3.0 ALTERNATIVES

A fundamental principle of NEPA is that an agency should consider reasonable alternatives to a proposed action to minimize environmental impacts while ensuring that the project objectives are met. The Agency Staffs collectively evaluated several alternatives to the Phoenix Expansion Project to determine whether they would be reasonable and environmentally preferable to the proposed project; for some alternatives, the analysis was done solely by the FERC staff. The alternatives evaluated include the no action or postponed action alternatives, energy and energy conservation alternatives, system alternatives, route alternatives, route variations, and aboveground facility site alternatives.

The criteria used to evaluate potential alternatives included whether they offer a significant environmental advantage over the proposed project; are technically and/or economically feasible and practical; and meet the project objectives, which are to:

- deliver up to 500 MMcfd of natural gas to customers in the Phoenix, Arizona area;
- add natural gas supply reliability and flexibility to customers in central and southern Arizona; and
- provide an alternative source of competitively priced natural gas to Arizona markets from supplies in the San Juan and Rocky Mountain Basins.

The alternatives analysis is based on information provided by Transwestern; field surveys; aerial reconnaissance; aerial photographs; U.S. Geological Survey (USGS) topographic maps; other publicly available electronic data; agency consultations; and input from intervenors, local communities, and the public. By definition, the alternatives possess unique characteristics when compared to the proposed project; therefore, each alternative did not warrant the same degree of analysis. In general, the analysis advanced from consideration of broad criteria (e.g., determining whether the alternative would meet the objectives of the proposed project) to successively more detailed criteria (e.g., quantifying how many residences would be located within 50 feet of the construction work area) until it was clear that the alternative either was or was not preferable to the proposed project.

The results of the analysis are presented below.

3.1 NO ACTION OR POSTPONED ACTION ALTERNATIVES

The actions triggering this environmental review were Transwestern's applications to the FERC for a Certificate and to the BLM for a Right-of-Way Grant to cross federal lands, including lands managed by the BLM, the FS, and the BOR. This environmental review will also satisfy the BIA's NEPA responsibilities in considering issuance of a Right-of-Way Grant to cross tribal and allotted lands. The FERC and affected land management agencies have three courses of action in processing these applications. They may: (1) grant the approvals with or without conditions; (2) deny the approvals; or (3) postpone action pending further study by denying the application without prejudice.

If the FERC and affected land management agencies deny or postpone Transwestern's applications, the environmental impacts identified in this EIS would not occur or would be delayed. In addition, should the No Action Alternative be selected, the stated objectives of Transwestern's proposal would not be met. Specifically, both the producers in the San Juan and Rocky Mountain supply regions and the customers in the proposed service area would not have access to the 500 MMcfd of capacity of natural gas that Transwestern proposes to provide. If this volume of natural gas is not available, the firm and potential users of the proposed volumes would need to obtain their energy supply from either new or

existing natural gas systems or alternative energy sources. If other, new natural gas facilities are approved and constructed, each project would result in its own set of specific impacts that could be less or greater than those associated with Transwestern's proposal. The use of alternative energy sources and existing natural gas systems is discussed in section 3.2 and section 3.3, respectively.

Furthermore, because central and southern Arizona is currently served by one natural gas supplier, selection of the No Action Alternative would not provide the added supply reliability, flexibility, and access to an alternative source of competitively priced natural gas that would result from construction of the Phoenix Expansion Project. Therefore, consequences of the No Action Alternative could include the potential for natural gas shortages and higher natural gas prices. Higher natural gas prices could potentially adversely influence the regional economy by reducing realized household incomes and business profits (Greenspan, 2003).

In its December 18, 2003 Policy Statement, the ACC encouraged the development of alternative natural gas supplies in Arizona, including the construction of one or more interstate natural gas pipelines (ACC, 2003). According to the ACC, the States of Arizona, New Mexico, and Nevada are expected to have an increase of nearly 50 percent in electric generation by 2009, with the majority of that increase fueled by natural gas. In light of the growing energy demands of central and southern Arizona, the No Action or Postponed Action Alternatives are not considered viable alternatives to the proposed project.

3.2 ENERGY AND ENERGY CONSERVATION ALTERNATIVES

Renewable energy sources, including wind, hydropower, municipal solid wastes, solar, wood, and other biomass, are projected to have some role in meeting the country's future energy needs. The DOE, EIA estimates that in 2006 energy consumption in the Mountain Division (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming) from renewable sources such as hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, wind, ethanol, photovoltaic, and solar thermal sources would have accounted for about 7 percent of the region's total energy consumption compared to estimates of 24 percent from natural gas, 32 percent from petroleum, 33 percent from coal, and 4 percent from nuclear power (DOE, EIA, 2005). The DOE, EIA also predicts that consumption of renewable energy will increase by 1.8 percent a year between 2004 and 2030 (DOE, EIA, 2006). The DOE, EIA predicts that natural gas consumption will increase over the same period by 0.7 percent per year, consumption of petroleum and coal will increase by 1.1 and 1.7 percent per year, respectively, and there will be a 0.4 percent increase in consumption of energy from nuclear power. Because of the high rate of population growth in Arizona, Arizona's actual increase in total natural gas consumption was much higher than these predicted increases, averaging 15 percent annually from 2000 to 2004, with electric power generation accounting for the largest share (72 percent) of the state's natural gas consumption (DOE, EIA, 2004).

The use of renewable energy sources as an alternative to the proposed project could help reduce natural gas use but solar, wind, hydroelectric, and other energy sources such as geothermal or fuel cells are either not physically or commercially available in the market region or have not been developed to the point where they would be viable substitutes for natural gas. The DOE, EIA study, which considers renewable energy as well as other energy sources, supports this conclusion and suggests that renewable energies such as hydroelectric, wind, or solar, while important to the overall mix of available energy sources, will not replace the demand for natural gas over the next 20 years (DOE, EIA, 2006).

The increasing energy needs associated with the growing population of the Phoenix metropolitan area, and regulatory requirements for improved air quality, necessitate that natural gas provided by the proposed project be used, in part, as fuel for electric power generation. Because air pollution is a concern in the project area and natural gas is a cleaner burning fuel, most existing and future electric generating

plants are or will be gas fired. If alternative fuel sources (e.g., fuel oil, coal, nuclear) are used to meet electrical generation and other needs, the increased use of these fuels, which are often delivered by truck, would increase highway traffic. Highway transportation has much poorer safety and reliability records, more associated risks, and greater air quality impacts than transportation via natural gas pipelines. Further, the increased use of these alternative fuels would result in higher emission rates of nitrogen oxides (NO_x) and sulfur dioxide (SO_2), which have the potential to negatively affect air quality. The use of nuclear energy to replace other fuel sources also carries undesirable consequences such as negative public perception of the safety of electric generation through nuclear plants and the disposal of waste byproducts. Lastly, natural gas is more energy efficient. Extraction of the energy content of natural gas can be accomplished more efficiently than from other fuels because the absence of impurities in the fuel makes it clean burning and eliminates the need for energy-consuming auxiliary equipment.

In light of the preceding analysis, renewable fuels do not offer an environmentally preferable and technically feasible alternative to the proposed project.

Energy conservation and increased efficiency in energy production have been a component of the national energy agenda since the Arab Oil Embargo in the mid-1970s. However, while energy conservation can play a critical role in the future of the United States energy sector, growth projections continue to indicate that the demand for energy, and specifically natural gas, will outstrip cost-effective programs designed to stimulate energy conservation. For example, the Oak Ridge National Laboratory analyzed data from the DOE's State Energy Program. The State Energy Program is a federally funded, state-based program administered by the DOE that provides financial and technical assistance for a variety of energy efficiency and renewable energy initiatives. The Oak Ridge National Laboratory determined that the program resulted in an estimated annual energy savings of approximately 41 trillion British thermal units (Btu) (Schweitzer, 2003). To put this amount of energy in context, the United States consumed 98 quadrillion Btu of total energy in 2002, roughly 2,400 times the 41 trillion Btu of energy savings reported by the Oak Ridge National Laboratory.

In summary, existing energy conservation programs cannot fully offset the projected growth in demand for energy, and a corresponding demand for natural gas, in the central and southern Arizona region or nationally. Continued economic growth, particularly growth of electricity demand, will lead to increased natural gas use despite programs to encourage energy conservation. Energy conservation alone would not preclude the need for the Phoenix Expansion Project and thus is not considered to be a viable alternative to the proposed project.

