3.0 ALTERNATIVES

As required by the NEPA, we have evaluated several alternatives to the proposed Fayetteville/Greenville Expansion Project to determine whether they would be reasonable and environmentally preferable to the proposed action. Our analysis of alternatives includes alternatives proposed by other federal and state resource agencies as well as those proposed by the general public. Our analysis also considers the environmental differences resulting from each alternative compared to the corresponding portion of the proposed Project and the alternative's ability to achieve the proposed Project's purpose.

We considered the No-Action Alternative and Postponed-Action Alternative, the effects of energy conservation, alternative energy sources, system alternatives, route alternatives, route variations, and aboveground facility siting alternatives. We also considered the potential impacts on environmental resources and land uses in our alternatives analysis and evaluated alternatives that would avoid or minimize impacts on them.

The following evaluation criteria were used to determine whether alternatives would be environmentally preferable:

- significant environmental advantage over the proposed Project,
- ability to meet the proposed Project's need and purpose, and
- technical feasibility.

3.1 NO-ACTION OR POSTPONED-ACTION ALTERNATIVE

The Commission has three alternative courses of action in processing an application. It may (1) deny the application, (2) delay approval of the application pending further study, or (3) approve the application with or without conditions.

If the Commission denies the proposal (i.e., selects the No-Action Alternative), the proposed Project would not be constructed. Selection of the No-Action Alternative would not meet the purpose and need for the proposed Project; thus, specific shipper needs would not be met. No additional transportation capacity would be provided for the substantial volumes of newly produced natural gas in north-central Arkansas, which would potentially prevent the production of additional gas supplies from these fields. On a broader scale, implementation of this alternative would not meet the stated national goal of increasing the production of stable and reliable natural gas supplies in the U.S. (The White House National Economic Council, February 2006). If adequate natural gas supplies are not available in the U.S., consumers would need to seek other sources of fuel, many of which are potentially more costly and could result in greater environmental impacts associated with combustion of other fuels. Natural gas shortages also would be possible, since natural gas demand in the U.S. is expected to continue to grow, while U.S. production is expected to continue to decline. Analysis by the DOE/EIA indicates that, in the lower 48 states, demand is expected to exceed supply by about 8 Tcf by 2010 (DOE/EIA, 2005). Electric power generation is expected to become the largest individual component of the growth of natural gas consumption (U.S. Natural Gas Markets, 2001).

If the No-Action Alternative is selected, the impacts of constructing and operating the proposed Project would be avoided. However, if this Project is not implemented, other projects and activities would be needed, and these projects would result in their own environmental impacts. In addition, the beneficial

impacts of implementing the proposed Project would not occur, including increased employment, income, and tax revenues. The No-Action Alternative was rejected for these reasons.

A delay in approval (the Postponed-Action Alternative) would only defer any construction-related environmental impacts to the future. Other gas transportation projects would still be required to meet the demand for natural gas and to transport the new Fayetteville Shale natural gas production. Reduction in available supply could result in higher natural gas prices, potentially causing switching to less environmentally benign sources of fuel or the curtailment of economic growth. Delay in approval would not meet the stated purpose of the Project to develop an interstate transportation infrastructure for an additional 853 MMcf/d of natural gas from north-central Arkansas to consumer markets served by Texas Gas, Trunkline, Columbia Gulf, ANR, Tennessee, and Texas Eastern.

Energy Conservation Alternatives

An increase in the scope of energy conservation measures employed throughout the market area that would be served by the proposed Project could also potentially decrease or slow the amount of increase in the nation's energy demand. However, as noted in section 1.1, energy demand in the United States has been increasing steadily, with total energy consumption in the United States estimated to increase from 100.2 quadrillion Btu per year in 2005 to 131.2 quadrillion Btu per year in 2030 (DOE/EIA, 2007). Natural gas usage will represent about 22 percent of all energy consumption in the United States by 2025. To maintain pace with growing energy demands, the EIA anticipates that consumption of natural gas in the United States will grow from 22.4 Tcf per year in 2005 to 26.1 Tcf by 2030. The growth in natural gas demand is being driven primarily by increased use of natural gas for electricity generation and industrial applications. Given the anticipated increases of energy consumption over the next 20 years, it is unlikely that voluntary energy conservation measures would be sufficient to offset increasing demand in general or affect the need for the proposed Project in particular.

Other Energy Alternatives

Other energy sources could be used as short-term and long-term alternatives to the use of natural gas. In general, alternative energy sources include coal, oil, nuclear, hydropower, solar, wind, biofuels, and geothermal. Most of these alternative energy sources are suitable for electric power generation, but are either not suitable or are less suitable for residential heating and some industrial processes.

Coal is an available fuel alternative for power generation. However, coal combustion results in higher air emissions than natural gas combustion on an equivalent basis. In addition, coal mining and coal transportation result in environmental impacts. The use of oil (fuel oil) for power generation also results in greater air emissions than natural gas. When combusted, natural gas generates 34 percent to 52 percent less carbon dioxide (CO_2) than other fuels such as oil or coal. Other emissions generated by the combustion of natural gas also are significantly lower than those from oil or coal combustion, including sulfur oxides (SO_X) and nitrogen oxides (NO_X). Other impacts resulting from the use of oil as a fuel are associated with processing and transporting supplies (Interstate Natural Gas Association of America [INGAA], 2004). These impacts include potential spills and the impacts of constructing and operating facilities such as refineries and terminals associated with increased use of crude oil.

Using nuclear energy for power generation is a potential alternative, although the political, social, and regulatory issues associated with the safety and waste management considerations of this technology are very substantial and prevent this alternative from being viable, at least in the short and medium term. Hydropower is a viable power generation alternative in some geographic areas, but there is not sufficient generation capacity in most geographic areas to allow this technology to provide the required levels of power generation. In addition, use of this technology results in some environmental impacts. It is

important to note that there is no projected national growth in the supplies of nuclear and hydropower in the United States (DOE/EIA, 2004). Though efficiency upgrades at existing hydropower facilities are expected to produce incremental additions of power production in the coming years, it is unlikely that new and/or significant sources of hydropower would be permitted and brought on-line as reliable energy source alternatives to the proposed Project.

Federal, state, and local initiatives will likely contribute to an increase in the availability and cost effectiveness of non-hydropower renewable energy sources such as wind, solar, tidal, geothermal, and biomass. For example, state and local initiatives have increased the availability of wind power-derived energy to local consumers in Texas (Texas Renewable Energy Industries Association, 2006), and renewable energy is playing a larger role in the Mid-Atlantic and Northeast regions of the United States (CSC, 2004; NYSERDA, 1999). Still, the percentage of electricity generated from non-hydropower renewable energy sources at the national level is projected to increase to only 3.2 percent by 2025 (DOE/EIA, 2006a), which would offset only a small portion of the projected national energy demands; therefore, we believe that these other energy sources would not be able to meet the overall objectives of the proposed Project and as a result are not preferable to the proposed action.

3.2 PIPELINE SYSTEM ALTERNATIVES

System alternatives are alternatives to the proposed action that would make use of existing, modified, or proposed pipeline systems to meet the stated objectives of the proposed Project. Implementation of a system alternative would make it unnecessary to construct the proposed Project, although some modifications or additions to existing or proposed pipeline systems may be required to meet the objectives of the proposed Project. Modifications or additions to existing or proposed pipeline systems would result in environmental impacts that may be less than, similar to, or greater than those associated with construction and operation of the proposed Project. The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with construction and operation of the proposed Project would be avoided or reduced by using existing, modified, or proposed pipeline systems.

Our analysis of pipeline system alternatives included examination of the use of existing and proposed pipeline systems to meet the need and purpose of the proposed Project.

3.2.1 Existing Pipeline Systems

Fayetteville Lateral

Texas Gas has no existing pipelines in the Project area that could be used “as is” or modified to meet the purpose and need of the proposed Project. Other pipeline systems that are located in the general Project area include CenterPoint, Texas Eastern, Natural Gas Pipeline Company of America (NGPL), Mississippi River Transmission (MRT), and Ozark (see figure 3.2-1). CenterPoint has an existing 20-inch-diameter natural gas pipeline (Line JM-1) that originates near Bald Knob, Arkansas, and follows a southeasterly path to the Mississippi River, where it terminates near Helena, Arkansas. This pipeline is operating at or near capacity and does not have capacity to transport the proposed large volume of natural gas from the Fayetteville Shale production as proposed, even if additional compression was added to its system. Looping[1] CenterPoint’s Line JM-1 would result in impacts similar to those of the proposed Project. A pipeline lateral from the Fayetteville Shale natural gas production area to the “CenterPoint loop” also would need to be constructed since the purpose of the proposed Project is to connect this developing gas

[1] Looping is constructing a new segment, or loop, of pipeline immediately adjacent to an existing pipeline. Both ends of the loop tie into the existing pipeline.

production area to existing natural gas transportation systems, and in particular to connect it to the existing pipeline systems near Bald Knob. CenterPoint has no plans to construct a loop of Line JM-1.

None of the other existing pipeline systems near the proposed Fayetteville Lateral project area would meet the purpose of the proposed Project, unless pipelines such as the proposed Fayetteville Lateral are constructed. Any such project would likely have environmental impacts that are similar to those of the proposed Fayetteville Lateral.

Greenville Lateral

There are no existing pipelines that could connect Texas Gas's mainline with the existing pipelines in the Kosciusko area. In order to achieve Texas Gas's purpose and need for transfer of natural gas to markets in the southeastern United States, pipeline construction would be required if the proposed Greenville Lateral is not constructed. We found that no other interstate pipeline systems in the region could serve Texas Gas's customers without having to construct additional facilities that would result in environmental impacts similar to or greater than those of the proposed Project.

