accumulate if both projects were constructed. More distant proposed or recently approved interstate natural gas pipeline projects are not assessed because their impact would generally be localized elsewhere and, therefore, would not contribute significantly to cumulative impacts in the immediate Project area.

Table 4.12-1 lists ongoing or reasonably foreseeable future projects or activities that may also contribute to cumulative impacts on resources that would be affected by construction and operation of the proposed Project.

4.12.1 Planned Pipeline Projects in the Vicinity of the Project Area

Cumulative impacts in this section are limited to the Fayetteville Lateral since no other natural gas projects have been identified in proximity to the Greenville Lateral.

We are aware of only one other interstate pipeline project that has been proposed for construction in the vicinity of the Fayetteville Lateral, Ozark's East End Expansion Project (Docket No. PF06-34-000). The East End Expansion Project is in the pre-filing stage and is being evaluated by the FERC, but it has not yet been approved.

The East End Expansion Project would include about 180 miles of 36-inch-diameter pipeline beginning in Conway County, Arkansas, at the proposed new 10,000-hp Wonderview Compressor Station and extending along Ozark's existing 20-inch-diameter pipeline right-of-way for about 58.5 miles. It would then extend eastward along its existing 12-inch-diameter pipeline right-of-way for another 6.1 miles through Faulkner and White Counties, to a point near Searcy, Arkansas. At that point it would divert eastward from the existing pipeline right-of-way onto new right-of-way to the proposed new 20,000-hp Searcy Compressor Station in White County. From the proposed Searcy Compressor Station, the East End Expansion Project pipeline would continue southeastward through Woodruff, Prairie, Monroe, Lee, and Phillips Counties, Arkansas, and Coahoma, Quitman, Panola, Lafayette, and Calhoun Counties, Mississippi, to a terminus near Banner, Calhoun County, Mississippi, on new pipeline right-of-way. The East End Expansion Project also would include an 8-mile-long, 24-inch-diameter pipeline (Noark Extension) extending from Ozark's existing 16-inch-diameter Noark Pipeline to the proposed Wonderview Compressor Station, all in Conway County. The East End Expansion Project would transport about 1.0 bcf/d of natural gas from new natural gas production areas to proposed new delivery points on existing pipeline systems of Texas Gas (in Coahoma County, Mississippi), ANR (in Panola County, Mississippi), and Trunkline (in Panola County, Mississippi).

TABLE 4.12-1

Existing or Proposed Activities or Projects in the Vicinity of the Fayetteville/Greenville Expansion Project

Activity/Project	Description	Primary Environmental Impact								
		Water Resources	Wetlands	Wildlife/Vegetation	Recreation	Socioeconomics	Land Use	Transportation	Air Quality/Noise	
Proposed Action										
Texas Gas Fayetteville/Greenville Expansion Project, CP07-417-000	Construction of the **Fayetteville Lateral**: about 166.2 miles of 36-inch-diameter pipeline in Faulkner, Cleburne, White, Woodruff, St. Francis, Lee, and Phillips Counties, Arkansas, and Coahoma County, Mississippi; and the **Greenville Lateral**: about 96.4 miles of 36-inch-diameter pipeline in Washington, Sunflower, Humphreys, Holmes, and Attala Counties, Mississippi; about 0.8 mile of 36-inch-diameter tie-in pipeline and 0.4-mile of 20-inch-diameter tie-in pipeline in Attala County; and a 10,650-hp compressor station near Kosciusko in Attala County. Total length of pipeline would be 263.8 miles. Anticipated time frame for construction is 8 months, from June 2008 to January 2009.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reasonably Foreseeable Future Projects or Activities										
Ozark East End Expansion Project, PF06-34-000	Construction of about 180 miles of 36-inch-diameter gas pipeline in Conway, Faulkner, White, Woodruff, Prairie, Monroe, St. Francis, Lee, and Phillips Counties, Arkansas, and Coahoma, Quitman, and Panola Counties, Mississippi; 8 miles of 24-inch-diameter pipeline (Noark Extension) in Conway County; the 20,000-hp Searcy Compressor Station in White County; the 10,000-hp Wonderview Compressor Station in Conway County. Anticipated time frame for construction has not been determined.	✓	✓	✓	✓	✓	✓	✓	✓	
Present Projects or Activities										
Agriculture: row crops and livestock/poultry	Growing cotton, soybeans, rice, small grains; raising beef cattle and poultry	✓				✓	✓	✓	✓	
Gas Exploration	Ongoing Fayetteville Shale production. Well drilling; and gathering pipeline, gas treatment, and compression facilities construction (as needed) and operation.	✓	✓	✓	✓	✓	✓	✓	✓	

The Fayetteville Lateral and the East End Expansion Project pipeline would be collocated for the first 37 miles of the proposed Fayetteville Lateral. Different in-service dates would likely prevent these two projects from being constructed simultaneously.