3.3 SYSTEM ALTERNATIVES

System alternatives would make use of other existing, modified, or proposed pipeline systems to meet the stated objectives of the proposed project. A system alternative would make it unnecessary to construct all or part of the proposed project, although some modifications or additions to another existing pipeline system may be required to increase its capacity, or another entirely new system may need to be constructed. Such modifications or additions would result in environmental impact; however, the impact could be less than, similar to, or greater than that associated with construction of the proposed project. The purpose of identifying and evaluating system alternatives is to determine whether potential environmental impacts associated with the construction and operation of the proposed facilities could be avoided or reduced while still allowing the stated basic objectives of the project to be met.

3.3.1 San Juan Lateral Loops

The San Juan Lateral Loops A and B would be installed between looping segments that were constructed as part of the San Juan 2005 Expansion Project, essentially completing the looping along that

system. The San Juan Lateral pipeline system transports natural gas south from the San Juan Basin and the Rocky Mountain Basin; there are no other pipeline systems with available capacity to transport the gas south from these basins to Transwestern's existing mainline system.

Additional compression on the existing San Juan Lateral system could potentially provide the additional capacity that would be realized by construction of Loops A and B. However, looping has the advantage of increasing service reliability by providing a redundant path for flow, thus allowing continued gas flow if the parallel section of pipe is removed from service. Generally, pipeline loops are considered more reliable than compression because pipeline outages are predictable and can be planned. A pipeline also provides reliability because the pipeline can store natural gas, thus mitigating impacts associated with a compression outage or to meet non-uniform demand. Additional compression would also result in increased air emissions that would not occur if Loops A and B were constructed.

In conclusion, the Agency Staffs' analysis did not identify any viable or environmentally preferable alternative to the proposed San Juan Lateral Loops A and B.

3.3.2 Phoenix Lateral

Customers in central and southern Arizona are entirely dependent upon the existing EPNG pipeline system to meet their natural gas needs. Because the EPNG pipeline system currently provides 100 percent of the natural gas to the Phoenix metropolitan area, the only potentially viable existing system alternative to the Phoenix Lateral is the EPNG system.

As demand for natural gas has increased in Arizona, the EPNG system has become congested. In the past 12 months, EPNG has posted on its website 8 warnings of strained operating conditions, 5 notices declaring strained operating conditions, 1 notice declaring a critical operating condition, and 1 notice declaring an emergency critical operating condition on its system. Therefore, expansion of the EPNG system would be needed to accommodate the additional capacity of the Phoenix Expansion Project. This expansion of the EPNG system would likely include significant looping and additional compression, and would result in environmental impacts that could be less than, similar to, or greater than the impacts associated with the Phoenix Expansion Project. Also, expanding the EPNG system, instead of building the proposed project, would not accomplish two of the major objectives of the project, which are to increase the reliability and flexibility of natural gas supplies to central and southern Arizona markets and to provide an alternative source of competitively priced natural gas to Arizona markets.

Based on the above analysis, the Agency Staffs have concluded that there is no existing, viable system alternative to the proposed Phoenix Lateral. In addition, there are no other planned projects that could meet the objectives of the Phoenix Expansion Project and allow for an in-service date of mid-2008. Even if such projects were developed, it is likely that they would require more pipeline and thus result in greater environmental impact than the proposed project because such projects would not have an existing mainline pipeline system in New Mexico and Arizona.

3.4 ROUTE ALTERNATIVES

In evaluating pipeline alternatives, the Agency Staffs considered both route alternatives and route variations. A route alternative deviates from a significant segment of a proposed pipeline alignment for a substantial length and distance. A route variation may also be a number of miles in length but is typically shorter and nearer to the proposed alignment than a major route alternative. Route alternatives are considered in an effort to reduce overall environmental impacts while meeting the goals of a project, whereas route variations are generally identified in an effort to avoid or reduce the impacts associated with localized resource issues. Route alternatives and route variations would each involve construction of

new pipeline instead of their corresponding segments of the proposed alignment but would ultimately serve the same delivery points as the proposed alignment. Route alternatives for the proposed project are discussed below. Route variations are discussed in section 3.5.

3.4.1 San Juan Lateral Loops

The San Juan Lateral Loops already represent the shortest length of pipeline needed to complete the looping of the existing San Juan Lateral and would be adjacent to the existing San Juan Lateral right-of-way for a majority of their lengths. Any route alternative would involve additional pipeline length and construction in areas not previously affected by a pipeline right-of-way, resulting in increased impacts on the environment and landowners and increased costs for both construction and materials. Therefore, no environmentally preferable or economically viable route alternative exists for the proposed San Juan Lateral Loops A and B.

3.4.2 Phoenix Lateral

Eight route alternatives to the proposed Phoenix Lateral were identified by Transwestern during its project planning process; through feedback from the FERC and cooperating agencies; and with input from the public, intervenors, and local government agencies. The following criteria were utilized to consider potential route alternatives to the Phoenix Lateral:

- impact on environmentally sensitive areas;
- the use of existing rights-of-way;
- impact on existing and planned developments;
- impact on public safety; and
- constructability and economic viability.

3.4.2.1 Alternatives Beginning East of Ash Fork

As shown on figure 2.1-2, the Phoenix Lateral would extend south from Transwestern's existing mainline system at Ash Fork in Yavapai County. For the majority of its length, the Phoenix Lateral would be adjacent to existing utility rights-of-way. Potential take-off points for the Phoenix Lateral further east than Ash Fork were considered in an effort to reduce overall project environmental impacts. Based on the east-west orientation of Transwestern's existing mainline pipeline and the location of the Phoenix Expansion Project's major natural gas delivery points to the south and west of the Phoenix metropolitan area, potential take-off points located increasingly further east of Ash Fork would result in increasing lengths of the Phoenix Lateral. The increased length of pipeline would require more land for construction and operation than would the proposed route. In addition, any potential route alternative that would start to the east of Ash Fork would cross substantially more FS land in the Kaibab, Prescott, Coconino, and Tonto National Forests than the 29.4 miles of FS lands that would be crossed by the proposed Phoenix Lateral. Such alternatives would cross at least 70 miles of FS lands along mostly new right-of-way, whereas the corresponding segment of the proposed Phoenix Lateral would be adjacent to the existing EPNG pipeline right-of-way for the majority of its length across the Kaibab and the Prescott National Forests.

Based on USGS topographic maps and physiographic maps of the project area, any route alternative that would begin to the east of Ash Fork would encounter substantially more rugged terrain than the corresponding segment of the proposed route. These alternatives would cross the Mogollon Rim, an escarpment with up to 2,000 feet of relief that marks the southern boundary of the Colorado Plateau physiographic province in northeastern Arizona, and may cross the Black Hills, Sierra Ahcha Mountains, and New River Mountains depending on the actual alignment of the alternative. These physiographic

features would pose significant constructability constraints and increased safety concerns for pipeline workers than the corresponding segment of the Phoenix Lateral.

In conclusion, any route alternative that would begin on Transwestern's existing mainline system at a point further to the east than Ash Fork would increase the overall length of the Phoenix Lateral, would cross a greater length of FS lands, would be collocated with existing rights-of-way to a lesser degree, and would pose significant constructability constraints and increased safety concerns for pipeline workers than the proposed Phoenix Lateral. Therefore, no environmentally preferable or constructible route alternatives were identified that would begin at a point to the east of Ash Fork.

3.4.2.2 Alternatives Beginning West of Ash Fork

One route alternative that would begin at a point to the west of Ash Fork was evaluated. This alternative, referred to as the Kingman Alternative, would begin at Transwestern's existing mainline system approximately 70 miles west of Ash Fork and 20 miles east of the city of Kingman, Arizona (see figure 3.4.2-1). From that point, the Kingman Alternative would follow existing powerline and road rights-of-way in a south and then southeasterly direction to intersect with the proposed Phoenix Lateral at MP 137.0. The Kingman Alternative would be between 130 and 145 miles long depending on how the crossing at Burro Creek Canyon would be accomplished (discussed below) whereas the corresponding segment of the Phoenix Lateral would be 137 miles long. Similar to the Kingman Alternative, the corresponding segment of the Phoenix Lateral would primarily follow existing utility rights-of-way. The Kingman Alternative was considered primarily because it would avoid construction on FS lands. The Kingman Alternative would also avoid construction near Prescott Valley, which has recently experienced significant residential growth, and Black Canyon City, where existing conditions limit the range of route alternatives to a narrow corridor (see sections 3.5.2.2 and 3.5.2.3).