3.2.2 Other Proposed Pipeline Systems

East End Expansion Project

Ozark proposes constructing and operating the East End Expansion Project (Docket No. PF-06-34-000)[2]. 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. It would extend eastward along its existing 20-inch-diameter pipeline right-of-way for about 58.5 miles and then 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 its 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) 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 1,000 MMcf/d of natural gas from the 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).

However, the proposed East End Expansion Project pipeline route would not extend to the Bald Knob, White County, Arkansas, area where connections with many of the major existing pipeline systems could be made, and where Texas Gas's anchor shipper, Southwestern, has requested delivery. Texas Gas is proposing to tie-in to NGPL (MP 64.1), MRT (MP 65.6), and Texas Eastern (MP 65.9) in the Bald Knob area; and is also proposing other tie-ins, including a tie-in to its existing pipeline system in Coahoma County, Mississippi, at MP 166.2. While the East End Expansion Project would have interconnections with other interstate pipeline systems in Mississippi, including Texas Gas's pipeline system (East End Expansion Project MP 160.0), these interconnections are about 100 miles east of Bald Knob. The two

[2] The East End Project is still in pre-filing; the NOI for it was issued on December 4, 2006. The status of this project will be updated in late 2007. The initially proposed in-service date of December 2008 is likely no longer achievable since Ozark has not yet filed its certificate application with the FERC.

proposed project pipelines would be collocated for the first 37 miles of the proposed Fayetteville Lateral, and also would be collocated with an existing Ozark pipeline right-of-way. Different in-service dates would likely prevent these two projects from being constructed simultaneously.

Texas Gas System Alternative for Ozark's East End Expansion Project

We evaluated increasing the capacity of the proposed Project so that it could also carry the proposed volumes of gas of the East End Expansion Project. The approximate additional facilities that would be required to provide an additional 1,000 MMcf/d of transportation capacity on the Fayetteville and Greenville Laterals would require construction of the Fayetteville Lateral and the construction of a 36-inch-diameter pipeline loop of the entire Fayetteville Lateral plus portions of the proposed East End Expansion Project west and east of the proposed termini of the Fayetteville Lateral, about 30 miles of 36-inch-diameter pipeline loop of the Greenville Lateral, installation of a new compressor station near Bald Knob, and the addition of more compression to the existing Greenville Compressor Station in Greenville, Mississippi.

Looping the entire 166.2-mile-long Fayetteville Lateral would mean that two 36-inch-diameter pipelines would be installed next to each other for their entire length. This would increase the proposed construction right-of-way width for about 166.2 miles from 100 feet to 150 feet, and would increase the permanent right-of-way width from 50 feet to 75 feet to allow for a 25-foot-wide offset between the pipelines that would be needed for safe operation should either pipeline require maintenance. Land requirements for construction along the Fayetteville Lateral route would increase by about 1,007 acres and permanent land requirements for operation would increase by about 505 acres. Plus, the segments of the East End Expansion Project that would be constructed west of the western terminus of the Fayetteville Lateral (west of MP 0.0) and east of the eastern terminus of the Fayetteville Lateral (east of MP 166.2) would also need to be constructed as would Ozark's proposed Noark Lateral so that natural gas receipts and deliveries for the Ozark shippers could occur as well. This would add about 13.7, 20, and 8 miles, respectively of pipeline construction. Assuming a 100-foot-wide construction right-of-way, about 506 and 253 acres would be added to the land requirements for construction and operation, respectively. This would bring the total land requirement for construction of this portion of the system alternative to about 3,978 acres and for operation to about 1,764 acres.

Looping about 30 miles of the Greenville Lateral also would have increased land requirements due to the wider construction and permanent rights-of-way. The construction right-of-way land requirement would increase by about 545.5 acres to about 1,898 acres, and the permanent right-of-way land requirement would increase by about 91 acres to 682 acres.

This system alternative would require[3] about 2,041 more acres for pipeline construction and about 841 more acres for operation than the proposed Project, or about 5,876 acres for construction and about 2,446 acres for operation. This system alternative also would require a new compressor station near Bald Knob. We assumed that construction and operation of the additional compressor facilities that would be needed at Texas Gas's existing Greenville Compressor Station could be accommodated within the existing footprint of this facility. Therefore, we estimated the temporary and permanent land requirements for the aboveground facilities for this system alternative to be about 50 acres, bringing the total permanent land requirement for this alternative to 2,496 acres.

[3] These land requirements do not include the permanent requirement for the aboveground facility (the proposed Kosciusco Compressor Station) or the temporary requirements for storage yards and access roads.

Ozark states in its pre-filing documentation, that the land requirements for construction and operation of the 188-mile-long East End Expansion Project would be about 3,603.8 and 1,197.9 acres, respectively. Ozark would retain a 50-foot-wide permanent right-of-way for operation along the pipeline right-of-way, and about 66 acres would be required for operation of the compressor stations.

The land requirements for construction of the 263.8-mile-long proposed Project would be 5,057.23 acres which includes about 162.5 acres for temporary access road use. Ozark has not provided any information about the temporary impact created by access road use. Thus, for comparison of the alternatives, the acreage for access roads was subtracted from the estimated land requirements for construction of the proposed Project to get 4,894.1 acres. In comparison, the combined total land requirements of the proposed Project and Ozark's East End Project would be 8,497.9 acres for construction and 3,449.2 acres for operation.

Construction of both the Fayetteville Lateral and the East End Expansion Project as separate projects would result in an increase in land disturbance over construction of a single project to meet the purpose and needs of both projects. While the reduction in land use impacts would be significant in terms of acreage, we do not believe that combining the projects is a viable option. The difficulties in coordinating the projects and achieving the objectives of all parties, including producers, shippers, and customers, would be quite considerable. The needs of the anchor shippers for both the proposed Project and East End Expansion Project vary. The need to provide specific capacities for transporting natural gas to specific locations by specific dates would preclude combining these two projects. The potential benefit of reducing short-term impacts and reducing total land requirements for operations are not sufficient to justify the cost of redesigning the projects and forcing all parties to delay meeting their objectives.

3.3 PIPELINE ROUTE ALTERNATIVES AND VARIATIONS

The routes of the two Project laterals were developed by Texas Gas to meet the stated purpose and need of the Project. In evaluating pipeline alternatives, we reviewed both alternative corridors and specific route variations. For the purposes of this document, we will use the term "alternatives" when discussing significantly different corridors or alignments. Also, we will use the term "variations" when discussing differences that involve smaller departures for shorter distances than "alternatives." Route alternatives generally follow a different corridor for a portion of the proposed route, and may ultimately terminate at different locations. Route variations differ from route alternatives in that they are identified to avoid or reduce construction impacts on specific, localized resources that may include cultural resource sites, residences, or site-specific terrain conditions.

During the pre-filing process, both state and federal agencies suggested route alternatives and route variations to the pipeline alignment originally proposed by Texas Gas. Based on input received from the agencies, Texas Gas integrated many of them into the pipeline routes ultimately proposed for the Project in its FERC certificate application. Furthermore, landowners who would be affected by project construction and operation were contacted by Texas Gas representatives, and some identified to Texas Gas certain pipeline alignment issues relative to their properties. Similarly, some landowners filed comments with the FERC or commented during scoping meetings about alignment issues. Texas Gas modified the pipeline route, where feasible, based on this input. We examined alternatives and variations that could reduce overall environmental impacts associated with the pipeline route and could avoid or reduce impacts on environmentally sensitive resources. Figure 3.2-1 shows the proposed Fayetteville Lateral and alternative routes; figure 3.3-1 shows the Greenville Lateral and alternative routes.

3.3.1 Alternatives

As part of its Project development, Texas Gas identified two significant route alternatives for the Fayetteville Lateral, Alternatives A and B (see figure 3.2-1), and one alternative for the Greenville Lateral, Alternative C (see figure 3.3-1). In addition, during the course of the pre-file process, both the USACE and ADHHS proposed route alternatives. These are presented in greater detail below.

Fayetteville Lateral - Alternative A

Alternative A would provide a more direct route from Cleburne County, Arkansas, to the proposed Mississippi River crossing between MP 37 and MP 143. Alternative A would pass to the southwest of Bald Knob and is very similar to Ozark's East End Project route through that portion of Arkansas. Alternative A would be about 12 miles shorter than the proposed Project. However, Alternative A would require the construction of a separate, 15-mile-long lateral (Bald Knob Lateral) in order to meet the Project purpose of connecting to the existing pipeline systems at Bald Knob. Therefore, Alternative A,

DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED FAYETTEVILLE/GREENVILLE
EXPANSION PROJECT

Docket Nos. CP07-417-000
PF07-2-000

Page 3-8

Figure 3.2-1 Fayetteville Lateral Project Area
Pipeline Systems and Route Alternatives

Page 3-9

Figure 3.3-1 Greenville Lateral Project Area
Pipeline Systems and Route Alternatives

with its corresponding interconnection lateral, would actually increase the overall length of the Project by about 3 miles.

Table 3.3.1-1 compares the impacts of Alternative A alone and Alternative A with the 15-mile-long lateral to Bald Knob to the corresponding segment of the Project along the Fayetteville Lateral. The data show that Alternative A would be collocated with existing pipeline rights-of-way for 21 percent of the route compared to 48 percent for the proposed Fayetteville Lateral. In addition, Alternative A would cross three more waterbodies, about 1.5 more miles of wetlands, and about 1.2 more miles of managed resource areas. A review of landforms with a high probability for containing cultural resources indicates that Alternative A could affect more cultural resources than the proposed route.