Figure 4.12.1-1 shows the general location of the East End Expansion Project and the Fayetteville/Greenville Expansion Project, as well as the locations of other pending or recently approved interstate natural gas pipeline projects in the Arkansas-Mississippi-Louisiana region. We note that expansions of natural gas transmission systems are proposed in Texas, Louisiana, and southern Mississippi. For informational purposes, these proposed pipelines are presented on figure 4.12.1-1; however, since these projects are well removed from the Project area considered in this EIS, they would not contribute to the cumulative impacts for the proposed Project; therefore, no further information is provided about them.

4.12.2 Other Projects and Activities

The Fayetteville Lateral would transport natural gas supplies from the developing Fayetteville Shale production area. Southwestern and other producers are currently developing the Fayetteville Shale in northern Arkansas, primarily in Cleburne, Conway, Faulkner, Independence, Johnson, St. Francis, Prairie, Van Buren, White, and Woodruff Counties. In August 2004, Southwestern announced that its wholly owned subsidiary, SEECO, Inc., had successfully drilled test wells targeting the Fayetteville Shale and had commercially produced gas from the shale. As of May 1, 2006, SEECO had drilled a total of 148 wells in 18 pilot areas in seven separate counties. SEECO has established production from two other gas-bearing formations (the Moorefield and Chattanooga Shales) that lie geologically beneath the Fayetteville Shale production area. Gas-gathering pipelines, gas treatment, and compressor facilities have been constructed to transport and process the gas produced from this production area to the existing interstate pipeline systems. Wells are actively being drilled, and gas-gathering pipelines to connect the new production are being constructed as needed. Well drilling and construction and operation of gathering facilities are not under FERC jurisdiction. The AOGC has jurisdiction over gas production facilities in Arkansas. Potential well drilling and gathering line construction would result in temporary and minor impacts during construction but should be conducted in a manner that avoids or minimizes impacts on wetlands, waterbodies, species of concern, and other sensitive resources pursuant to the requirements of the AOGC.

Possible new gas production or gathering facilities might be constructed near the proposed Project in these same counties since the Project would cross about 55 miles of the Fayetteville Shale production area. Table 2.1-2 lists the 14 interconnects the proposed Project would have with the Southwestern system in Conway, Faulkner, and White Counties. Texas Gas has consulted with Southwestern to develop a pipeline route through the gas production area to minimize conflicts with ongoing development of this resource and to plan locations for M&R stations to interconnect with Southwestern's gathering pipelines.

Construction of facilities related to gas production and gathering would have impacts similar to those identified for the proposed Project. However, gathering pipelines generally are smaller in diameter than the 36-inch-diameter of the proposed pipeline; therefore, a narrower construction right-of-way would be required for their construction. Use of appropriate erosion and sediment controls would minimize off-site impacts on undisturbed areas and waterbodies and wetlands. State regulatory review and issuance of necessary permits and approvals would reduce or avoid significant environmental impacts. Specific information about where and when future gathering facilities might be constructed is not available. Therefore, these activities are not included in the cumulative impact analysis provided in this section.