Transwestern conducted a field survey of the Kingman Alternative and determined that the alternative would encounter 40 to 50 miles of very rugged terrain in the Burro Creek Canyon area in La Paz County, Arizona. At the potential crossing point, Burro Creek Canyon is approximately 1,200 feet wide with vertical cliff faces that are at least 400 feet above Burro Creek. A minimum 2,000-foot-long aboveground span or a lengthy reroute would be required to cross the canyon. This area is part of the Burro Creek Recreation Area and includes the Burro Creek Campground. This land is managed by the BLM's Kingman Field Office and is a popular picnicking and camping area visited by recreational vehicle users, campers, backpackers, and day hikers. An aerial span crossing of Burro Creek Canyon would be highly visible to the numerous visitors to the area. In addition, an exposed span would increase the pipeline's vulnerability to third-party damage, which is the major cause of pipeline ruptures.

Although the Kingman Alternative would be similar in length to the corresponding segment of the Phoenix Lateral, because of its take-off point on Transwestern's existing mainline system, it would require additional compression at a minimum of two locations along the route to move the proposed natural gas volumes to the Phoenix area. The additional compression would result in increased land requirements and air emissions compared to the corresponding segment of the Phoenix Lateral. No compression would be required on the Phoenix Lateral as proposed.

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Figure 3.4.2-1 Kingman Alternative

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In conclusion, the Kingman Alternative and the corresponding segment of the Phoenix Lateral would be similar in length and both would primarily follow existing utility rights-of-way. A major advantage of the Kingman Alternative is that it would avoid construction on FS lands and near Prescott Valley and Black Canyon City. However, based on constructability concerns, the potential impacts on the Burro Creek Recreation Area, the increased vulnerability to third-party damage as a result of an aboveground span, and the requirement for additional compression and the associated increased air emissions, the Kingman Alternative is not considered to be an environmentally preferable alternative to the proposed Phoenix Lateral. In addition, although the Kingman Alternative would connect to Transwestern's major natural gas delivery points in the Phoenix area, if the Kingman Alternative were selected, Transwestern would be unable to provide new natural gas supplies to proposed future customers in the Prescott Valley area without construction of about 70 miles of pipeline lateral, which would not be economically feasible or environmentally preferable.

Other route alternatives that would begin on Transwestern's existing mainline system at a point nearer to Ash Fork than the Kingman Alternative would result in an alignment through the heart of the rugged Bradshaw Mountains within the Prescott National Forest. Other major route alternatives that would begin at a point further west of Ash Fork than the Kingman Alternative would increase the overall length of the Phoenix Lateral and would also require additional compression as does the Kingman Alternative. Therefore, no other route alternatives that would begin to the west of the proposed Ash Fork Facility were considered.

3.4.2.3 Agua Fria National Monument Alternative

The AFNM was created in January 2000 by Presidential Proclamation 7263. The AFNM is located in Yavapai County, Arizona and entirely east of Interstate 17. The AFNM comprises approximately 70,900 acres of BLM land and 1,444 acres of scattered private parcels.

The existing EPNG pipeline that the Phoenix Lateral would parallel for a substantial distance between approximate MPs 0.0 to 107.8 was constructed approximately 45 years ago and crosses the AFNM for approximately 10 miles in a location northeast of Black Canyon City. Transwestern's proposed route would deviate from the existing EPNG right-of-way between approximate MPs 68.4 and 86.3 and would thus avoid the AFNM.

The Agency Staffs considered a route alternative that would utilize the existing EPNG right-of-way through the AFNM (the AFNM Alternative) (see figure 3.4.2-2). The main advantage of this alternative would be to avoid the creation of approximately 17.9 miles of new right-of-way. However, status as a National Monument discourages placement of new utilities within the boundaries of the monument unless the new utilities can be entirely constructed and operated within the existing easements. Due to the size of the Phoenix Lateral pipeline (42 inches), the nominal right-of-way needed to install this diameter pipeline (120 feet wide), and the nominal right-of-way needed to operate the pipeline (50 feet wide), it would not be feasible to construct or operate the new pipeline within the existing EPNG right-of-way. Therefore, construction and operation of the AFNM Alternative would result in new impacts on soils, vegetation, visual resources, and other resources in the AFNM, and would diminish the overall natural setting of the AFNM.

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Figure 3.4.2-2 Agua Fria National Monument Alternative

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As discussed in section 1.5.1, in response to the designation of the AFNM and to address future management for the planning area, the BLM issued the Agua Fria National Monument and Bradshaw-Harquahala Draft Resource Management Plan and Draft EIS that will establish a new RMP for the AFNM and the Bradshaw-Harquahala Planning Area when the draft document becomes final. In the document, the BLM evaluated several new and modified utility corridor alternatives to accommodate future utilities through the Black Canyon City area. Based on its analysis, the BLM identified Alternative "E" as the preferred utility corridor alternative. Where the Phoenix Lateral deviates from the EPNG pipeline right-of-way, it would be within Alternative E. Therefore, the BLM has determined that Transwestern's proposed route through the Black Canyon City area would be in conformance with the new RMP when the current draft document becomes final.

Because construction of the AFNM Alternative would result in new impacts on the AFNM and Transwestern's proposed route would conform with the BLM's new utility corridor for the area, the AFNM Alternative was eliminated from further consideration.

3.4.2.4 EPNG New River Alternative

As described in section 3.4.2.3, the Phoenix Lateral would follow the existing EPNG right-of-way for the majority of its length between MPs 0.0 to 107.8, at which point the pipeline would deviate towards the west from the EPNG right-of-way in order to connect to proposed delivery points at existing and proposed customer facilities. During preliminary route analysis, Transwestern initially considered a route alternative that would continue generally south along the existing EPNG right-of-way from MP 107.8 until connecting with the proposed route near MP 193.4. This alternative, referred to as the EPNG New River Alternative (see figure 3.4.2-3), would be approximately 51 miles long whereas the corresponding segment of the Phoenix Lateral would be 85.6 miles long.

Field reconnaissance by Transwestern and an aerial reconnaissance of the EPNG New River Alternative route by the FERC staff on May 10, 2006 identified that a significant amount of development has occurred on both sides of the EPNG right-of-way since the installation of the pipeline approximately 45 years ago. Portions of the EPNG New River Alternative would cross through heavily populated areas with mature infrastructure already in place including homes, light commercial buildings, roads, and buried and aboveground utilities. Some of this development appears to have encroached upon the EPNG right-of-way. Construction of a large-diameter pipeline in these mature, congested areas would cause significant disruption to the local community. Furthermore, for a distance of approximately 3 miles, the EPNG right-of-way crosses the Agua Fria River and active sand and gravel mines, both of which would present problematic construction concerns for installation of a new pipeline.

In addition to the construction constraints discussed above, the EPNG New River Alternative would not allow for customer deliveries to the proposed SWG Sun Valley North, SWG Sun Valley South, APS Redhawk, or the Entegra Gila River or Gila Bend delivery points without the construction of approximately 70 miles of customer laterals. Therefore, even though the EPNG New River Alternative would be shorter than the corresponding segment of the Phoenix Lateral, construction of the associated customer laterals would result in approximately 35 more miles of new pipeline construction.

In conclusion, the EPNG New River Alternative would encounter greater construction constraints, result in greater disruption to the local community, and require the construction of approximately 35 more miles of new pipeline compared to the corresponding segment of the Phoenix Lateral. Therefore, the EPNG New River Alternative is not considered to be an environmentally preferable or economically feasible alternative to the corresponding segment of the Phoenix Lateral.

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Figure 3.4.2-3 EPNG New River Alternative

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3.4.2.5 Buckeye Alternatives

As discussed in section 4.7.3.2, numerous developments and master planned communities have been approved for construction along the proposed route of the Phoenix Lateral through the Buckeye, Arizona area from approximate MPs 134.5 to 159.7. The FERC staff conducted an aerial reconnaissance of the proposed route on January 10, 2006 and a ground reconnaissance of the area on December 14, 2006. Two communities, Sun City Festival and Tartesso, were under construction as of December 14, 2006, and others are expected to be under construction by the time the Phoenix Lateral would be constructed.