Table 3.3.1-1

Comparison of Alternative A to the Corresponding Segment of the Proposed Fayetteville Lateral

Environmental Parameter	Potential Impacts		
	MP 37 to MP 142	Alternative A	Alternative A (including Bald Knob Lateral)
Length (mi.)	105	93	108
Waterbodies (no.)	73	76	87
Perennial (no.)	15	14	14
Intermittent (no.)	58	62	73
Wetlands (mi.)	0.4	1.9	1.9
Roads (no.)	133	127	148
Resource Management Lands (mi.)	3.4	4.6	4.6
NWR (mi.) a/	3.4	4.3	4.3
State WMA (mi.) b/	0	0.3	0.3
Forest (mi.)	14.2	12.1	19.0
Agriculture Land (mi.)	82.8	63.8	69.5
Cultural Resource High Probability Areas (mi.)	26	28	32
Length collocated (mi.)	50	20	20
Percentage of miles collocated	48	21	19

a/ Cache River NWR - Apparent crossing distance based on GIS overview mapping.

b/ Steve N. Wilson/Raft Creek WMA - Apparent crossing distance based on GIS overview mapping.

Alternative A, including the Bald Knob Lateral, would require crossing one fewer perennial waterbody. However, it would affect more of all the other listed resources. It would cross about 1.2 more miles of resource management lands, 14 more waterbodies, 1.5 more miles of wetlands, and 15 more roads. It also would be about 3 miles longer and would, therefore, have more land requirements associated with construction and operation, about 36 mores acres for construction and about 18 more acres for operation within the permanent right-of-way. This alternative would have greater land requirements, would affect more sensitive environmental resources such as wetlands, and would require more pipeline length with less collocation. Therefore, we believe that the disadvantages of Alternative A, with or without the Bald Knob Lateral, outweigh the potential advantages, and we conclude that the proposed route is the preferred route.

Fayetteville Lateral - Alternative B

Alternative B would follow the existing CenterPoint pipeline and would be a relatively straight line path between MP 65 and MP 106 of the proposed route. Although it would be collocated for most of its length, Alternative B would require a crossing of the Cache River NWR that would be 3.0 miles longer than the NWR crossing under the proposed route. It also would cross more land enrolled in the NRCS's WRP (see table 3.3.1-2 and figure 3.2-1). The proposed route would be 7 miles longer than Alternative B. It would, however, cross the Cache River NWR where the refuge narrows north of the Alternative B route, making it possible to cross the Cache River NWR via HDD. The proposed route would cross seven fewer waterbodies, 5.8 fewer miles of wetlands, 2.4 fewer miles of a state WMA, and about 1.8 fewer miles of forest. The proposed route would, therefore, minimize impacts on the refuge and wetlands and would avoid all WRP tracts that Alternative B would impact.

Because Alternative B would result in greater environmental impacts on the Cache River NWR, wetlands, a WMA, forested land, and WRP tracts, we believe that the disadvantages of Alternative B outweigh potential advantages due to its shorter length, and we do not recommend the use of Alternative B.

Table 3.3.1-2

Comparison of Fayetteville Lateral to Alternative B

Environmental Parameter	Potential Impacts	
	MP 65 to MP 106	Alternative B
Length (mi.)	41.0	33.7
Waterbodies (no.)	32	39
Perennial (no.)	No Data	No Data
Intermittent (no.)	No Data	No Data
Wetlands (mi.)	2.1	7.9
Roads (no.)	42	29
Resource Management Lands (mi.)	3.6	9.2
NWR (mi.) a/	3.6	6.8
State WMA (mi.) b/	0	2.4
Forest (mi.)	0.5	2.3
Agriculture (mi.)	37.4	21.8
Cultural Resource High Probability Areas (mi.)	No Data	No Data
Length collocated (mi.)	0.5 c/	33.1 c/
Percentage of miles collocated	1	98

a/ Cache River NWR - Apparent crossing distance based on GIS overview mapping.

b/ Steve N. Wilson/Raft Creek WMA - Apparent crossing distance based on GIS overview mapping.

c/ Collocated with Reliant Energy Pipeline.

Greenville Lateral – Alternative C

We evaluated one route alternative at the eastern end of the proposed Greenville Lateral. This 8.3-mile-long alternative would depart from the proposed Greenville Lateral near MP 87.6 and would terminate at the eastern terminus of the Greenville Lateral at MP 96.4. Although the proposed route would be about 0.4 mile longer than Alternative C (a total of 8.7 miles), it would be collocated with an existing power line right-of-way for about 4.4 miles and would require significantly less clearing of forest (see table 3.3.1-3 and figure 3.3-1). Alternative C would be collocated with a pipeline right-of-way for about 3.1 miles. It would, however, still require more forest clearing than the proposed route. The primary reason for evaluation of alternatives in this area was to develop an appropriate location for crossing the Natchez Trace Parkway.

Table 3.3.1-3

Comparison of Greenville Lateral to Alternative C

Environmental Parameter	Potential Impacts	
	MP 87.6 to MP 96.4	Alternative C
Length (mi.)	8.7	8.3
Waterbodies (no.)	12	8
Perennial (no. crossed)	6	4
Intermittent (no. crossed)	6	4
Wetlands (mi.)	0.7 a/	0.8
Roads (no.)	9	8
Resource Management Lands (mi.)	0.2	.1
Natchez Trace Parkway b/	0.2	0.1
Forest (mi.)	2.2	4.2
Agricultural (mi.)	3.0	2.1
Cultural Resource High Probability Areas (mi.)	No Data	No Data
Length collocated (mi.)	4.4 c/	3.1 d/
Percentage of miles collocated	51	37

a/ Incomplete Data Set – Not all wetlands were available.
b/ Both the proposed route and Alternative C would cross the Natchez Trace Parkway by HDD, resulting in negligible surface impacts.
c/ Collocated with existing power line right-of-way; distance scaled from aerial images; represents length of OCM installation adjacent to power line; does not include length of power line right-of-way adjacent to HDD installation.
d/ Collocated with Texas Eastern Transmission pipeline.

Natchez Trace Parkway. Several route variations were considered in consultation with the NPS for the crossing of the Natchez Trace Parkway near MP 92.9 of the Greenville Lateral. The NPS commented that the chosen crossing location and crossing method should avoid potentially significant impacts on the viewshed from the Natchez Trace Parkway. Issues related to construction feasibility and environmental impacts also were considered. The proposed route would cross the Natchez Trace Parkway by a 4,850-foot-long HDD. It would maximize the use of agricultural areas for the entry and exit points for the HDD crossing, follow an existing electric transmission line right-of-way, and minimize the amount of forest

clearing by taking the shortest route across forested areas. Figure 3.3-1 shows the proposed route and a previously considered Alternative C.

Alternative C would require an estimated 6,000-foot-long HDD crossing of the Natchez Trace Parkway and the Yockanookany River channel, and would impact higher quality forested wetland in the Yockanookany River floodplain than the proposed route. Because the HDD route for Alternative C would be through a forested area, this alternative would require an extensive amount of forest clearing to accommodate the HDD pull string. The proposed route for crossing the Natchez Trace Parkway and the Yockanookany River channel would be shorter (about 4,850 feet) and would allow these resources to be crossed by HDD, and the HDD staging areas would be established mostly in cleared pasture.

Construction activities associated with the proposed route would not occur on NPS-managed lands. Existing trees would visually screen construction activities and the permanent right-of-way from view along the Natchez Trace Parkway and Highway 14; therefore, no significant impacts on visual resources would occur as a result of construction of the proposed route. The only activities on NPS lands would be a civil survey across the area along the path of the HDD to mark the centerline and the edges of the construction right-of-way, and the placement of two drag tracker wires for the HDD along the edges of the construction right-of-way. Although these activities may require the removal of a few low-hanging tree limbs, no significant impacts would be anticipated. The entry hole for the HDD on the west side of the crossing would be about 500 feet from the road. The exit hole for the HDD on the east side of the crossing would be almost 4,000 feet from the road and east of the Yockanookany River. Use of the HDD crossing technique would reduce impacts on the Natchez Trace Parkway, the Yockanookany River and associated wetlands, and forests compared to the use of an open-cut technique since no clearing would be required along the path of the HDD.

The proposed pipeline alignment for the Greenville Lateral across the Natchez Trace Parkway was developed in consultation with the NPS. Further, because Alternative C would result in greater environmental impacts and would involve less collocation, we believe that the disadvantages of Alternative C outweigh potential advantages, and we do not recommend the use of this alternative.

3.3.2 Variations Reviewed During Pre-filing

In addition to the major route alternatives identified in the project development and route selection process, numerous minor route variations for the Fayetteville and Greenville Laterals were reviewed during pre-filing and adopted into Texas Gas's proposed pipeline alignments. They were adopted to minimize or avoid potential impacts on cultural resources, residences, and various natural resources, and to improve constructability and safety during construction. Table 3.3.2-1 summarizes these variations for the Fayetteville Lateral, and table 3.3.2-2 summarizes the variations for the Greenville Lateral.