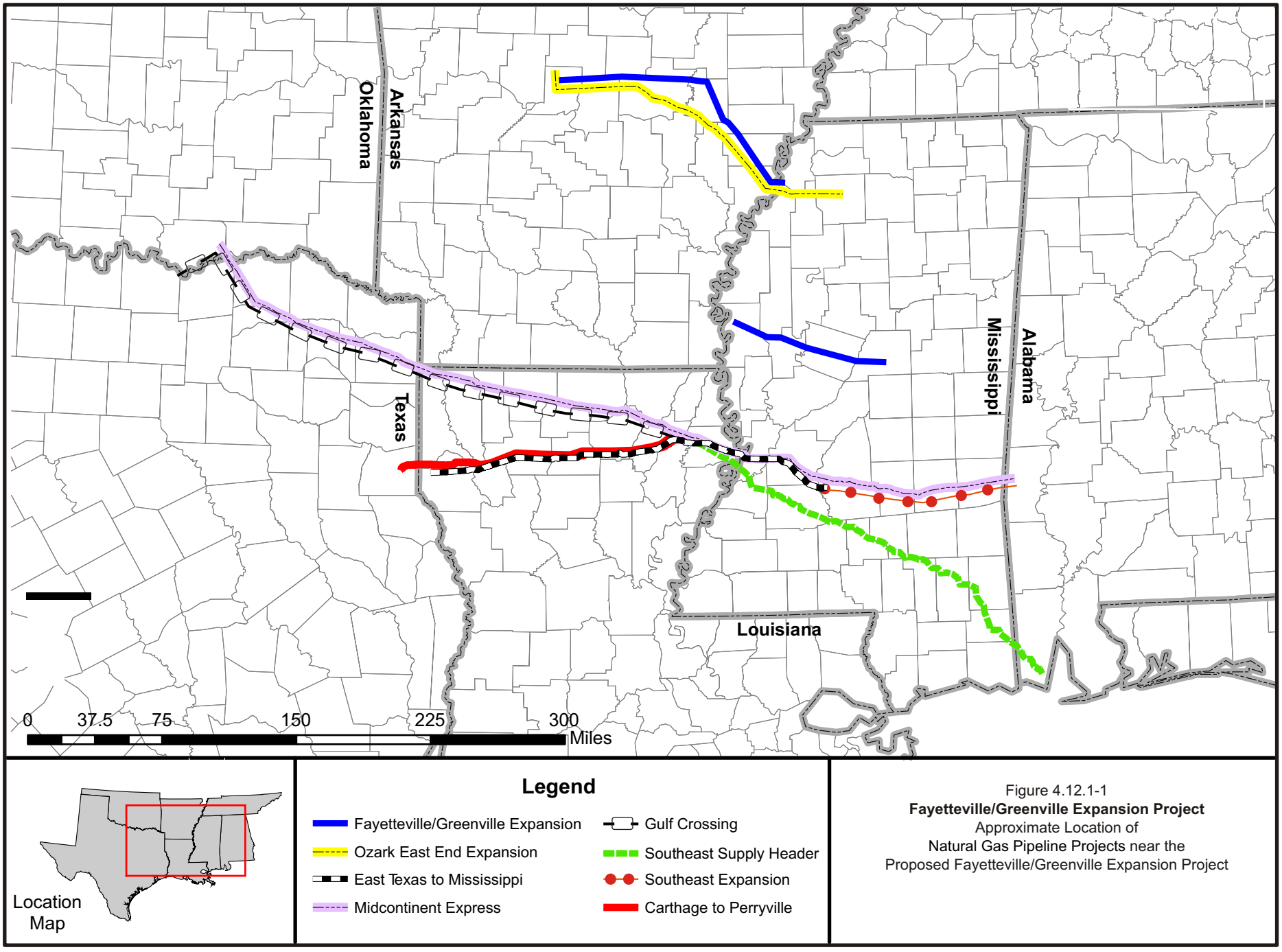

Figure 4.12.1-1
Fayetteville/Greenville Expansion Project
Approximate Location of
Natural Gas Pipeline Projects near the
Proposed Fayetteville/Greenville Expansion Project

Agricultural activities (mainly related to planting and harvesting crops) occur throughout most of the Project area along both the Fayetteville and Greenville Laterals (see section 4.8). The removal of vegetation (crops) from fields and soil disturbance may result in erosion and sedimentation that may be considered as a cumulative impact with the Project. Agricultural activities can contribute to cumulative impacts on water resources, land use, socioeconomics, and air quality. Impacts from agricultural activities would generally be localized and temporary and, therefore, would not contribute significantly to cumulative impacts in the immediate Project area. As such, agricultural activities are not included in the cumulative impact analysis provided in this section.

4.12.3 Potential Cumulative Impacts of the Proposed Action

Cumulative impacts would be greatest where the proposed Project and other projects or activities would be adjacent to or in proximity to each other. The East End Expansion Project would be adjacent or in proximity to the proposed Project in Conway, Faulkner, and White Counties, Arkansas, between MP 0.0 and about MP 37 of the Fayetteville Lateral. Construction schedules also would affect the extent and duration of cumulative impacts. Projects located adjacent to each other, which are constructed at the same time, may have greater short-term impacts but similar long-term impacts. Since the schedule for the East End Expansion Project has not been updated, it is not certain to what extent timing would affect impacts on any resource along this segment of the Project. However, we assume that Ozark's East End Expansion Project would begin construction later than Texas Gas's proposed Project (if both are approved by the FERC) since Ozark has not yet filed a certificate application for it with the FERC. The planning process has not been completed for Ozark's East End Expansion Project. Therefore, much of the description about the cumulative impacts in this section will be of a general and conditional nature.

4.12.3.1 Geology and Soils

Geology

The impacts of the Fayetteville Lateral and the East End Expansion Project on geological resources are not considered to be significant. Mineral resources are not present in large quantities and known sites would likely be avoided. Both projects would cross areas of active natural gas exploration and development related to production of the Fayetteville Shale natural gas reserves. Texas Gas proposes interconnections with Southwestern's existing gas gathering system to transport this production to markets east of the production area. Ozark may plan similar interconnections, but, at this time, this is not known since Ozark's project is still in development. Communication and coordination with the natural gas producers concerning their plans for new wells and gathering pipelines would minimize conflicts with natural gas production. Therefore, we conclude that the cumulative impact of both projects on mineral resources and gas production would not be significant.

In the areas where the projects would be collocated, risk due to geologic hazard would be similar: no significant seismic, subsidence, or landslide risk. The lack of unusual or significant paleontological resources results in a low risk of significant impacts by the proposed projects on such resources. Although bedrock near the surface will require blasting in areas of the Fayetteville Lateral and the East End Expansion Project, impacts due to blasting would be minimized by implementing appropriate blasting specifications. Therefore, we conclude that the cumulative impact of both projects related to geologic risk and blasting would not be significant.