The proposed pipeline would cross or abut existing or planned developments for a distance of approximately 14.9 miles through the Buckeye area. The pipeline and the 50-foot-wide permanent right-of-way would be located within the outer edge of an existing 330-foot-wide SRP powerline easement for approximately 13.9 (93 percent) of the 14.9 miles. The proposed route also includes two natural gas delivery points, the SWG Sun Valley North and SWG Sun Valley South Meter Stations, at MPs 137.7 and 148.6, respectively. SWG would provide natural gas to the existing and planned developments in the Buckeye area through these connections to the Phoenix Lateral.

Motions to Intervene and other comments were received from area developers, home builders, and the Town of Buckeye regarding the potential impacts that the proposed project could have on existing and planned developments in the Buckeye area. The primary concern raised by commentors was the risk to public safety posed by the project. Commentors also expressed concern about the environmental impact of the proposed project; the potential for the proposed pipeline to interfere with, damage, and increase costs for utility and street crossings; potential restrictions on the use of the permanent right-of-way; and decreased property values.

The majority of the commentors proposed a route alternative that would avoid most of the existing and planned developments in the Buckeye municipal planning area. Representatives from the FERC, the Town of Buckeye, developers, builders, and Transwestern attended a technical conference in the Town of Buckeye on December 14, 2006 to discuss the project and the commentors' proposed alternative.

The proposed alternative would utilize an established utility corridor that includes an existing CAP canal, existing electric power transmission lines, and the approved APS Palo Verde Hub to TS-5 500 kilovolt (kV) transmission project, which is in final route design. The alternative would diverge by as much as 21 miles to the west of the proposed route and would be located within a 1-mile-wide BLM-designated utility corridor where it would cross BLM-managed land. With the exception of collocation within the existing CAP right-of-way, which would not be allowed due to concerns that the pipeline could damage the integrity of the canal (CAP, 2007), the alternative could potentially be located anywhere within the 1-mile-wide BLM-designated corridor.

Transwestern analyzed two alignments within the established utility corridor in response to the Commission's January 12 and March 1, 2007 environmental information requests. Both alignments deviate from the proposed route at approximate MP 136.3. The first alignment (referred to as the North Buckeye Alternative) crosses to the north side of the CAP canal and parallels the north side of the canal for 27.7 miles at which point it crosses back to the south side of the CAP canal and proceeds to the south and southeast within the existing utility corridor for 19.5 miles. The second alignment (referred to as the South Buckeye Alternative), stays on the south side of the CAP canal and parallels it for 27.4 miles before turning to the south and southeast within the existing utility corridor for 19.5 miles. The North Buckeye Alternative and the South Buckeye Alternative are 47.2 and 46.9 miles long, respectively. Both alternatives rejoin the proposed route at approximate MP 162.7.

Table 3.4.2-1 compares the North and South Buckeye Alternatives to the portion of the proposed route that would be avoided if either of the alternatives is adopted. The North and South Buckeye Alternatives and the corresponding segment of the proposed route are shown on figure 3.4.2-4 and discussed in detail below.

As shown on figure 3.4.2-4, the alignments of the North and South Buckeye Alternatives are similar except for their location on the north and south sides of the CAP canal, respectively. The alternatives would be approximately 19 miles longer and would require approximately 220 more acres of construction right-of-way and 115 more acres of permanent right-of-way compared to the corresponding segment of the proposed route. This additional land disturbance would result in correspondingly greater impacts on soils, vegetation, wildlife, and visual resources when compared to the proposed route. The collocation status of the alternatives and the proposed route would be relatively similar.

The North and South Buckeye Alternatives would each cross 7.5 miles of state lands compared to 5.5 miles of state lands that would be crossed by the corresponding segment of the proposed route. Approximately 26.5 and 24.3 miles of BLM-managed lands would be crossed by the North and South Buckeye Alternatives, respectively. In comparison, the corresponding segment of the proposed route would cross 0.2 mile of BLM-managed lands. The BLM was the lead federal agency in conducting the NEPA review of the APS Palo Verde Hub to TS-5 500 kV transmission project and is a cooperating agency for the EIS for the Phoenix Expansion Project. The BLM examined the North and South Buckeye Alternatives and concluded that the alternatives did not warrant detailed analysis because each would impact approximately 220 more acres than the proposed route and because the detailed analysis of the proposed route did not identify any competing or conflicting environmental resource issues.

As noted above, the corresponding segment of the proposed route would cross or abut existing or planned developments for a distance of approximately 14.9 miles. The proposed route would deviate from the SRP right-of-way at one location within this segment to avoid a flood control structure operated by the Flood Control District of Maricopa County. This deviation would be located along the southern border of a planned portion of the Tartesso development for approximately 1 mile but would cross through another planned development, Desert Creek, for approximately 1 mile. In a Motion to Intervene, Desert Creek stated that the proposed project would disrupt its development plans. As discussed in section 3.6, we have recommended that Transwestern work with the developers of Desert Creek to avoid or reduce impacts on the development if it is constructed. The proposed route would also deviate from the SRP right-of-way from MPs 160.7 to 162.7 to avoid the Palos Verde nuclear power plant; however, this deviation would not affect any existing or planned developments.

According to Transwestern, the North and South Buckeye Alternatives would cross or abut existing or planned developments for a distance of approximately 9.4 and 18.0 miles, respectively. Transwestern estimates that the alternatives would place permanent right-of-way on between 642 and 835 residential lots within these developments. However, we believe that the Buckeye alternatives would likely impact significantly fewer lots. Plans filed by developers indicate that one residential lot would be located within 50 feet of the permanent right-of-way for every approximate 1,000 feet that the Phoenix Lateral would cross the Tartesso and Sun City Festival developments. Based on this distribution, 50, 95, and 79 residential lots would be located within 50 feet of the permanent right-of-way of the North Buckeye Alternative, the South Buckeye Alternative, and the corresponding segment of the proposed route, respectively. Because the proposed pipeline would be located nearly entirely within the right-of-way of the existing SRP electric power transmission system through the Buckeye development corridor, construction of the proposed alignment would not result in the placement of permanent right-of-way on any residential lots with the possible exception of within the Desert Creek development noted above.

TABLE 3.4.2-1

Comparison of the North and South Buckeye Alternatives with the Corresponding Segment of the Proposed Phoenix Lateral Route (Mileposts 136.3 to 162.7)

Factor	North Buckeye Alternative	South Buckeye Alternative	Proposed Route
Phoenix Lateral			
Length (miles)	47.2 [a]	46.9 [a]	27.8 [a]
Land Requirements (acres)			
Construction Right-of-Way	607.3	604.5	385.6
Permanent Right-of-Way	285.6	283.8	168.4
State Lands Crossed (miles)	7.5 [a]	7.5 [a]	5.5 [a]
Bureau of Land Management Lands Crossed (miles)	26.5 [a]	24.3 [a]	0.2 [a]
Existing and Planned Developments Crossed or Abutted (miles) [b]	9.4	18.0	14.9
Residential Lots Within 50 Feet of the Permanent Right-of-Way [c]	50	95	79
Collocation Status (miles)	47.2 [d]	46.9 [d]	22.6 [e]
Additional Compression Required	Yes	Yes	No
CAP Canal Crossings (number)	2	0	0
Customer Laterals [f]			
Length (miles)	13.3 [g]	13.3 [g]	< 0.1 [h]
Land Requirements (acres) [i]			
Construction Right-of-Way	139.2	139.2	0.4
Permanent Right-of-Way	48.4	48.4	0.2
Existing and Planned Developments Crossed or Abutted (miles) [j]	10.1	10.1	0
Residential Lots Within 50 Feet of the Permanent Right-of-Way [c]	53	53	0
Construction Costs (millions) [k]			
Pipeline Facilities (per mile)	$1.99	$1.96	$1.88
Pipeline Facilities (total)	$93.9	$91.9	$52.8
Additional Compression	$30.0	$30.0	$0
Customer Laterals	$5.0	$5.0	<$0.1
Total	$128.9	$126.9	$52.8

TABLE 3.4.2-1 (cont'd)

Comparison of the North and South Buckeye Alternatives with the Corresponding Segment of the Proposed Phoenix Lateral Route (Mileposts 136.3 to 162.7)

Factor	North Buckeye Alternative	South Buckeye Alternative	Proposed Route

[a] Lengths are based on the measured distances, not mileposts.