Table 3.3.2-1

Route Variations Reviewed During Pre-filing: Fayetteville Lateral

Mileposts					
Begin	**End**	**County, State**	**Length (miles)**	**Land Use**	**Reason for Adoption**
6.48	7.43	Conway, AR	0.95	Forest, Right-of-Way	Avoid a pond and managed forest.
6.58	6.78	Conway, AR	0.21	Forest	Avoid a pond.
7.76	8.85	Faulkner, AR	1.09	Ag Land, Forest, Residential	Avoid a high rock bluff at the Cove Creek crossing; and avoid a newly installed well pad, gathering lines, and gravel access road.
9.59	9.98	Faulkner, AR	0.39	Right-of-Way, Ag Land, Forest	Avoid environmental features.
12.55	13.23	Faulkner, AR	0.68	Forest, Ag Land, Right-of-Way	Avoid severe side slopes and potential construction safety issues.
15.10	16.07	Faulkner, AR	0.97	Ag Land, Forest, Rural Residential	Avoid ponds, an underground storm/fruit cellar, and a residence.
20.64	22.84	Faulkner, AR	2.20	Ag Land, Forest	Avoid severe side slope and potential construction safety issues.
20.64	22.84	Faulkner, AR	1.82	Ag Land, Right-of-Way, Forest	Follow an existing pipeline corridor.
20.64	22.84	Faulkner, AR	0.44	Ag Land, Forest	Avoid severe side slope and potential construction safety issues.
30.23	32.60	White, AR	2.37	Forest, Ag Land, Existing Right-of-Way, Grassland	Avoid new well pad sites and new gathering lines.
32.86	33.97	White, AR	1.12	Forest, Right-of-Way Residential, Ag Land	Avoid a recently installed 10-inch-diameter gathering pipeline, valves, and meter station; and avoid ponds and residential areas.
34.29	34.53	White, AR	0.24	Ag Land, Right-of-Way	Avoid a recently installed 10-inch-diameter gathering pipeline and valve site (SEECO).
36.27	36.46	White, AR	0.19	Forest, Grassland	Facilitate waterbody crossing.
41.53	42.93	Cleburne, AR	1.40	Right-of-Way, Rural Residential, Forest, Ag Land	Avoid a parallel road and residences.
44.88	46.96	White, AR	2.09	Forest, Ag Land, Right-of-Way, Grassland	Avoid environmental features.
44.88	46.96	White, AR	0.64	Ag Land, Forest, Right-of-Way, Grassland	Avoid residential areas.
48.50	49.08	White, AR	0.58	Ag Land, Forest	Avoid environmental features.
49.72	49.96	White, AR	0.24	Right-of-Way, Ag Land, Forest	Avoid environmental features.
50.10	50.17	White, AR	0.07	Roadway, Ag Land, Forest	Improve road crossing.

Table 3.3.2-1

Route Variations Reviewed During Pre-filing: Fayetteville Lateral

Mileposts					
Begin	**End**	**County, State**	**Length (miles)**	**Land Use**	**Reason for Adoption**
50.36	50.92	White, AR	0.56	Ag Land, Forest	Improve road crossing and avoid a residence.
52.44	53.07	White, AR	0.63	Forest, Ag Land	Improve constructability and avoid side hill construction.
53.28	53.53	White, AR	0.25	Forest, Ag Land, Residential	Landowner requirements.
54.85	58.19	White, AR	3.34	Forest, Grassland, Ag Land, Residential	Avoid vineyards and orchards.
59.40	59.67	White, AR	0.27	Ag Land, Forest, Residential	Avoid a residence.
60.23	60.65	White, AR	0.42	Forest, Ag Land	Avoid environmental features
60.81	63.62	White, AR	2.81	Forest, Ag Land, Residential	Avoid residences and improve constructability.
64.10	65.07	White, AR	0.97	Rights-of-Way, Ag Land	Improve two road crossings and avoid a residence.
66.60	67.55	White, AR	0.95	Ag Land	Avoid environmental features.
70.66	72.79	Woodruff, AR	2.13	Ag Land	Avoid environmental features.
72.79	74.17	Woodruff, AR	1.38	Ag Land, Forest	Avoid environmental features and improve constructability of HDD.
75.82	76.81	Woodruff, AR	0.99	Ag Land	Route designed to avoid terrain features and to improve constructability.
78.92	80.21	Woodruff, AR	1.29	Ag Land, County Road, Forest	Avoid federal WRP area.
80.21	85.63	Woodruff, AR	5.41	Ag Land, Forest, Managed Forest	Minimize impacts on the Cache River.
86.17	86.38	Woodruff, AR	0.21	Ag Land	Avoid environmental features.
89.06	89.36	Woodruff, AR	0.30	Managed Forest	Minimize impact on trees.
91.05	92.22	Woodruff, AR	1.17	Ag Land, Forest	Minimize impact on forest.
93.09	93.73	Woodruff, AR	0.64	Forest, Ag Land	Avoid environmental features.
94.43	96.61	Woodruff, AR	2.18	Ag Land, Wetland	Avoid environmental features and improve wetland crossing.
98.14	98.67	Woodruff, AR	0.53	Ag Land	Avoid environmental features and improve constructability.
99.86	100.31	Woodruff, AR	0.45	Ag Land	Minimize wetland impact.
102.71	102.91	Woodruff, AR	0.20	Ag Land	Route designed to avoid environmental features
111.05	112.11	St. Francis, AR	1.06	Right-of-Way, Ag Land, Wetland	Improve waterbody crossing and constructability.
116.48	117.71	St. Francis & Lee, AR	1.25	Ag Land, Forest, Right-of-Way, Residential	Avoid buildings.
119.05	119.40	Lee, AR	0.35	Ag Land, Wetland	Improve waterbody crossing and minimize forest impact.

Table 3.3.2-1

Route Variations Reviewed During Pre-filing: Fayetteville Lateral

Mileposts					
Begin	**End**	**County, State**	**Length (miles)**	**Land Use**	**Reason for Adoption**
119.05	119.40	Lee, AR	0.28	Ag Land, Wetland, Right-of-Way	Avoid wetlands and improve waterbody crossing.
120.62	120.88	Lee, AR	0.26	Ag Land, Right-of-Way	Minimize forest impact.
121.73	121.94	Lee, AR	0.21	Ag Land	Avoid environmental features.
130.38	131.46	Lee, AR	1.10	Ag Land, Right-of-Way	Avoid environmental features and improve a waterbody crossing.
135.83	136.22	Lee, AR	0.39	Ag Land, Right-of-Way	Avoid environmental features.
142.55	142.88	Phillips, AR	0.33	Ag Land, Managed Forest, Right-of-Way	Avoid a tree farm.
144.51	145.53	Phillips, AR	1.02	Ag Land, Right-of-Way, Forest	Improve a waterbody crossing and avoid environmental features.
145.90	146.36	Phillips, AR	0.46	Forest, Ag Land, Commercial, Right-of-Way	Avoid residences and aboveground storage tanks.
147.46	147.67	Phillips, AR	0.21	Ag Land	Avoid environmental features.
149.88	149.33	Phillips, AR	0.45	Ag Land	Avoid environmental features.
154.50	156.22	Phillips, AR	0.64	Ag Land	Avoid environmental features.
154.50	156.22	Phillips, AR	0.41	Ag Land	Avoid environmental features.
154.50	156.22	Phillips, AR	1.72	Ag Land	Avoid environmental features and improve road and waterbody crossings.
160.89	161.49	Coahoma, MS	0.60	Right-of-Way, Ag Land	Avoid environmental features.

Table 3.3.2-2

Route Variations Reviewed During Pre-filing: Greenville Lateral

Mileposts					
Begin	**End**	**County, State**	**Length (miles)**	**Land Use**	**Reason for Adoption**
6.54	7.97	Washington, MS	1.43	Residential, Ag Land, Forest	Minimize impacts on an agricultural resource.
8.22	9.73	Washington, MS	1.51	Deer Creek, Ag Land	Avoid environmental feature and improve HDD constructability.
10.56	11.61	Washington, MS	1.05	Ag Land, Open water	Improve HDD alignment at Bogue Phalia.
19.01	19.85	Sunflower, MS	0.84	Ag Land	Avoid environmental feature.
20.94	21.20	Humphreys, MS	0.26	Ag Land, Drain	Improve crossing of an intermittent drain.
23.41	23.97	Humphreys, MS	0.56	Ag Land, Open water	Improve constructability at crossing of Beasley Bayou.
38.48	40.32	Humphreys, MS	1.84	Ag Land, Forest	Improve HDD constructability of west levee of Yazoo River.
40.32	41.49	Humphreys, MS	1.17	Ag Land, Open water, Forest	Improve HDD constructability at crossing of Yazoo River.
41.49	44.82	Humphreys, MS	3.33	Ag Land, Forest	Accommodate landowner concerns and minimize conflicts with WRP site.
44.84	48.12	Humphreys and Holmes, MS	3.30	Forested Wetland, Ag Land, Open water	Minimize conflicts with WRP sites and avoid environmental feature.
48.85	49.51	Holmes, MS	0.66	Ag Land	Avoid environmental feature.
51.19	51.58	Holmes, MS	0.39	Commercial, Ag Land	Improve HDD constructability at crossing of Highway 49 E and the Illinois Central Railroad.
52.42	55.89	Holmes, MS	3.47	Ag Land, Forest	Minimize impact on the Hillside NWR and environmental features.
56.43	57.16	Holmes, MS	0.73	Managed Forest, Forest, Ag Land	Avoid environmental feature.
58.54	59.24	Holmes, MS	0.70	Forest	Avoid environmental feature.
59.58	59.89	Holmes, MS	0.31	Cleared	Avoid environmental feature.
61.88	62.00	Holmes, MS	0.12	Forest, Cleared	Avoid geological feature (sinkhole).
63.43	64.33	Holmes, MS	0.90	Ag Land, l Residential	Avoid golf course and college.
64.43	65.85	Holmes, MS	1.42	Ag Land, Forest	Avoid planned subdivision.
67.14	67.79	Holmes, MS	0.65	Forest, Ag Land	Avoid abandoned cemetery.
68.59	70.93	Holmes, MS	2.34	Forest, Agriculture	Minimize impact on forest and improve constructability and access.
71.33	71.52	Holmes, MS	0.19	Forest	Avoid crossing a drain.
75.20	78.41	Holmes and Attala, MS	2.94	Ag Land, Open Land, Forest, Open water	Accommodate landowner concerns.
80.21	81.58	Attala, MS	1.37	Managed Forest, Ag Land	Accommodate landowner concerns and improve constructability.