Soils

Both projects would disturb soils during construction. Texas Gas and Ozark would implement the mitigation measures described in our Plan and Procedures to control erosion and sedimentation, to

minimize impacts to soils, and to restore construction workspaces. These measures include topsoil segregation and decompaction in appropriate areas, rock removal, consultation with landowners and local soil resource agencies about seeding, and monitoring the success of revegetation. Texas Gas and Ozark would be responsible for ensuring all areas affected by construction activities were finish graded and restored as closely as practicable to preconstruction contours. If active drainage tiles, culverts, or other drainage facilities are damaged during construction, Texas Gas and Ozark would replace or repair them to a condition that is equal to or better than preconstruction condition. Although damage to drainage structures and patterns would result in short-term impacts, the corrective actions that would be implemented by Texas Gas and Ozark would avoid or minimize any long-term impact. Further, both Texas Gas and Ozark would repair any damaged irrigation systems.

At this time, about 37 miles of the Fayetteville Lateral (from MP 0.0 to MP 37) and Ozark's East End Project would be collocated along existing pipeline right-of-way. If both projects are approved, Ozark's project would likely be constructed about a year after Texas Gas's project. It's construction would re-disturb some of the restored Fayetteville Lateral construction right-of-way. This would extend the time that soils and land uses would be affected in this area by about a year. Since the remaining 129 miles of the Fayetteville Lateral would not be collocated with the remaining 143 miles of the East End Expansion Project, re-disturbance of the restored construction right-of-way would not be an issue in those areas. However, since both project sponsors would implement our Plan and Procedures and any additional mitigation we may recommend, impacts on soils would be minimized and cumulative impacts on soils would not be significant.

Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils; however, the effects of such contamination would typically be minor and widely dispersed because of the low frequency and volumes of spills and leaks. Texas Gas and Ozark would implement their SPCC Plans for the pipelines and aboveground facilities (see appendix D, Texas Gas's SPCC Plan). Successful use of the SPCC Plans would minimize the potential for spills of contaminated materials to occur and would contain spills that might occur during construction of each project; therefore, the cumulative impact would not be considered significant.

4.12.3.2 Water Resources and Wetlands

Construction of the proposed Fayetteville Lateral would result in 278 waterbody crossings. For eight of the 11 major waterbody crossings, Texas Gas would use HDD methods (see table 4.3.2-4) to avoid and minimize direct impacts on waterbodies and riparian vegetation, including associated wetlands, at these crossings. Any inadvertent release of drilling fluids (frac-out) or accidental fuel and chemical spills would be greatly reduced by implementation of Texas Gas's HDD Plan and SPCC Plan. The East End Expansion Project would traverse a total of 721 waterbodies, of which 25 are defined as major waterbodies. Four of the 25 waterbodies would be crossed using HDD methods. Both Texas Gas and Ozark would use our Plan and Procedures to construct, operate, and maintain their projects.

Because the two projects would be within the same major watersheds (in the areas where they would be collocated), and because both projects would likely involve direct and indirect waterbody impacts, the projects would, in combination, result in some cumulative impacts on waterbodies. These temporary impacts could include runoff from construction areas, temporary and localized increases in turbidity and sedimentation associated with in-water construction, and withdrawal and discharge of waters for hydrostatic testing of pipeline segments. These impacts would be greater if construction of both projects were to occur within the same time frame. However, if approved, Ozark's project likely would not begin construction in 2008, the year Texas Gas plans to begin construction. As described in section 4.3, impacts due to construction of the proposed Project would be relatively minor and would be further minimized by the use of HDDs to cross most of the major waterbodies and implementation of our Plan

and Procedures and our recommendations; therefore, we believe that cumulative impacts on waterbodies would be minimized and cumulative impacts would not be significant.

Construction and operation of the projects would result in both short-term and long-term impacts on waterbodies and wetlands. Short-term impacts such as soil and sediment disturbance would dissipate over a period of weeks, while longer-term impacts such as the regrowth of forested wetlands within the temporary construction right-of-way would persist for months or years. The primary impacts on wetlands and waterbodies during operation of the proposed projects would be associated with the routine right-of-way maintenance. All maintenance would comply with our Plan and Procedures but would continue throughout the life of the projects.

If approved and constructed, the proposed Fayetteville Lateral and the East End Expansion Project would impact wetlands. Construction of the proposed Fayette Lateral and associated facilities would affect about 57.7 acres of wetlands, including about 33.5 acres of PFO wetlands (see table 4.4.1-1). Construction of the proposed East End Expansion Project would affect a total of about 108.2 acres of wetlands, of which about 74.6 acres would be PFO wetlands. Impacts to wetlands would be minimized by implementing the appropriate mitigation measures in our Procedures which reduces the construction right-of-way width to 75 feet and which reduces the maintained corridor through wetlands to 30 feet centered over the pipeline. The narrowed maintenance corridor allows for the restoration of more wetland area. However, impacts to PFO wetlands would be permanent within the maintained right-of-way since PFO wetlands would be converted to PEM or PSS wetlands; but, they would still retain wetland function since wetland hydrology would be reestablished.