[b] Based on information filed by Transwestern, the North Buckeye Alternative would cross or abut the following developments: Sun City Festival, Ten Thousand West, Sun Valley/Buckeye 36, FATCO Trust #8436, Sonoran West Properties, and Douglas Ranch El Dorado. The South Buckeye Alternative would cross or abut the following developments: Sun City Festival, Ten Thousand West, Sun Valley/Buckeye 36, Douglas Ranch El Dorado, Belmont, Verma Family LLP, Silver Star Ranch, Survey Section (Individual Lots - two occurrences), West Valley Ranch, and Survey PT (Nancy Zimmerman). The corresponding segment of the proposed route would cross or abut the following developments: Sun City Festival, Sun Valley, Valley Village III, Stardust Tartesso, Desert Creek, Verma II, Maricopa Freeway Center Unit, and Sonoma.

[c] Based on development drawings filed by Stardust-Tartesso W-12, Inc. and Pulte Home Corporation, which indicate that one residential lot would be located within 50 feet of the permanent right-of-way for every approximate 1,000 feet that the pipeline would cross the Tartesso and Sun City Festival developments. The actual number of lots within 50 feet of the permanent right-of-way would depend on final plats and actual alignments of the alternatives.

[d] Within an established utility corridor. The actual alignment of the North and South Buckeye Alternatives would likely require some new right-of-way.

[e] Within the existing Salt River Project Agricultural Improvement and Power District (SRP) right-of-way.

[f] Assumes the customer laterals to connect the Southwest Gas (SWG) Sun Valley North and Sun Valley South meter Stations to the Buckeye alternatives would be installed within the existing SRP right-of-way. SRP filed comments with the Commission on April 5, 2007, indicating that it would not permit the installation of the customer laterals within its easement. Alternative alignments for the customer laterals outside of the SRP right-of-way would be of similar length and result in similar amounts of land disturbance. These laterals would, however, likely result in greater impact on area developments than laterals collocated within the SRP right-of-way because it is unlikely they could be collocated within an existing right-of-way for 100 percent of their lengths.

[g] Based on a 1-mile-long, 6-inch-diameter lateral to connect the SWG Sun Valley North Meter Station to either of the Buckeye alternatives and a 12.3 mile-long, 6-inch-diameter lateral to connect the SWG Sun Valley South Meter Station to either of the Buckeye alternatives.

[h] The SWG Sun Valley North Meter Station would be located immediately adjacent to the Phoenix Lateral right-of-way and would not require a lateral pipeline. The SWG Sun Valley South Meter Station would require a 210-foot-long lateral pipeline from the Phoenix Lateral right-of-way.

[i] Based on a 75-foot-wide construction right-of-way, a 30-foot-wide permanent right-of-way, and temporary extra workspace of 85 percent of the original requirement.

[j] The 12.3-mile-long lateral would cross or abut the Sun City Festival, Sun Valley, and Valley Village III developments.

[k] Based on costs provided by Transwestern.

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Figure 3.4.2-4 Buckeye Alternatives

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Due to the added length of the North and South Buckeye Alternatives, Transwestern would be required to install approximately 15,000 horsepower of additional compression to meet the contractual deliveries of the project. Based on Transwestern's modeling and the availability of electric power, this additional compression would be installed at a new compressor station near MP 180 of the Phoenix Lateral. The site for the compressor station would require additional land near the proposed right-of-way. Operation of the facility would result in increased impacts on air quality and noise. In addition, the new compressor station would create a visual impact.

As discussed above, there are two natural gas delivery points, the SWG Sun Valley North and SWG Sun Valley South Meter Stations, at MPs 137.7 and 148.6, respectively, of the proposed route. The central location of these meter stations within the Buckeye development corridor would minimize the overall length of pipeline that would be needed to serve the developments in the Buckeye area. Specifically, the SWG Sun Valley North Meter Station would be located immediately adjacent to the Phoenix Lateral right-of-way and would not require a lateral pipeline. The SWG Sun Valley South Meter Station would require a 210-foot-long lateral pipeline from the Phoenix Lateral right-of-way. In comparison, Transwestern would need to construct lateral pipelines to deliver gas to the Buckeye area from the North or South Buckeye Alternative. The SWG Sun Valley North and SWG Sun Valley South Meter Stations would be connected to the North and South Buckeye Alternatives via 6-inch-diameter laterals of minimum lengths of approximately 1.0 and 12.3 miles, respectively. Construction of the laterals would require at least 139 more acres of construction right-of-way and 48 more acres of permanent right-of-way compared to the 210-foot-long lateral that would be constructed to the SWG Sun Valley South Meter Station in conjunction with the proposed route. If the laterals were collocated within the SRP right-of-way for 100 percent of their lengths, they would cross or abut existing and planned developments for approximately 10.1 miles and an estimated 53 residential lots would be located within 50 feet of the permanent right-of-way of the laterals. Alternative alignments for the customer laterals outside of the SRP right-of-way would likely result in greater impact on area developments than laterals collocated within the SRP right-of-way because it is unlikely they could be collocated within an existing right-of-way for 100 percent of their lengths

Transwestern estimates that the cost to construct the North and South Buckeye Alternatives and the corresponding segment of the proposed route would be approximately $1.99 million, $1.96 million, and $1.88 million per mile, respectively. The cost per mile for the North Buckeye Alternative would be greater than for the South Buckeye Alternative due to the more rugged terrain along the north side of the CAP canal and the two crossings of the CAP canal. Based on these estimates, the cost to construct the pipeline facilities for the North and South Buckeye Alternatives would be approximately $41.1 and $39.1 million more, respectively, than the cost for the corresponding segment of the proposed route. Transwestern estimates that the cost to construct the laterals and the compressor station associated with the Buckeye alternatives would be approximately $5 million and $30 million, respectively. Therefore, the total cost to construct the Buckeye alternatives would be between $126.9 million and $128.9 million, or $74.1 million to $76.1 million more than the $52.8 million estimated to construct the corresponding segment of the proposed route. Transwestern has stated that these additional capital costs render both of the Buckeye alternatives economically unacceptable.

The primary concern raised by commentors in the Buckeye area is the safety risk posed by the proposed project. Sections 2.6 and 4.11 discuss general pipeline safety and describe the equipment and procedures that Transwestern would install and implement to ensure the safe operation of the Phoenix Lateral. Some of the specific measures that would address the safety concerns raised by commentors include:

- The pipeline and aboveground facilities associated with the Phoenix Expansion Project would be designed, constructed, operated, and maintained in accordance with the DOT

Minimum Federal Safety Standards in Title 49 CFR Part 192. These regulations are intended to protect the public and to prevent natural gas facility accidents and failures.

- The safety standards become more stringent as the human population density in the vicinity of the pipeline increases. For example, the pipe grade and wall thickness of the proposed pipeline have been designed in anticipation of development in the Buckeye area.

- External corrosion control measures to be used on the Phoenix Expansion Project would include a protective coating on the exterior of the pipe and use of a cathodic protection system. Transwestern has committed to monitoring for the occurrence of stray electrical currents and the effectiveness of the cathodic protection system. Transwestern would also conduct field readings to determine whether nearby metallic objects are being affected by the cathodic protection system and would implement mitigation measures such as adjusting the cathodic protection system or installing an electrical interference bond between the pipeline and nearby structures.

- To reduce the potential for future utility crossings or other excavation work to damage the pipeline, the pipeline would be installed at least 40 inches below the ground surface rather than the minimum of 36 inches required by DOT regulations. The pipeline would be clearly marked at line-of-sight intervals, roads, railroads, and other key points, and approximately every 1,000 feet in open terrain to alert the public to the presence of the pipeline. Transwestern would participate in the Arizona "One-Call" service, which utility contractors must use before commencing excavation work. The "One-Call" service would automatically notify Transwestern and other utility operators that construction is proposed in proximity to their utilities. The "One-Call" system would send a technician to locate all utilities, including Transwestern's pipeline, in proximity to the proposed excavation. Transwestern would send a trained operations lineman to assist in locating the pipeline and to discuss appropriate safety measures to be implemented by the utility installation contractor. Transwestern's field personnel would observe construction activities to ensure compliance with the required safety measures.