Table 3.3.2-2 Route Variations Reviewed During Pre-filing: Greenville Lateral					
Mileposts					
Begin	End	County, State	Length (miles)	Land Use	Reason for Adoption
82.22	83.61	Attala, MS	1.39	Forest, Ag Land	Avoid a planned building site.
92.83	95.14	Attala, MS	2.31	Forest, Managed Forest, Ag Land	Improve constructability and minimize impact on forestland.

3.3.3 Agency-Proposed Alternatives

During the pre-filing process, the USACE Memphis District requested evaluation of four route alternatives for the Fayetteville Lateral to minimize impacts on wetlands, particularly forested wetlands. The ADHHS also requested evaluation of a route alternative to avoid the Little Red River Watershed, which serves as the water supply for the City of Searcy. These route alternatives are presented in appendix B-3 and B-4 and in table 3.3.3-1.

We considered a variety of factors in evaluating these agency-proposed alternatives, including length, land requirements, and potential for reducing and minimizing impacts on natural resources, as well as considering engineering constraints.

The ADHHS D1, and USACE U1, U2, and U3 had significant disadvantages when compared to the proposed route, and all of these alternatives were longer than the corresponding segment of the proposed Project.

ADHHS Alternative D1

The ADHHS Alternative D1 would extend between MPs 31.0 to 64.3 of the proposed route. A map of the alternative route is in appendix B-3. Although it appears the ADHHS Alternative DI would impact less wetland and forestland, this was due in large part to the alternative route going through more developed areas. It would be within 50 feet of about 146 residences in two communities, but the proposed route would be within 50 feet of no residences. The ADHHS Alternative DI would be about 3.6 miles longer than the proposed route and would, therefore, require about 44 more acres for construction and 22 more acres for operation. It would cross about 28 more waterbodies and 16.5 more acres of agricultural land than the proposed route. The advantages of the ADHHS Alternative DI are that it would cross about 1.6 fewer acres of wetlands and 76.7 fewer acres of forestland. However, the proposed route would follow existing right-of-way along about 32 percent of it length, compared to about 5.7 percent for the alternative. To avoid impacts on this watershed, the ADHHS requested either modifications to the Fayetteville Lateral route or for Texas Gas to provide the ADHHS with its plans for constructing in the watershed for review so that ADHHS may document any potential impact on the water supply associated with planned activities. Texas Gas would be required to use BMPs and our Plan and Procedures to minimize impacts during construction and operation and to consult with the ADHHS to address any additional concerns it may have about construction in these areas (see section 4.3). Texas Gas also would implement its SPCC Plan to prevent and control any spills of hazardous materials. We believe the proposed route, with its more remote location, would have significantly less impact on residences. Its greater collocation along more existing right-of-way would minimize new impacts and land requirements. Therefore, we believe that the Project could be constructed through the Little Red River Watershed in a way that would minimize potential impacts on this resource, and conclude that the proposed route is the preferred alternative. The USACE concurs with our conclusion.

USACE Alternative U1

The USACE Alternative U1 would extend from about MP 122.4 to 136.0 of the proposed route. Maps of the alternative route are in appendix B-4. This route would be about 2.7 miles longer than the proposed route and would require about 32.7 more acres for construction and about 16.3 more acres for permanent right-of-way. It would not be collocated along an existing right-of-way compared to the proposed route, which would be collocated with existing right-of-way along about 86 percent of its length. The USACE Alternative U1 would be within 50 feet of 10 more residences than the proposed route and would affect about 1.7 more acres of wetlands, 23.6 more acres of agricultural land, and 3.0 more acres of forestland than the corresponding segment of the proposed route. The only advantage of this alternative over the proposed route would be that it would cross three fewer waterbodies. We believe that the USACE Alternative U1 would have greater land requirements and resource impacts than the proposed route and that the impact of the corresponding segment of the proposed route would be further minimized by its collocation along existing right-of-way for about 86 percent of its length. Therefore, we conclude that the proposed route is the preferred alternative. The USACE concurs with our conclusion.

USACE Alternative U2

The USACE Alternative U2 would extend from MP 110.1 to 122.3. A map of the alternative route is in appendix B-4. This route would be about 1.6 miles longer than the proposed route and would, therefore, require about 19.4 more acres for construction and about 9.7 more acres for the permanent right-of-way. It would be within about 50 feet of three residences, whereas the proposed route would not be within 50 feet of any residences. The USACE Alternative U2 would cross five fewer waterbodies and 4.1 fewer acres of wetlands. However, it would cross about 5.5 more acres of forestland and 1.8 more acres of agricultural land. The USACE Alternative U2 would require new right-of-way along its entire length, whereas the proposed route would be constructed adjacent to existing right-of-way along about 94.3 percent of its length. Since the USACE Alternative U2 would have greater impact on residences and would create a new utility corridor along its entire length, we conclude that the proposed route is the preferred alternative. The USACE concurs with our conclusion.

USACE Alternative U3

The USACE Alternative U3 would extend from MP 86 to 95.2. Maps of the alternative are in appendix B-4. This route would be about 0.2 mile shorter than the proposed route and would require about 2.4 fewer acres for construction and about 1.2 fewer acres for permanent right-of-way. It would be within 50 feet of a small community with three residences, whereas the proposed route would not be within 50 feet of any residences. The proposed route would cross nine more waterbodies. 0.2 more acre of wetlands, 3.4 more acres of agricultural lands, and 0.2 more acre of forestland. The proposed route was developed to accommodate a proposed HDD crossing of Bayou DeView (part of the Cache River NWR), which requires an alignment that approaches the Bayou more nearly at a right angle than does Alternative U3. Since Alternative U3 would have greater potential impacts on residential land uses and would require modification to the proposed crossing of Bayou DeView, we conclude that the proposed route is the preferred alternative. The USACE concurs with our conclusion.

USACE Alternative U4

USACE Alternative U4 was proposed as an alternative to the original route Texas Gas had proposed and would extend from MP 74.7 to 85.2. A map of the alternative is in appendix B-4. The intent of Alternative U4 was to minimize impacts on forests and wetlands. Texas Gas changed its earlier route to incorporate much of the intent of Alternative U4. While directly incorporating the portion of Alternative U4 east of the Cache River, Texas Gas modified its route west of the Cache River to avoid larger

forested/wetland tracts. Both routes would be about the same length, and neither would follow existing right-of-way. Alternative U4 would be within 50 feet of two residences, whereas the original Fayetteville Lateral route would be within 50 feet of no residences. Alternative U4 would affect about 2.9 fewer acres of wetlands, 6.6 fewer acres of agricultural land, and 8.6 more acres of forestland compared to the original route. Alternative U4 would cross one fewer waterbody. As indicated above, Texas Gas modified the original route to significantly avoid forestlands. The proposed route also incorporates an approved crossing location of the Cache River NWR, whereas Alternative U4 would require a more northerly crossing. Since it would reduce impacts on wetlands and waterbodies and cross the Cache River and NWR at an agency-recommended location, we conclude that Texas Gas's proposed route, which incorporates the USACE intent in developing Alternative U4, is the preferred alternative. The USACE concurs with our conclusion

Table 3.3.3-1

Comparison of the Agency-Proposed Route Alternatives to the Corresponding Segments of the Proposed Project

Environmental Parameter	Potential Impacts	
	Proposed Fayetteville Lateral Segment (Milepost 31.0 to 64.3)	ADHHS Alternative DI
Length (mi.)	31.3	34.9
Residences within 50 feet (no.)	0	146
Waterbodies (no.)	45	73
Number/Wetland (acres)	7/1.6	0
Agricultural Lands (acre)	55.6	72.1
Forested Lands (acre)	207.9	131.2
Adjacent Utility Right-of-Way (mi.)	10.0	2.0
Environmental Parameter	**Potential Impacts**	
	Proposed Fayetteville Lateral Segment (Milepost 122.4 to 136.0)	**USACE Alternative U1**
Length (mi.)	13.6	16.3
Residences within 50 feet (no.)	1	11
Waterbodies (no.)	11	8
Number/(acres)	4/1.5	4/3.2
Agricultural Lands (acre)	156.5	180.1
Forested Lands (acre)	2.9	5.9
Adjacent Utility Right-of-Way (mi.)	11.7	0
Environmental Parameter	**Potential Impacts**	
	Proposed Fayetteville Lateral Segment (Milepost 110.1 to 122.3)	**USACE Alternative U2**
Length (mi.)	12.3	13.9
Residences within 50 feet (no.)	0	3
Waterbodies (no.)	10	5
Number/Wetland (acres)	8/4.6	2/0.5
Agricultural Land (acres)	137.6	139.4
Forested Land (acres)	2.2	7.7
Adjacent Utility Right-of-Way (mi.)	11.6	0

Table 3.3.3-1 Comparison of the Agency-Proposed Route Alternatives to the Corresponding Segments of the Proposed Project		
	Potential Impacts	
Environmental Parameter	Proposed Fayetteville Lateral Segment (Milepost 86 to 95.2)	USACE Alternative U3
Length (mi.)	9.2	9.0
Residences within 50 feet (no.)	0	2
Waterbodies (no.)	10	1
Number/Wetland (acres)	4/1.2	0/1.4
Agricultural Land (acres)	106.9	103.5
Forested Land (acres)	1.5	1.3
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	Proposed Fayetteville Lateral Segment (Milepost 74.7 to 85.2)	USACE Alternative U4
Length (mi.)	10.6	10.6
Residences within 50 feet (no.)	0	2
Waterbodies (no.)	11	10
Number/Wetland (acres)	10/15.8	6/12.9
Agricultural Land (acres)	106.6	100.2
Forested Land (acres)	5.4	14.0
Adjacent Utility Right-of-Way (mi.)	0	0

3.3.4 Agency-Proposed Route Variations

Route variations differ from system or major route alternatives in that they are identified to solve or reduce construction impacts on localized, specific resources such as forested wetlands, cultural resource sites, recreational lands, residences, terrain conditions, and to accommodate landowner requests. Because route variations are identified in response to specific local concerns, they are usually the result of landowner comment, greater field engineering design, or field surveys. While route variations may be a few miles in length, most are relatively short and in general proximity to the proposed route. We have considered a variety of factors in identifying and evaluating variations, including length, land requirements, and potential for reducing and minimizing impacts on natural and cultural resources. During the pre-filing process, Texas Gas refined its proposed route based on discussions with landowners, resource managers, project engineers, and our input to avoid or minimize impacts on natural or cultural resources, reduce or eliminate engineering and constructability concerns, and/or avoid or minimize conflicts with existing land uses.