Elements of both projects with the potential to affect wetlands and waterbodies would be subject to review and approval under Sections 401 and 404 of the CWA. Discharges to wetlands and other surface waters associated with construction and operation would require review, approval, and mitigation, if necessary, under state storm water discharge programs. All permanent or long-term impacts on wetlands and waterbodies would be appropriately mitigated to offset anticipated adverse impacts, as determined by the USACE. Texas Gas will be required by the USACE to develop a wetland compensation plan for these impacts and would likely require Ozark to develop a similar plan. Since wetland impacts would be minimized by the use of appropriate mitigation measures and the USACE will require compensation for long-term and permanent wetland impacts, we conclude that the cumulative impacts on wetland would not be significant.

4.12.3.3 Vegetation and Wildlife

Construction of the proposed Fayetteville Lateral and the East End Expansion Project would cause a cumulative impact on native vegetation and associated wildlife. These cumulative impacts would be most significant if the projects were constructed at or near the same time and within proximity of one another. Either circumstance would increase the direct impact acreages and would lengthen the recovery time for the affected vegetative communities, particularly if construction of the East End Expansion Project follows construction of the proposed Project. It is possible that previously disturbed and restored construction workspaces would be disturbed again by the subsequent construction of the East End Expansion Project along the 37-mile-long segment where these projects would be collocated.

Cumulative impacts within a region, such as lost acreage of forestland, are additive. Furthermore, many wildlife species depend on mature contiguous tracts of forest to sustain their migratory and reproductive cycles. These species include dozens of migratory songbirds and terrestrial mammals that are not migratory but that require large tracts of forest to support their home ranges. The impacts of fragmentation can be immediate and significant because population levels for many such species are low and on the decline. The proposed Fayetteville Lateral and associated facilities, if approved, would mainly

affect agricultural land (about 112.7 miles, or 2,197.7 acres) during construction. Impacts on native vegetative communities during construction would affect 29.5 miles (389.4 acres) of upland forest and 4.3 miles (43.1 acres) of managed forest. The East End Expansion Project would impact about 17.0 miles (275.4 acres) of upland forest and 3.0 (66.4 acres) miles of managed forest.

The extent and duration of the cumulative impact on wildlife habitats associated with construction of the two projects would be minimized by using existing maintained rights-of-way and other disturbed areas as much as possible. The proposed Project pipeline route would be collocated with or parallel to the existing Ozark and CenterPoint rights-of-way where possible (about 90 miles, or about 54 percent of the proposed route), thereby minimizing impacts on undisturbed vegetation. About 76 percent of the proposed Fayetteville Lateral would traverse agricultural, industrial, and open lands and pastures and other areas that would typically experience rapid revegetation after construction is completed, and only 18 percent of the proposed Fayetteville Lateral route would traverse upland forest. Texas Gas and Ozark would implement the mitigation measures outlined in our Plan and Procedures to encourage the regrowth of native vegetation and discourage the spread of exotic or noxious plants. The East End Expansion Project would be collocated for about 33 percent of its proposed route, and only 10 percent of the East End Expansion Project would traverse upland forest or managed forest. We believe that since forest impact would be minimized along both project routes by collocation along existing rights-of-way and by developing pipeline routes that would mainly cross agricultural and more open land use types, cumulative impacts on vegetation and wildlife have been minimized and would not be significant.

Both projects have the potential to impact federally or state-listed threatened and endangered species and/or special status species. As described in section 4.7, we believe that the proposed Project would not significantly affect federally listed species. We and the project sponsors have consulted with the federal and state resource agencies concerning the need to implement specific conservation and mitigation measures to protect threatened, endangered, and other special-status species. To the extent possible, Texas Gas has integrated agency recommendations by conducting appropriate surveys to identify and locate listed species and their potential habitat and to develop project locations that would minimize/avoid impacts to these species or their habitats as needed. Consequently, we believe that the cumulative impacts on vegetation and wildlife resources would not be significant.

4.12.3.4 Land Use, Recreation, and Visual Resources

Construction of the proposed Project and other reasonably foreseeable projects would result in temporary and permanent changes in land use within the Project area. The proposed Fayetteville Lateral and associated facilities would affect a total of about 3,082.4 acres of land during construction. The proposed East End Expansion Project would impact 2,472.0 acres of land during construction. As indicated in section 4.12.3.3, about 72 percent of these impacts would be on agricultural lands for the Fayetteville Lateral. Less than 1 percent of both projects would impact commercial, industrial, or residential lands. Unlike highway transportation projects, which would permanently convert thousands of acres of land to paved impervious surfaces, much of the land use affected during construction of these projects would be restored and allowed to revert to preconstruction uses and conditions once pipeline installation is complete. Because non-woody vegetation would be expected to return to preconstruction conditions over the short term, impacts on acreage classified as agriculture, pastures, and open land would be minor and short term. Long-term impacts on cleared forestlands located outside the permanently maintained rights-of-way would take many years to return to preconstruction conditions, with recovery time dependent on the types and ages of the trees removed. However, given the prevalence of these land uses and cover types within the affected counties, we believe that cumulative impacts on land use would not be significant.