Stardust-Tartesso W-12, Inc. and Pulte Home Corporation filed a report with the Commission that identified third-party damage and a subsequent explosion as the greatest risk posed by the proposed project. To mitigate these concerns if an alternative route to avoid the Buckeye area is not selected, the report recommended that the Phoenix Lateral be installed at a depth of 14 to 20 feet and reinforced concrete walls be constructed along both sides of the pipeline route through the Buckeye area. As discussed in section 4.11, the available pipeline accident data show that by designing, constructing, and operating the Phoenix Expansion Project in accordance with applicable DOT regulations, including the safety measures outlined above, the proposed project would not pose a significant safety risk to the nearby public. Therefore, the mitigation measures recommended in the report would not significantly improve public safety.

As proposed, the Phoenix Lateral would generally be installed 15 feet inside the outer edge of the existing SRP right-of-way through the Buckeye development area. SRP is the operator of jointly owned high voltage lines supported on parallel electric transmission towers. Comments were received suggesting that locating the pipeline between the towers would improve public safety by providing a greater distance between the pipeline and homes located near the SRP right-of-way. However, standard industry practice has not permitted any facilities to be constructed between transmission lines because such close collocation would impact normal operating and maintenance procedures for both utilities and could affect the ability of Transwestern and SRP to respond to an emergency situation. Therefore,

locating the Phoenix Lateral between the powerline towers would not improve overall public safety and energy reliability when compared to the proposed alignment.

In summary, construction of either the North or South Buckeye Alternative and associated laterals would require approximately 32.5 more miles of pipeline, 358 more acres of construction right-of-way, and 164 more acres of permanent right-of-way compared to the corresponding segment of the proposed route. Either alternative would also require the construction of a new compressor station, whereas the proposed project does not include any new compression requirements. Construction and operation of the additional pipeline and compressor facilities would result in correspondingly greater impacts on soils, vegetation, wildlife, air quality, noise, and visual resources when compared to the proposed route. Selection of either alternative would also impact 24 to 26 more miles of BLM-managed lands compared to the proposed route, and the BLM has determined that further analysis of either alternative is not warranted. Furthermore, the cost of either alternative, including the required laterals and compressor station, would be approximately $75 million more than the proposed alignment; Transwestern has stated that these additional costs are economically unacceptable.

Either of the Buckeye alternatives could result in direct impact on residential lots depending on final plats and the actual alignment of the alternative. Because the proposed pipeline would be located nearly entirely within the right-of-way of the existing SRP electric power transmission system through the Buckeye development corridor, construction of the proposed alignment would not result in the placement of permanent right-of-way on any residential lots with the possible exception of within the Desert Creek development. We have recommended that Transwestern work with Desert Creek to avoid or reduce impacts on the development if it is constructed.

To address concerns raised by developers and the Town of Buckeye, the pipeline would be installed below existing utilities that are within approximately 7 feet of the land surface. Transwestern has also committed to working with developers and the Town of Buckeye to incorporate planned utility and street crossings into the final pipeline design at Transwestern's expense. Future utility crossings that are currently unplanned could be more costly but would not be prevented due to the presence of the pipeline. Other construction-related impacts such as increased traffic, noise, and dust, would be limited to the period of construction. To minimize these impacts, Transwestern would abide by local ordinances governing construction times and would implement the measures described in its Dust Control Plan (see section 4.10.1.3 and Appendix M). After construction, the permanent right-of-way could be utilized as described in section 4.7.1, although no buildings or other permanent structures could be constructed in the permanent right-of-way. The impact of this encumbrance would be the subject of negotiations between the affected landowners and Transwestern, as discussed in section 4.7.2. The effect that a pipeline easement may have on property values is also a damage-related issue that would be negotiated between the landowner and Transwestern during the easement acquisition process, as discussed in section 4.8.5. Lastly, as discussed in section 4.11, by constructing and operating the proposed alignment in accordance with applicable regulations and Transwestern's additional proposed safety measures, the nearby public would not face a significant increased safety risk.

In conclusion, based on the analysis presented above, we have determined that neither the North nor South Buckeye Alternative represent an environmentally preferable or economically viable alternative to the proposed route through the Buckeye area.

3.4.2.6 Casa Grande Alternatives

The proposed alignment for the Phoenix Lateral would abut the south side of the existing EPNG pipeline right-of-way to the east and west of the City of Casa Grande, Arizona, but would deviate from the EPNG right-of-way from MPs 238.5 to 244.3 through the City. At MP 238.5, the Phoenix Lateral

would turn south and then east for approximately 600 feet to avoid an existing EPNG surface facility. At MP 238.6, the Phoenix Lateral would turn south to parallel the east side of Burris Road for approximately 5,000 feet at which point it would turn east and enter the North Santa Cruz Wash and a proposed municipal utility corridor referred to as the Greenbelt Utility Corridor. The pipeline would generally follow the North Santa Cruz Wash in an easterly direction for approximately 26,700 feet to Henness Road where it would turn north for approximately 4,100 feet to rejoin the EPNG right-of-way near MP 244.3.[1] The segment of the route through the North Santa Cruz Wash would not be adjacent to or within an existing pipeline or powerline right-of-way or fee property. The proposed alignment through the City of Casa Grande, referred to as "The Wash," would cross a municipal golf course and an area dedicated to the City as a nature reserve (see section 4.7.5), and would be located near existing and planned developments (see section 4.7.3). The proposed project in the City of Casa Grande would also include the SRP Desert Basin Lateral, which would extend south from MP 239.1 of the Phoenix Lateral along Burris Road for approximately 4,000 feet to the proposed SRP Desert Basin Meter Station at the existing SRP Desert Basin Power Plant. The segment of the Phoenix Lateral parallel to Burris Road and the SRP Desert Basin Lateral would parallel other EPNG pipelines that serve the SRP Desert Basin Power Plant. The proposed routes of the Phoenix Lateral and the SRP Desert Basin Lateral are shown on figure 3.4.2-5.

The City of Casa Grande has expressed concern regarding the impact that the proposed alignment would have on existing and planned developments near the route, the potential for the pipeline to be damaged by streambed scour if installed in The Wash, the potential for the pipeline to interfere with future plans to install municipal utilities or recreational trails within the Greenbelt Utility Corridor, and the potential impact of the proposed pipeline on street crossings. On March 6, 2006, the City of Casa Grande adopted a resolution encouraging the Commission to reject The Wash alignment and instead approve one of two alternatives that would place the Phoenix Lateral within existing pipeline or powerline right-of-way or fee property. The FERC staff attended an informational open house in Casa Grande on January 12, 2006; held a public scoping meeting in Casa Grande on February 28, 2006; conducted an aerial reconnaissance of the Casa Grande area on January 10 and May 10, 2006; and attended meetings with the City of Casa Grande and other stakeholders on January 12, June 28, and December 13, 2006, to discuss the proposed project and alternatives.

Other comments were received suggesting that the Phoenix Lateral be installed between the two EPNG pipelines. Because such an alignment would pose a significantly greater safety and reliability risk than an alignment outside of the existing pipelines, it was not considered in our analysis.

The alternatives considered to the proposed route through the Wash, referred to as the Casa Grande EPNG Collocation Alternative (CGEPNG Alternative) and the SRP Alternative, are discussed below and shown on figure 3.4.2-5.

[1] Transwestern recently filed a route variation between MPs 244.0 and 244.3 that was developed based on consultation with the City of Casa Grande and the landowner, the State of Arizona. The variation would avoid a diagonal crossing of land owned by the State of Arizona. This variation has been incorporated into the proposed route in this alternatives analysis and in the maps in Appendix B (sheet 82). The variation was filed too late to be included in the analysis of the proposed route in the remaining portions of the draft EIS and will be addressed as part of the proposed route in the final EIS.