During project development, Texas Gas identified a total of 59 minor route variations to its initially planned route for the Fayetteville Lateral and 26 minor route variations to its initially planned route for the Greenville Lateral. Texas Gas incorporated these variations into the proposed routes for the Project, and these are the pipeline routes evaluated in this EIS. These minor route variations are summarized in table 3.3.4-1. We have evaluated each of these minor route variations and considered their associated environmental consequence as part of our environmental analysis of the proposed Project. We conclude that they are reasonable and that their use would be the preferred route.

In addition to the route variations listed in table 3.3.4-1, it is anticipated that minor alignment shifts would be required prior to and during construction to accommodate currently unforeseeable site-specific constraints related to engineering, landowner, and environmental concerns. All such alignment shifts would be subject to post-Certificate review and approval by the FERC.

The ADHHS suggested a route variation to minimize construction within the Brewer Lake Watershed. The ADHHS route variation would begin about 2 miles north of the western end (MP 0.0) of the Fayetteville Lateral and would join the proposed route at about MP 5.2. However, this alternative would not allow the Project access to existing gas gathering facilities. ADHHS requested either modifications to the Fayetteville Lateral route or for Texas Gas to provide planned construction methods for review so that ADHHS can document any potential impact on the water supply associated with planned activities. Texas Gas would be required to use BMPs and our Plan and Procedures to minimize impacts during construction and operation and to consult with the ADHHS to address any additional concerns it may have about construction in these areas (see section 4.3). Texas Gas would also implement its SPCC Plan to prevent and control any spills of hazardous materials. We believe the proposed route would meet the stated purpose of the Project (to develop natural gas pipeline capacity for receipt, transportation, and delivery of new natural gas supplies from the new Fayetteville Shale production area). The ADHHS's suggested route variation would not accomplish the Project's purpose without the construction of a lateral pipeline from the route variation back to the gas gathering facilities, thereby affecting resources similar to those that the variation would avoid. Further, we believe that the Project could be constructed through the Brewer Lake Watershed in a way that would minimize potential impacts on this resource. Therefore, we conclude that the proposed route is the preferred route.

During the pre-filing period, the FWS identified 22 route variations, ranging from less than 1 mile to 5 miles in length. The FWS variations were largely developed from review of aerial photographs and focused on minimizing impacts on wetlands and potentially high quality ecosystems but did not consider constructability, use of adjacent utility rights-of-way, the possibility of cultural resources, or other site-specific land use issues. Table 3.3.4-1 lists each of the variations identified by the FWS. Of these 20 variations, Texas Gas incorporated the following five, either completely or in part, into the proposed route it filed for its Certificate application: Variations 10 (MPs 89.0 to 89.3), 11 (in part, between MPs 91.1 and 91.8 only), 12 (MPs 99.6 to 100.6), 15 (MPs 119.1 to 119.4), and 16 (in part, between MPs 120.6 and 120.9 only).

Table 3.3.4-1

Comparison of the Agency-Proposed Route Variations to the Corresponding Segments of the Proposed Fayetteville Lateral

Environmental Parameter	Potential Impacts	
	MP 15.1 - 16.1	**FWS Variation No. 1**
Length (mi.)	1	0.8
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	2	1
Number/Wetlands (acres)	0	1/0.1
Agricultural Land (acres)	7.1	2.5
Forested Land (acres)	4.6	2.3
Adjacent Utility Right-of-Way (mi.)	0	0
Environmental Parameter	**Potential Impacts**	
	MP 32.9 - 33.7	**FWS Variation No. 2**

Table 3.3.4-1

Comparison of the Agency-Proposed Route Variations to the Corresponding Segments of the Proposed Fayetteville Lateral

Length (mi.)	0.8	0.8
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	1	1
Number/Wetlands (acres)	0	0
Agricultural Lands (acres)	2.2	3
Forested Land (acres)	6.1	2.8
Miles of adjacent Utility Right-of-Way	0	0
Environmental Parameter	**Potential Impacts**	
	MP 42.4 - 42.9	**FWS Variation No. 3**
Length (mi.)	0.6	0.6
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	1	1
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	4.5	4.4
Forested Land (acres)	2	2
Adjacent Utility Right-of-Way (mi.)	0	0.2
Environmental Parameter	**Potential Impacts**	
	MP 46.9 - 47.6	**FWS Variation No. 4**
Length (mi.)	0.7	0.8
Residences within 50 feet (no.)	0	3
Waterbodies (no.)	1	1
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	0	3.9
Forested Land (acres)	7.3	1.1
Adjacent Utility Right-of-Way (mi.)	0	0
Environmental Parameter	**Potential Impacts**	
	MP 55.5 - 58.2	**FWS Variation No. 5**
Length (mi.)	2.7	2.5
Residences (no.)	0	3
Waterbodies (no.)	2	2
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	14.7	18.7
Forested Land (acres)	15.8	7.6
Adjacent Utility Right-of-Way (mi.)	0	0
Environmental Parameter	**Potential Impacts**	
	MP 59.1 - 59.4	**FWS Variation No. 21**
Length (mi.)	0.3	0.3
Residences within 50 feet (no.)	0	0

Table 3.3.4-1

Comparison of the Agency-Proposed Route Variations to the Corresponding Segments of the Proposed Fayetteville Lateral

Waterbodies (no.)	0	0
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	0	0
Forested Land (acres)	3.4	3.4
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 63.0 - 65.1**	**FWS Variation No. 6**
Length (mi.)	2.1	1.9
Residences within 50 feet (no.)	0	0
Waterbodies	2	2
Number/Wetlands (acres)	1/0.2	1/0.1
Agricultural Land (acres)	18.4	16.9
Forested Land (acres)	3.4	1.8
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 66.6 - 68.0**	**FWS Variation No. 7**
Length (mi.)	1.4	1.5
Residences (no.)	0	0
Waterbodies (no.)	4	3
Number/Wetlands (acres)	0/1.9	2/0.6
Agricultural Land (acres)	14.2	17.1
Forested Land (acres)	0	0
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 74.9 - 76.8**	**FWS Variation No. 8**
Length (mi.)	1.9	1.9
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	0	0
Number/Wetlands (acres)	1/0.2	0
Agricultural Land (acres)	22.2	22.2
Forested Land (acres)	0	0
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 86.2 - 86.8**	**FWS Variation No. 9**
Length (mi.)	0.6	0.6
Residences (no.)	0	0
Waterbodies (no.)	0	0
Number/Wetlands (acres)	1/0.5	0

Table 3.3.4-1

Comparison of the Agency-Proposed Route Variations to the Corresponding Segments of the Proposed Fayetteville Lateral

Agricultural Land (acres)	7.2	7.1
Forested Land (acres)	0	0
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 89.0 - 89.3**	**FWS Variation No. 10**
Length (mi.)	0.3	0.3
Residences (no.)	0	0
Waterbodies (no.)	0	0
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	0.3	0.4
Forested Land (acres)	3.3	1.4
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 91.1 - 95.0**	**FWS Variation No. 11**
Length (mi.)	3.9	4.5
Residences within 50 feet (no.)	0	1
Waterbodies (no.)	4	4
Number/Wetlands (acres)	2/0.9	0
Agricultural Land (acres)	45.6	52.7
Forested Land (acres)	6.2	0
Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 99.6 - 100.6**	**FWS Variation No. 12**
Length (mi.)	1	1
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	2	2
Number/Wetlands (acres)	1/0.5	1/0.2
Agricultural Land (acres)	10.4	10.5
Forested Land (acres)	0.7	0.5
Adjacent Utility Right-of-way (mi)	0	0
	Potential Impacts	
Environmental Parameter	**MP 102.7 - 102.9**	**FWS Variation No. 13**
Length (mi.)	0.2	0.2
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	0	0
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	2.4	2.2
Forested Land (acres)	0	0

Table 3.3.4-1

Comparison of the Agency-Proposed Route Variations to the Corresponding Segments of the Proposed Fayetteville Lateral