4.12.3.5 Air Quality and Noise

Air quality would be affected by construction and operation of the proposed Project and other reasonably foreseeable future projects. Construction of these projects would temporarily impact air quality by generating emissions from operation of fossil-fuel-powered construction equipment and fugitive dust from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. While Ozark has identified two future compressor stations associated with the East End Expansion Project, the Fayetteville Lateral has no compression associated with it; therefore, no cumulative operational air impacts would occur. Because construction-related activities would be temporary and localized in nature, they would be unlikely to contribute significantly to cumulative air quality impacts.

Potential noise impacts associated with the proposed Project and other reasonable foreseeable projects would occur during construction and operation. Because of the linear nature of these projects, construction-related noise impacts would tend to be of short duration in a given area. Furthermore, because most construction activities would be limited to daylight hours, construction-related noise impacts would generally not occur at night. The projects could cause minor temporary impacts at NSAs near HDD sites. As indicated in section 4.11, we have recommended that Texas Gas develop site-specific mitigation plans if potential noise impacts are identified in conjunction with the identified HDD sites. While Ozark has identified two future compressor stations associated with the East End Expansion Project, the Fayetteville Lateral has no compression associated with it; therefore, no cumulative operational noise impacts would occur.

4.12.4 Conclusions

If the proposed Project and the East End Expansion Project are certificated, the effects of their construction could overlap in time from the years 2008 through 2010. In addition, the type of project, construction methods, and impacts would be similar. Any identified significant but unavoidable impacts on sensitive resources resulting from construction or operation of the proposed Project or the East End Expansion Project would be mitigated. Mitigation generally leads to avoidance or minimization of cumulative impacts. The environmental impacts associated with the proposed Project and the East End Expansion Project would be minimized by careful project alignment, utilization of HDD techniques to avoid and minimize impacts on some sensitive resources such as waterbodies and wetlands, and implementation of appropriate mitigation measures. Consequently, only a small cumulative effect is anticipated when the impacts of the proposed Project are added to reasonably foreseeable future projects in the area.

4.13 RELIABILITY AND SAFETY

4.13.1 Pipeline Facilities

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiant, posing only a slight inhalation hazard. It is lighter than air and, therefore, tends to disperse upwards into the atmosphere rather than concentrating at ground level. Methane has an auto-ignition temperature of 1,000º Fahrenheit and is flammable at concentrations between 5.0 percent and 15.0 percent in air.

Unconfined mixtures of methane in air are not explosive. Methane's lighter-than-air condition does not allow it to concentrate, but at a flammable concentration within an enclosed space and in the presence of an ignition source, it can cause explosion. The specific gravity of methane is 0.55, so it is buoyant at atmospheric temperatures.

4.13.1.1 Pipeline Safety Standards

The DOT is mandated to provide pipeline safety under Title 49, U.S.C. Chapter 601. The Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety (PHMSA, OPS), administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards, which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. The PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards, while Section 5(b) permits a state agency that does not qualify under Section 5(a) to perform certain inspection and monitoring functions. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement action. The majority of the states have either 5(a) certifications or 5(b) agreements, while nine states act as interstate agents.

The DOT pipeline standards are published in 49 CFR Parts 190-199; Part 192 specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993, between the DOT and the FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a certificate is requested in accordance with federal safety standards and plans for maintenance and inspection, or shall certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with Section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the FERC becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert DOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines whether proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the proposed Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Part 192 also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that

extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined as follows:

Class 1 Location with 10 or fewer buildings intended for human occupancy.

Class 2 Location with more than 10 but less than 46 buildings intended for human occupancy.

Class 3 Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period.

Class 4 Location where buildings with four or more stories above ground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (i.e., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure, inspection and testing of welds, and frequency of pipeline patrols and leak surveys also must conform to higher standards in more populated areas.

Class locations along the proposed Project route have been determined in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192 for the pipe classifications along the Project. Class locations for the Fayetteville Lateral and Greenville Lateral are listed by milepost in table 4.13.1-1. The 0.8-mile Kosciusko 36-inch Tie-in Lateral and the 0.4-mile Kosciusko/Southern Natural 20-inch Tie-in Lateral are located entirely in a Class 1 area. No portions of the pipeline routes would be in Class 4 areas.

If a subsequent increase in population density adjacent to the right-of-way indicates a change in class location for the pipeline, Texas Gas would be required to reduce the maximum allowable operating pressure or replace the segment with pipe of sufficient grade and wall thickness, if required, to comply with the DOT code of regulations for the new class location.

In 2002, Congress passed an act to strengthen the nation's pipeline safety laws. The Pipeline Safety Improvement Act of 2002 (HR 3609) was passed by Congress on November 15, 2002, and signed into law by the President in December 2002. No later than December 17, 2004, gas transmission operators were required to develop and follow a written integrity management program that contains all the elements described in section 192.911 and addresses the risks on each covered transmission pipeline segment. Specifically, the law establishes an integrity management program that applies to all high consequence areas (HCAs). The DOT (68 Federal Register 69778, 69 FR 18228, and 69 FR 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in section 192.903 of the DOT regulations.