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Figure 3.4.2-5 SRP and Casa Grande EPNG Collocation Alternatives

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Figure 3.4.2-5 SRP and Casa Grande EPNG Collocation Alternatives

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Figure 3.4.2-5 SRP and Casa Grande EPNG Collocation Alternatives

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Figure 3.4.2-5 SRP and Casa Grande EPNG Collocation Alternatives

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Casa Grande EPNG Collocation Alternative

Rather than diverging from the existing EPNG right-of-way at MP 238.5 and utilizing The Wash alignment as proposed, the Phoenix Lateral segment of the CGEPNG Alternative would continue easterly from MP 238.5 and be collocated within existing EPNG right-of-way or fee property for its entire length to MP 244.3. Through this segment, the EPNG right-of-way contains a 36-inch-diameter natural gas pipeline that was installed approximately 38 years ago and a 30-inch-diameter natural gas pipeline that was installed approximately 21 years ago. Based on information filed by Transwestern, these two EPNG pipelines are 75 feet apart. The total width of the EPNG right-of-way or fee property between MPs 238.5 and 244.3 varies from approximately 140 feet to 300 feet, but is approximately 150 feet wide for a majority of the length.

Where the Phoenix Lateral segment of the CGEPNG Alternative deviates from the proposed route at MP 238.5, it would cross from the south side to the north side of the EPNG right-of-way and then extend east parallel to and 25 feet north of the northernmost EPNG pipeline for approximately 11,800 feet to a point just east of Pinal Avenue. At that location, it would cross the two EPNG pipelines and continue east parallel to and 25 feet south of the southernmost EPNG pipeline to the end of the alternative near MP 244.3. In addition to crossing Pinal Avenue, the Phoenix Lateral segment of the CGEPNG Alternative would cross Trekell Road, Peart Road, and other existing or planned roads.

As shown on figure 3.4.2-5, the SRP Desert Basin Lateral segment of the CGEPNG Alternative would turn south from the Phoenix Lateral segment of the CGEPNG Alternative at approximate MP 238.6 and follow the same route as the proposed Phoenix Lateral parallel to the east side of Burris Road between MPs 238.6 and 239.1. The alternative would then continue south along the originally proposed route of the SRP Desert Basin Lateral to the proposed SRP Desert Basin Meter Station at the existing SRP Desert Basin Power Plant. As discussed above, between MPs 238.6 and the SRP Desert Basin Power Plant, the SRP Desert Basin Lateral would parallel other EPNG pipelines that serve the plant.

The CGEPNG Alternative and the corresponding segment of the proposed route are compared on table 3.4.2-2 and discussed in detail below.

The CGEPNG Alternative would require 9,316 feet less of 36-inch-diameter pipeline for the Phoenix Lateral but 5,281 feet more of 16-inch-diameter pipeline for the SRP Desert Basin Lateral for a total of 4,035 feet less pipeline than the corresponding segment of the proposed route. Due to the shorter length, the CGEPNG Alternative would require approximately 12.3 fewer acres of construction right-of-way and 4.7 fewer acres of permanent right-of-way compared to the corresponding segment of the proposed route. In addition to less land disturbance, the permanent right-of-way of the Phoenix Lateral in the CGEPNG Alternative would completely overlap existing EPNG right-of-way or fee property, whereas the Phoenix Lateral would currently require all new right-of-way if constructed in The Wash. For the proposed route and the CGEPNG Alternative, the SRP Desert Basin Lateral would be located in new right-of-way parallel to Burris Road and other existing EPNG natural gas pipelines for its entire length, but the proposed alignment of the SRP Desert Basin Lateral would be shorter.

Regarding land ownership, the CGEPNG Alternative would cross 9,322 more feet of private land than the proposed route. However, 17,083 feet (64 percent) of the private land that would be crossed by the CGEPNG Alternative is owned in fee by EPNG. The CGEPNG Alternative would cross nearly 3.4 less miles of land owned by the City of Casa Grande but approximately 0.9 more mile of State of Arizona land than the proposed route.

TABLE 3.4.2-2

Comparison of the Casa Grande EPNG Collocation Alternative with the Corresponding Segment of the Proposed Phoenix Lateral Route (Mileposts 238.5 to 244.3)

Factor	Casa Grande EPNG Collocation Alternative	Proposed Route
Length (feet) [a]		
Phoenix Lateral	27,149	36,465
Salt River Project Agricultural Improvement and Power District (SRP) Desert Basin Lateral	9,348	4,067
Total Length	36,497	40,532
Land Requirements (acres)		
Construction Right-of-Way	83.8	96.1
Permanent Right-of-Way	41.9	46.6
Collocation Status of Phoenix Lateral (feet)	27,149	0 [b]
Length of State Land Crossed (feet)	10,003	5,311
Length of City Land Crossed (feet)	0	18,049
Length of EPNG Fee Property Crossed (feet)	17,083	0
Length of Other Private Land (feet)	9,411	17,172
Length of Golf Course Crossed (feet)	0	2,650 [c]
Length of Nature Reserve Crossed (feet)	0	2,900 [d]
Number of Existing Residences within 50 feet of the Construction Work Area[e]	39	0
Number of Planned Residences within 50 feet of the Construction Work Area [e, f]	82	46
Number of Existing/Planned Road Crossings [e]	10	8
Number of Crossings of Existing Pipelines	5	3

[a] Lengths were provided by Transwestern and are based on the measured distances, not mileposts.

[b] The collocation status of the proposed route within the City of Casa Grande's proposed Greenbelt Utility Corridor has not been determined.

[c] City of Casa Grande, Dave White Park Golf Course.

[d] Land dedicated by a landowner to the City of Casa Grande as a nature reserve.

[e] Based on information included in Transwestern's March 16, 2007 response to the Commission's March 1, 2007 environmental information request and information filed by the City of Casa Grande regarding the planned Vista Canyons development near MP 238.5. No existing or planned residences would be within 50 feet of the construction work area for the SRP Desert Basin Lateral.

[f] Assumes a 20-foot setback of residences from the lot line.

Along the CPENG Alternative, the Phoenix Lateral would be located entirely within previously disturbed pipeline right-of-way while the proposed alignment of the Phoenix Lateral would cross Casa Grande's planned location for the Greenbelt Utility Corridor, the municipal golf course, and an area dedicated to the City as a nature reserve. However, Transwestern has agreed to substantial mitigation or compensation for impacts on these areas, which we believe would adequately reduce or offset the land use impacts on the proposed route.

The data presented in table 3.4.2-2 describe the proximity of existing and planned residences to the CGEPNG Alternative compared to the proposed route. In general, residential development has occurred or is planned to occur in the near future adjacent to the existing EPNG right-of-way along most of the CGEPNG Alternative, whereas the proposed alignment would closely follow the North Santa Cruz Wash for a substantial length, providing a natural buffer between the pipeline and many of the existing and planned developments along The Wash.

There would be 39 existing residences within 50 feet of the construction work area for the CGEPNG Alternative whereas no existing residences would be located within 50 feet of the construction work area for the proposed route. Therefore, construction-related impacts would be greater on existing residences along the CGEPNG Alternative compared to those along the proposed route.

Because the project area is currently being developed, the number of residences that would be within 50 feet of the construction work area for either alignment is expected to increase rapidly. Therefore, we considered the number of planned residences in our evaluation as well as the potential for the project to impact the ability to develop certain lots. Assuming an average setback of 20 feet between planned residences and lot lines, an estimated 82 planned residences would be located within 50 feet of the construction work area for the CGEPNG Alternative compared to an estimated 46 planned residences within 50 feet of the construction work area for the proposed route.

Because the CGEPNG Alternative would place Transwestern's right-of-way entirely within the existing EPNG right-of-way, the CGEPNG Alternative would not cross any lots. Information provided by Transwestern and the City of Casa Grande indicates that the permanent right-of-way for the proposed route would cross approximately four lots in the Vista Canyons planned development and six or seven lots within the planned Mission Park development. Neither of these developments were under construction as of January 2007. Transwestern has stated that the easement across the affected lots in the Mission Park development has been negotiated with the landowner and that it would acquire the affected lots, thereby mitigating the impacts. Further, we are recommending that Transwestern work with EPNG to develop a minor route variation of the proposed alignment that would avoid placing permanent right-of-way on any lots within the Vista Canyons development (see section 3.5.2.5).

With the CGEPNG Alternative, the Phoenix Lateral would be located entirely within EPNG's existing right-of-way and 25 feet outside of EPNG's two active high pressure natural gas pipelines. Whereas pipeline companies often install new pipeline in close proximity to their own existing pipelines, the installation of high pressure natural gas pipelines that are owned and operated by different companies within the same right-of-way is not a common industry practice, primarily due to increased safety and reliability concerns during construction and for maintenance in the future. Third-party damage is the greatest concern to pipeline companies in congested corridors. Placing pipelines in too close of proximity to each other could also affect the ability of either company to expand its system to meet increasing demand in an area.