Adjacent Utility Right-of-Way (mi.)	0	0
	Potential Impacts	
Environmental Parameter	**MP 111.0 - 113.4**	**FWS Variation No. 14**
Length (mi.)	2.5	3
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	2	4
Number/Wetlands (acres)	1/2.2	1/1.7
Agricultural Land (acres)	25.4	32.8
Forested Land (acres)	1.1	0
Adjacent Utility Right-of-Way (mi.)	1.1	0
	Potential Impacts	
Environmental Parameter	**MP 119.1 - 119.8**	**FWS Variation No. 15**
Length (mi.)	0.7	0.7
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	0	0
Number/Wetlands (acres)	1	0
Agricultural Land (acres)	7.3	7.8
Forested Land (acres)	0	0
Adjacent Utility Right-of-Way (mi.)	0.2	0.2
	Potential Impacts	
Environmental Parameter	**MP 120.2 - 121.9**	**FWS Variation No. 16**
Length (mi.)	1.7	1.7
Residences within 50 feet (no.)	0	1
Waterbodies (no.)	0	0
Number/Wetlands (acres)	1/1.0	1/1.0
Agricultural Land (acres)	19	19.1
Forested Land (acres)	1.6	1.4
Adjacent Utility Right-of-Way (mi.)	1.3	0.4
	Potential Impacts	
Environmental Parameter	**MP 127.1 - 127.7**	**FWS Variation No. 22**
Length (mi.)	0.6	0.6
Residences (no.)	0	0
Waterbodies (no.)	1	1
Number/Wetlands (acres)	1/0.6	1/0.6
Agricultural Land (acres)	4.8	4.8
Forested Land (acres)	0.9	0.9
Adjacent Utility Right-of-Way (mi.)	0	0

Table 3.3.4-1

Comparison of the Agency-Proposed Route Variations to the Corresponding Segments of the Proposed Fayetteville Lateral

Environmental Parameter	Potential Impacts	
	MP 135.6 - 136.0	**FWS Variation No. 17**
Length (mi.)	0.4	0.5
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	0	0
Number/Wetlands (acres)	1/0.8	0
Agricultural Land (acres)	4.2	5.3
Forested Land (acres)	1	0
Adjacent Utility Right-of-Way (mi.)	0.4	0
Environmental Parameter	**Potential Impacts**	
	MP 140.5 - 145.3	**FWS Variation No. 18**
Length (mi.)	4.8	4.9
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	6	3
Number/Wetlands (acres)	8/1.3	0
Agricultural Land (acres)	49.1	57.2
Forested Land (acres)	5.1	0
Adjacent Utility Right-of-Way (mi.)	4.1	0
Environmental Parameter	**Potential Impacts**	
	MP 160.7 - 161.5	**FWS Variation No. 19**
Length (mi.)	0.8	0.9
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	1	1
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	8.6	9.3
Forested Land (acres)	0	0
Adjacent Utility Right-of-Way (mi.)	0.2	0.9
Environmental Parameter	**Potential Impacts**	
	MP 163.4 - 165.4	**FWS Variation No. 20**
Length (mi.)	2	2
Residences within 50 feet (no.)	0	0
Waterbodies (no.)	0	0
Number/Wetlands (acres)	0	0
Agricultural Land (acres)	21.8	22.3
Forested Land (acres)	0	0
Adjacent Utility Right-of-Way (mi.)	2	0.8

FWS Variation No. 1

FWS Variation No. 1 would extend from MP 15.1 to MP 16.1. A map showing the location of this variation is in appendix B-5. This variation would be about 0.8 mile shorter than the proposed route and would cross one fewer waterbody, 4.6 fewer acres of agricultural land, and 2.3 fewer acres of forested land. It would cross one delineated wetland, affecting about 0.1 acre of wetland. This variation was suggested to minimize forest fragmentation. However, Texas Gas states that while the proposed route along this segment of the Fayetteville Lateral would require clearing a total of about 2,000 feet of forest, most of this clearing would be along the edges of forested areas. Only about 800 feet (about 1.8 acres) of this total would be contiguous. Further, if the variation was constructed, additional land requirements would be needed for additional temporary workspaces (ATWSs) at two locations where the route variation would cross over the CenterPoint and Ozark high-pressure pipelines. Texas Gas estimates that four 50-foot by 150-foot ATWSs (about 0.7 acre) would be needed to safely construct the crossovers. Constructing pipeline crossovers is feasible, but they are usually minimized to the greatest extent practicable because of safety issues during construction and for maintenance during operation. While the proposed route would avoid crossovers, it would require about 2.3 acres of additional forest impact. This would be about 0.7 percent of the total upland forest impact required for construction of the Fayetteville Lateral portion of the Project. Since the proposed route would avoid crossovers and would make a minimal contribution to forest fragmentation, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 2

FWS Variation No. 2 would extend from MP 32.9 to MP 33.7 of the proposed route. A map showing the location of this variation is in appendix B-5. It would be about the same length as the corresponding segment of the proposed route, and no residences would be within 50 feet of either route. The primary reason the FWS suggested this variation was to minimize forest fragmentation: FWS Variation No. 2 would require about 3.3 fewer acres of forest clearing for construction. However, the required tree clearing for the proposed route would mainly be next to the existing pipeline right-of-way and would affect forest edge areas by expanding the open area along the pipeline corridor. The exception to this would be at locations where the proposed route would deviate to the south and away from the existing right-of-way to avoid constructing parallel to a waterbody, and to avoid small wetlands and two farm ponds. Since the additional forest clearing along the proposed route would minimize impacts on waterbodies and wetlands compared with construction immediately adjacent to the existing right-of-way, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 3

FWS Variation No. 3 would extend from MP 42.4 to MP 42.9. A map showing the location of this variation is in appendix B-5. It would be about the same length as the corresponding segment of the proposed route and no residences would be within 50 feet of either route. The primary reason the FWS suggested this variation was to minimize forest fragmentation. However, both routes would affect similar amounts of forest land. Since the variation would not significantly decrease the amount forest clearing, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 4

FWS Variation No. 4 would extend from MP 46.9 to MP 47.6 of the proposed route. The variation would be about 0.1 mile longer than the proposed route. A map showing the location of this variation is in appendix B-5. It would be within 50 feet of three residences and would have three road crossings. The proposed route would not be within 50 feet of any residences and would require two road crossings. Both routes would cross one waterbody. The variation would affect about 3.9 acres of agricultural land, and the proposed route would not affect agricultural land. The variation would affect about 6.2 fewer acres of

forest than the proposed route. Some of the forest impact is due to the alignment of the proposed route to avoid construction near residences. Since the proposed route would minimize impacts on residences, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 5

FWS Variation No. 5 would extend from MP 55.5 to MP 58.2 of the proposed route. A map showing the location of this variation is in appendix B-5. It would be about 0.2 mile shorter than the proposed route but would be within 50 feet of three residences. The proposed route would not be near any residences. Both routes would cross two waterbodies. The FWS commented that this variation was suggested to minimize habitat impact. The proposed route would require clearing about 8.2 more acres of forest. The variation would travel a more direct path that would cross about 4 more acres of agricultural land. The proposed route was developed to avoid impacts on vineyards and residential areas. The variation would require clearing about 4 acres of vineyards. Since the proposed route would minimize impacts on residential areas and vineyards, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 21

FWS Variation No. 21 would extend from MP 59.1 to MP 59.4 of the proposed route. A map showing the location of this variation is in appendix B-5. There does not appear to be any significant differences between the impact of constructing this variation and the proposed route. Therefore, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 6

FWS Variation No. 6 would extend from MP 63.0 to MP 65.1 of the proposed route. A map showing the location of this variation is in appendix B-5. The variation would be about 0.2 mile shorter. No residence would be near either route, and both would cross two waterbodies. The reason for the proposed alignment along this segment of the Project is to facilitate the crossings of Gladey Creek, Old Russell Road, an existing pipeline, Highway 367, the Missouri Pacific Railroad, and U.S. Highway 67. Therefore, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 7

FWS Variation No. 7 would extend from MP 66.6 to MP 68.0 of the proposed route. A map showing the location of this variation is in appendix B-5. The variation would be about 0.1 mile shorter than the proposed route. The FWS did not indicate why this variation was suggested. Neither route would be within 50 feet of any residence, nor would they require forest clearing for construction. There may be slightly less wetland impact (about 1.3 fewer acres), but wetland delineation has not been performed along the variation and there may be greater or lesser wetland impact than this estimate. The variation would affect about 2.9 more acres of agricultural land. Since the variation offers no significant advantage over the proposed route, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 8

FWS Variation No. 8 would extend from MP 74.9 to MP 76.8 of the proposed route. A map showing the location of this variation is in appendix B-5. The variation would be about the same length as the corresponding segment of the proposed route. The FWS did not indicate why this variation was suggested. Neither route would be within 50 feet of any residences, nor would they require clearing of forests. Both routes would affect about the same amount of agricultural land. The proposed route would

cross a small wetland within an agricultural area. Since the variation offers no significant advantage over the proposed route, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 9

FWS Variation No. 9 would extend from MP 86.2 to MP 86.8 of the proposed route. A map showing the location of this variation is in appendix B-5. The variation would be about the same length as the corresponding segment of the proposed route. The FWS did not indicate why this variation was suggested. Neither route would be within 50 feet of any residences, nor would they require clearing of forests. Both routes would affect about the same amount of agricultural land. The proposed route would cross a small wetland within an agricultural area. Since the variation offers no significant advantage over the proposed route, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 10

FWS Variation No. 10 would extend from MP 89.0 to MP 89.3 of the proposed route. A map showing the location of this variation is in appendix B-5. Neither route would be within 50 feet of residences, nor would they cross waterbodies or wetlands. The variation would impact about 1.9 fewer acres of forest and would require clearing fewer trees with larger diameters. Since there would be no constructability issues related to using this alternative, and since larger trees would be avoided, Texas Gas has incorporated it into its proposed route. We concur. The FWS Variation No. 10 is the preferred alternative.