TABLE 4.13.1-1

Class Locations by Milepost

Feature	Class 1		Class 1 Length	Class 2		Class 2 Length	Class 3		Class 3 Length
Fayetteville Lateral									
	From	**To**		**From**	**To**		**From**	**To**	
Class 1	0.0	46.5	46.5						
Class 2 – Residential				46.5	47.6	1.1			
Class 1	47.6	61.0	13.4						
Class 2 – Residential				61.0	63.1	2.1			
Class 1	63.1	145.9	82.8						
Class 2 - Residential				145.9	146.6	0.7			
Class 1	146.6	166.2	19.6						
Total Class 1, Fayetteville Lateral			**162.3**						
Total Class 2, Fayetteville Lateral						**3.9**			
Total Class 3, Fayetteville Lateral									**0.00**
Greenville Lateral									
Class 1	0.0	0.1	0.1						
Class 3 - Apartment Complex							0.1	0.4	0.3
Class 1	0.4	63.3	62.9						
Class 2 - Population Density				63.3	65.2	1.9			
Class 1	65.2	78.1	12.9						
Class 2 - Population Density				78.1	79.1	1.0			
Class 1	79.1	82.4	3.3						
Class 2 - Population Density				82.4	83.6	1.2			
Class 1	83.6	94.7	11.1						
Class 2 - Population Density				94.7	95.0	0.3			
Class 1	95.0	96.4	1.4						
Total Class 1, Greenville Lateral			**91.7**						
Total Class 2, Greenville Lateral						**4.4**			
Total Class 3, Greenville Lateral									**0.3**

OPS published a series of rules from August 6, 2002, to May 26, 2004 (69 FR 29903), that defines HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate in 49 U.S.C. 60109 for OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method, an HCA includes:

- current Class 3 and 4 locations,

- any area in Class 1 or 2 where the potential impact radius[5] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle[6], or

- any area in Class 1 or 2 where the potential impact circle includes an identified site.[7]

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy, or

- an identified site.

Once a pipeline operator has determined the HCAs along its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The DOT regulations specify the requirements for the integrity management plan at § 192.911.

HCAs for the proposed Project have been determined in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192 for the pipe classifications along the proposed route, and are summarized in table 4.13.1-2. No HCAs were identified along the proposed 0.8-mile Kosciusko 36-inch Tie-in Lateral or the 0.4-mile Kosciusko 20-inch Tie-in Lateral.

The pipeline integrity management rule for HCAs requires inspection of the entire pipeline in HCAs every 7 years.

Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under Section 192.615, each pipeline operator also must establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;

- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;

- emergency shutdown of system and safe restoration of service;

- making personnel, equipment, tools, and materials available at the scene of an emergency; and

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5 The potential impact radius is calculated as the product of 0.69 and the square root of the maximum allowable operating pressure of the pipeline in psi multiplied by the pipeline diameter in inches.

6 The potential impact circle is a circle of radius equal to the potential impact radius.

7 An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

- protecting people first and then property, and making them safe from actual or potential hazards.

TABLE 4.13.1-2

High Consequence Areas

HCA	Begin Milepost	End Milepost	Length (miles)	Description
Fayetteville Lateral				
No HCAs on Fayetteville Lateral				
	Total HCA Fayetteville Lateral		**0.0**	
Greenville Lateral				
HCA	0.0	0.4	0.4	Apartment Complex
HCA	64.0	64.5	0.5	Church Complex
HCA	73.1	73.6	0.5	Church Camp
HCA	76.4	76.5	0.1	Manufacturing Building
	Total HCA Greenville Lateral		**1.5**	

Part 192 requires that each operator must establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator also must establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. Texas Gas would provide the appropriate training to local emergency service personnel before the pipeline is placed in service. No additional specialized local fire protection equipment would be required to handle pipeline emergencies.

4.13.1.2 Pipeline Accident Data

Starting February 9, 1970, 49 CFR Part 191 required all operators of transmission and gathering systems to notify the DOT of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization;
- required taking any segment of transmission line out of service;
- resulted in gas ignition;
- caused estimated damage to the property of the operator, or others, or both, of a total of $5,000 or more;
- required immediate repair on a transmission line;
- occurred while testing with gas or another medium; or
- in the judgment of the operator was significant, even though it did not meet the above criteria.

The DOT changed reporting requirements after June 1984 to reduce the amount of data collected. Since that date, operators must report only incidents that involve property damage of more than $50,000, injury, death, release of gas, or that are otherwise considered significant by the operator. Table 4.13.1-3 presents a summary of incident data for the 1970 to 1984 period, as well as more recent incident data for 1986 through 2003, recognizing the difference in reporting requirements. The 14.5-year period from 1970 through June 1984, which provides a larger data set and more basic report information than subsequent years, has been subject to detailed analysis (Jones et al., 1986), as described in the following sections.