FWS Variation No. 11

FWS Variation No. 11 would extend from MP 91.1 to MP 95.0 of the proposed route. A map showing the location of this variation is in appendix B-5. The variation would be about 0.6 mile longer than the proposed route and would require about 7.3 more acres for construction (plus additional workspace for topsoil segregation where needed) and about 3.6 more acres within the permanent right-of-way. The variation would be within 50 feet of one residence. Both routes would cross four waterbodies. The proposed route would cross about 0.9 acre of wetland. The variation would affect about 7.1 more acres of agricultural land. Texas Gas has incorporated the first 0.7 mile of this variation into its proposed route since it would avoid a forested area with forested wetland (about 1.4 acres combined). About 0.7 acre of the remaining 3.8 acres of forest along the proposed route has been cleared for agricultural use. Since use of the first 0.7 mile of the FWS Variation No. 11 would reduce impacts on forest and forested wetlands, we concur that it would be the preferred alternative and that the remaining portion of the variation would not be the preferred alternative since it would be longer, would have greater land requirements for construction and operation, and would affect a residence.

FWS Variation No. 12

FWS Variation No. 12 would extend from MP 99.6 to MP 100.6 of the proposed route. A map showing the location of this variation is in appendix B-5. Both routes would be about the same length and would affect similar amounts of the listed resources. However, about 0.3 acre of wetland impact would be avoided by the variation. The original alignment of the pipeline would have crossed a large wetland near MP 100. Further, the modified alignment would facilitate the crossing of U.S. Highway 49, the St. Louis Southwestern Railway, and County Road 538. Texas Gas has incorporated this variation into its proposed route. We concur that FWS Variation No. 12 is the preferred alternative.

FWS Variation No. 13

FWS Variation No. 13 would extend from MP 102.7 to MP 102.9 of the proposed route. A map showing the location of this variation is in appendix B-5. It essentially would follow a straighter path between these two points. However, the proposed route was developed to avoid a sensitive environmental feature. Therefore, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 14

FWS Variation No. 14 would extend from MP 111.0 to MP 113.4 of the proposed route. A map showing the location of this variation is in appendix B-5. It would be about 0.5 mile longer than the proposed route and would require about 6.1 more acres for construction (plus additional workspace for topsoil segregation where needed) and about 3.0 more acres of permanent right-of-way. The proposed route would follow about 1.1 miles of existing utility right-of-way for about 44 percent of the pipeline route along this segment of the Project. The variation would follow no existing right-of-way. The variation would cross two more waterbodies and would require a longer HDD crossing of Big Creek and its associated wetlands, since this HDD would also include crossing I-40. Big Creek and its associated wetlands would be crossed by HDD along the proposed route, but I-40 and an exit ramp would be crossed by a separate, shorter HDD, and both HDDs would be close to the existing CenterPoint pipeline right-of-way. Since the variation offers no significant advantage over the proposed route, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 15

FWS Variation No. 15 would extend from MP 119.1 to MP 119.8 of the proposed route. A map showing the location of this variation is in appendix B-5. Both routes would be about the same length and would affect similar amounts of the listed resources. However, the variation would avoid a wetland, thereby reducing wetland impacts. Texas Gas has incorporated this variation into its proposed route. We concur that FWS Variation No. 15 is the preferred alternative.

FWS Variation No. 16

The FWS Variation No. 16 would extend from MP 120.2 to MP 121.9 of the proposed route. A map showing the location of this variation is in appendix B-5. Both routes would be about the same length and would affect similar amounts of agricultural land and forest. However, the variation would be within 50 feet of one residence and would be adjacent to 0.9 fewer mile of exiting right-of-way compared to the corresponding segment of the proposed route. Between MP 120.6 and MP 120.9, the variation would minimize impact on a wetland. At this location the variation leaves the existing right-of-way and goes through an agricultural field and avoids wetland and forest before returning to again follow the right-of-way. Therefore, Texas Gas has incorporated this segment of the variance into its proposed route. The remaining portion of the variance would be near a residence and an environmental feature that the proposed route would avoid. Since use of the 0.3-mile-long segment of FWS Variation No. 16 would reduce impacts on forest and forested wetlands, we concur that it would be the preferred alternative and that the remaining portion of the variation would not be the preferred alternative.

FWS Variation No. 22

FWS Variation No. 22 would extend from MP 127.1 to MP 127.7 of the proposed route. A map showing the location of this variation is in appendix B-5. Both routes would have similar impacts, with one having no apparent advantages or disadvantages over the other. Therefore, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 17

FWS Variation No. 17 would extend from MP 135.6 to MP 136.0 of the proposed route. A map showing the location of this variation is in appendix B-5. The variation would leave the proposed route, which would follow the existing CenterPoint pipeline right-of-way to avoid about 0.8 acre of wetland and 1 acre of forest, and would be about 0.1 mile longer than the proposed route. However, since the proposed route would follow the existing pipeline right-of-way through the wetland, no new corridor would be created. The variation would not follow any existing right-of-way and would affect about 0.9 more acre of agricultural land. Since the proposed route would follow the existing CenterPoint right-of-way along this segment, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 18

FWS Variation No. 18 would extend from MP 140.5 to MP 145.3 of the proposed route. A map showing the location of this variation is in appendix B-5. The variation would be about 0.1 mile longer than the proposed route and would follow no existing rights-of-way. It would affect about 8.1 more acres of agricultural land. The proposed route would follow about 4.1 miles of the existing CenterPoint pipeline right-of-way (about 85 percent of this segment of the Project). Where the proposed route deviates from the existing right-of-way, it would avoid forest and other habitat, thereby minimizing impacts on these resources. The proposed route would impact eight small wetlands (about 1.7 acres total) that would be across or adjacent to the proposed pipeline construction right-of-way. The proposed route would affect about 5.1 more acres of forest than the variation. Since clearing a construction right-of-way along the existing cleared corridor would minimize fragmentation and resource impacts by keeping the pipelines together, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 19

FWS Variation No. 19 would extend from MP 160.7 to MP 161.5 of the proposed route. A map showing the location of this variation is in appendix B-5. The proposed route was developed to avoid a sensitive environmental feature. Therefore, we conclude that the proposed route is the preferred alternative.

FWS Variation No. 20

FWS Variation No. 20 would extend from MP 163.4 to 165.4 of the proposed route. A map showing the location of this variation is in appendix B-5. Both routes would be similar in length and impact on resources. However, the proposed route would follow existing right-of-way along its entire length, whereas the variation would only follow about 0.8 mile of existing right-of-way. Therefore, we conclude that the proposed route is the preferred alternative.

3.4 ABOVEGROUND FACILITY ALTERNATIVES

We evaluated the proposed locations of the aboveground facilities for the Project to determine whether environmental impacts would be reduced or mitigated by the use of alternative facility sites. Our evaluation involved inspection of aerial photographs and maps, as well as site visits along the proposed pipeline corridors. The aboveground facilities for the proposed Project include one new compressor station, 29 M&R stations (see section 2.1.2), 21 MLVs, and three pig launchers and three pig receivers.

Because the locations of the M&R stations would be linked to the locations of the associated natural gas receipt and interconnect points, the search for alternatives was constrained to sites located adjacent to the intersection of the proposed Project route and the existing pipeline locations. Similarly, the location of

MLVs would be linked to the location of the proposed Project route and are largely determined by DOT regulations, which specify the maximum distance between sectionalized block valves and require that these facilities be in readily accessible areas. We did not identify any alternative sites for the proposed M&R stations, MLVs, or the pig launcher/receiver facilities that would offer a significant environmental advantage to the proposed sites.

As with the other proposed aboveground facilities, the compressor station location would be constrained to sites near the proposed Project route. Specifically, the proposed compressor station site along the proposed Project route was largely dictated by engineering and economic design standards and the purpose of the Project. Texas Gas initially evaluated compressor station locations along the proposed Greenville Lateral based on pipeline hydraulics, the distance to other pipelines, and the proximity of high-voltage lines, which would be used as a power source. Texas Gas also initially evaluated an alternative compressor station location for the Greenville Lateral at MP 30.0, near Isola, Mississippi. However, as the proposed Project has a different delivery objective from the originally conceived project. When the delivery objective changed, the alternative site at MP 30.0 was eliminated from further consideration. Based on its analysis, Texas Gas concluded that its proposed location for the Kosciusko Compressor Station would be at MP 96.4 on the Greenville Lateral in Attala County, Mississippi.

The proposed site for the Kosciusko Compressor Station would mainly occupy agricultural land, but would be sited next to an existing Texas Eastern compressor station. However, about 0.2 acre of wetland would be permanently impacted by site development. With the exception of the minimal wetland acreage identified on site, we identified no significant advantages to other adjacent parcels near the terminus of the Greenville Lateral. Since the proposed compressor station would be constructed centrally on the land parcel and not near the identified wetland resource, **we recommend that:**

- **Texas Gas evaluate an alternate compressor station configuration at the Kosciusko Compressor Station to avoid impact on the 0.2 acre of delineated wetland. Texas Gas shall file with the Secretary a revised plot plan of the compressor station showing how this wetland has been avoided prior to the end of the comment period of the draft EIS.**

Three alternative types of compressors for the Kosciusko Compressor Station on the Greenville Lateral were considered: electric-motor-driven turbines, natural-gas-fired turbines, and natural-gas-fired reciprocating engines. Texas Gas states that due to the lower reliability of electricity and the higher costs of purchasing electricity to operate this facility, the use of electric-motor-driven turbines was eliminated. We note that there is little significant difference in environmental impact in terms of air emissions between the natural-gas-fired turbines and natural-gas-fired reciprocating engines. However, the natural-gas-fired reciprocating engines have higher control capabilities and lower noise impacts. Therefore, Texas Gas proposes using two Caterpillar 3612 and two Caterpillar 3606 reciprocating engine compressors (10,650 hp total) to generate the proposed compression for the Greenville Lateral. The impacts of using these types of compressors are addressed in section 4.11.1 (Air Quality) and section 4.11.2 (Noise). We concluded that their operation would not have a significant impact on air quality and that there would be no significant adverse noise impacts due to operation. Therefore, we conclude that use of the proposed compressors would be reasonable.