TABLE 4.13.1-3

Natural Gas Service Incidents by Cause

	Incidents per 1,000 miles of Pipeline (percentage)	
Cause	**1970-1984**	**1986-2005**
Outside force	0.70 (53.8)	0.10 (38.4)
Corrosion	0.22 (16.9	0.06 (23.1)
Construction or material defect	0.27 (20.8)	0.04 (15.4)
Other	0.11 (8.5)	0.06 (23.1)
Total	**1.30**	**0.26**

Source: Jones et al. (1986); USDOT, OPS http//ops.dot.gov/stats.htm (2006)

During the 14.5-year period, 5,862 service incidents were reported over the more than 300,000 total miles of natural gas transmission and gathering systems nationwide. Service incidents, defined as failures that occur during pipeline operation, remained fairly constant over this period, with no clear upward or downward trend in annual totals. In addition, 2,013 test failures were reported. Correction of test failures removed defects from the pipeline before operation.

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 4.13.1-3 provides a percentage distribution of the causal factors as well as the annual frequency of each factor per 1,000 miles of pipeline in service. The pipelines included in the data set in table 4.13.1-3 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The dominant incident cause is outside forces, constituting 53.8 percent of all service incidents in the 1970–1984 period and 38.4 percent in the 1986–2003 period. Outside forces incidents result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 4.13.1-4 shows that human error in equipment usage was responsible for about 75 percent of outside forces incidents. Since April 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers regarding the underground location of pipes, cables, and culverts. The 1986 through 2003 data show that the portion of incidents caused by outside forces has decreased to 38.4 percent.

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of

corrosion incidents, since corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

TABLE 4.13.1-4

Outside Forces Incidents by Cause (1970-1984)

Cause	Percent
Equipment operated by outside party	67.1
Equipment operated by or for operator	7.3
Earth movement	13.3
Weather	10.8
Other	1.5

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller diameter pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

Table 4.13.1-5 clearly demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure compared to unprotected or partially protected pipe. The data shows that bare, cathodically protected pipe actually has a higher corrosion rate than unprotected pipe. This anomaly reflects the retrofitting of cathodic protection to actively corroding spots on pipes.

TABLE 4.13.1-5

External Corrosion by Level of Control (1970-1984)

Corrosion Control	Incidents per 1,000 miles per Year
None-bare pipe	0.42
Cathodic protection only	0.97
Coated only	0.40
Coated and cathodic protection	0.11

4.13.2 Impact on Public Safety

The service incident data summarized in table 4.13.1-3 include pipeline failures of all magnitudes with widely varying consequences. About two-thirds of the incidents were classified as leaks, and the remaining third classified as ruptures, implying a more serious failure.

Table 4.13.2-1 presents the average annual fatalities that occurred on natural gas transmission and gathering lines from 1970 to 2003. Fatalities between 1970 and June 1984 have been separated into employees and non-employees, to better identify a fatality rate experienced by the general public. Of the total 5.0 nationwide average, fatalities among the public averaged 2.6 per year over this period. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and non-employees. However, the data show that the total annual average for the period 1984 through 2003

decreased to 3.8 fatalities per year. Subtracting two major offshore incidents in 1989, which do not reflect the risk to the onshore public, yields a total annual rate of 2.9 fatalities per year for this period.

TABLE 4.13.2-1

Annual Average Fatalities - Natural Gas Transmission and Gathering Systems a,b/

Year	Employees	Non-employees	Total
1970-June 1984	2.4	2.6	5.0
1984-2006			3.2
1984-2006			2.6

a/ 1970 through June 1984 - American Gas Association, 1986.

b/ DOT Pipeline and Hazardous Materials Safety Administration. Office of Pipeline Safety (OPS).

c/ Employee/non-employee breakdown not available after June 1984.

d/ Without 18 offshore fatalities occurring in 1989 (11 fatalities resulted from a fishing vessel striking an offshore pipeline and 7 fatalities resulted from explosion on an offshore production platform).

The nationwide totals of accidental fatalities from various man-made and natural hazards are listed in Table 4.13.2-2 in order to provide a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Nevertheless, the average of 2.6 public fatalities per year is relatively small considering the more than 300,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is about two orders of magnitude (100 times) lower than the fatalities from natural hazards such as lightning, tornados, floods, earthquakes, etc.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on about 300,000 miles in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per about 1,000 miles of pipeline. Using this rate, the proposed Project might result in a public fatality every 380 years. This would represent a slight increase in risk to the nearby public.

TABLE 4.13.2-2

Nationwide Accidental Deaths a/

Type of Accident	Fatalities
All accidents	90,523
Motor vehicles	43,649
Falls	14,985
Drowning	3,488
Poisoning	9,510
Fires and burns	3,791
Suffocation by ingested object	3,206
Tornado, flood, earthquake, etc. (1984-93 average)	181
All liquid and gas pipelines (1978-87 average) b/	27
Gas transmission and gathering lines Non-employees only (1970-84 average) c/	2.6

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a/ All data, unless otherwise noted, reflects 1996 statistics from the U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the U.S. 118th edition.

b/ U.S. Department of Transportation, Annual Report on Pipeline Safety - Calendar Year 1987.

c/ American Gas Association, 1986.