Transwestern has proposed a nominal 100-foot-wide construction right-of-way for the 36-inch-diameter segment of the Phoenix Lateral, which would ensure a safe work area given the size of the pipeline and the heavy equipment that would be utilized in construction. Due to the width of the EPNG right-of-way and the presence of existing and planned development adjacent to the EPNG right-of-way along the CGEPNG Alternative, the Phoenix Lateral would be constructed in a corridor that ranges from approximately 50 to 60 feet wide for a distance of approximately 17,600 feet. Due to these space constraints, Transwestern would be required to work over at least one of the existing EPNG pipelines with heavy equipment in some areas. Such a practice would pose an increased safety risk due to the potential to damage the existing pipelines either by inducing excess stress or coming in direct contact with the pipelines. Depending on soil conditions and trench stability, excavating too close to the existing pipelines could cause them to shift, which would also threaten their integrity. Adoption of the CGEPNG Alternative would also require two additional crossings of the EPNG pipelines by the Phoenix Lateral compared to the proposed route. Crossovers pose additional construction safety concerns.

Along the proposed route, one of the concerns raised by the City of Casa Grande is the potential for streambed scour in the North Santa Cruz Wash to damage the Phoenix Lateral. In its March 16, 2007 response to the FERC staff's March 1, 2007 environmental information request, Transwestern stated that

the pipeline would be installed within the physical boundaries of the actual wash at three locations for a total of 0.35 mile. As discussed in section 4.1.3.3, Transwestern would contract with a local geotechnical firm to determine the scour depth in these areas and would install the pipeline with sufficient cover and negative buoyancy to avoid any potential scour impacts.

While certain construction techniques such as stove-pipe installation could reduce the potential for a construction-related incident to occur, the risk of such an incident would remain greater during construction of the CGEPNG Alternative. Construction of the proposed route would not require Transwestern to work over EPNG's existing active high pressure natural gas pipelines and would require two fewer crossings of EPNG's existing pipelines.

In addition to the above construction-related safety concerns, close collocation of the EPNG and Transwestern pipelines would present increased natural gas supply reliability concerns. Specifically, EPNG expressed concerns about the following:

- Close collocation of the EPNG and Transwestern pipelines would significantly limit the amount of workspace available for future routine maintenance activities. EPNG noted that the decreased amount of workspace that would be available in the right-of-way if the CGEPNG Alternative is constructed could result in extended periods of service outages to EPNG customers by limiting the ability to offset segments of pipeline that require replacement or service. EPNG could also be required to reduce the operating pressure of its pipelines during construction, which could impact customer deliveries.

- It is likely that EPNG will be required to replace segments of its existing pipelines in Casa Grande in the near future to meet DOT class location changes as a result of development near the right-of-way, and that placement of the Phoenix Lateral in close proximity to the EPNG pipelines would likely cause EPNG to work over active, high pressure pipelines during the replacement activity.

- The cathodic protection systems that would be impressed on all of the pipelines could interfere with each other, thereby compromising the effectiveness of the systems.

The FERC staff agrees that these are valid concerns.

In summary, the primary advantage of the CGEPNG Alternative is that it would not require any new permanent right-of-way. The primary disadvantages of the CGEPNG Alternative relative to the proposed route are in the area of construction safety and reliability and impact on existing residences. Because of the space constraints caused by the two existing active EPNG pipelines and development immediately adjacent to the existing EPNG right-of-way, the CGEPNG Alternative would pose construction challenges that would increase the risk of a construction-related incident. An operational incident on either the EPNG or Transwestern system could also threaten the reliability of the other system.

While the CGEPNG Alternative offers some advantages over the corresponding segment of the proposed route, the advantages are outweighed by the construction safety and reliability concerns that would be associated with the alternative. In addition, the proposed route would result in reduced construction-related impacts on existing residences. Therefore, based on the above analysis, the FERC staff has concluded that the CGEPNG Alternative is not preferable to the proposed alignment through The Wash.

SRP Alternative

The SRP Alternative would deviate from the EPNG pipeline right-of-way at approximate MP 229.0 and follow SRP's approved Pinal West-to-Southeast Valley/Browning (PW-SEV/BRG) powerline right-of-way south, east, and then north to MP 255.1 (see figure 3.4.2-5). As shown on figure 3.4.2-5 and discussed above, the proposed project includes the SRP Desert Basin Lateral that would deliver gas to the proposed SRP Desert Basin Meter Station at the existing SRP Desert Basin Power Plant. Within this milepost range, the proposed project would include an additional natural gas delivery point, the APS Sundance Meter Station. The proposed APS Sundance Meter Station would be adjacent to MP 250.6 of the Phoenix Lateral and thus would require only 158 feet of lateral pipeline (the APS Sundance Lateral). The APS Sundance Meter Station delivery point is shown on figure 3.4.2-5.

The SRP Alternative would add approximately 11.5 miles to the length of the Phoenix Lateral. To deliver gas from the SRP Alternative to the SRP Desert Basin and APS Sundance Meter Stations would add at least 4.1 miles and 4.6 miles to the lengths of the SRP Desert Basin Lateral and APS Sundance Lateral, respectively. Due to the additional length of pipe, the SRP Alternative and associated laterals would require approximately 219 more acres of construction right-of-way (excluding temporary extra workspace) and 123 more acres of permanent right-of-way compared to the corresponding segment of the proposed route and customer laterals. This additional land disturbance would result in correspondingly greater impacts on soils, vegetation, and wildlife when compared to the proposed route.

The Phoenix Lateral could potentially be collocated within the approved SRP easement for a majority of its length. However, Transwestern stated that, based on the terrain along the approved SRP route, there would be extensive lengths where the pipeline would have to deviate out of the approved powerline corridor. In addition, it is unlikely that the SRP Desert Basin Lateral and the APS Sundance Lateral could be collocated within other existing utility easements for their entire length. Therefore, whereas the SRP Alternative would avoid or reduce impacts on the existing or planned developments along the corresponding segment of The Wash alignment, construction of the SRP Alternative, including the Phoenix Lateral, SRP Desert Basin Lateral, and APS Sundance Lateral, would likely result in similar impacts on other existing or planned developments.

Lastly, Transwestern stated that construction of the additional 20.2 miles of pipeline associated with the SRP Alternative would add approximately $50 million in capital cost to the project and that this additional cost would clearly terminate the project.

In conclusion, based on the analysis presented above, we have determined that the SRP Alternative is not an environmentally preferable or economically viable alternative to the proposed route through The Wash or greater Pinal County (see section 3.5.2.5).

3.4.3 Customer Laterals

All of the proposed customer laterals represent the shortest distance between the Phoenix Lateral and the meter stations that would be installed within or adjacent to the existing customer facilities that Transwestern would serve. Therefore, any route alternative to the proposed customer laterals would require a longer pipeline to connect the Phoenix Lateral to the customer facilities. The longer pipelines would result in increased land requirements and environmental impacts compared to the proposed routes. In addition, the longest of the proposed customer laterals, the SRP Desert Basin Lateral (approximately 4,000 feet long), would parallel existing pipeline and road rights-of-way for its entire length and the next longest customer lateral, the APS Redhawk Lateral (approximately 2,000 feet long), would cross disturbed land for its entire length. Based on the location of the Phoenix Lateral and customer facilities, route alternatives to either of these customer laterals would likely require more new right-of-way than the proposed routes or may not be located on disturbed lands.

A route alternative to the SWG Sun Valley North and SWG Sun Valley South Meter Stations is evaluated in conjunction with the analysis of the North and South Buckeye Alternatives (see section 3.4.2.5). The analysis of the Casa Grande Alternatives includes an evaluation of route alternatives to the SRP Desert Basin and APS Sundance Meter Stations (see section 3.4.2.6).

Based on the above analyses, we did not identify any environmentally preferable route alternatives to the proposed customer laterals.

3.5 ROUTE VARIATIONS

Route variations differ from system alternatives or route alternatives in that they are identified to reduce impact on specific localized resource issues such as residences, cultural resources sites, biological resources, and areas of steep terrain. Additionally, route variations may be examined to avoid conflicts with other projects or in response to scoping comments. The route variations evaluated for the proposed project are described below.

3.5.1 San Juan Lateral Loops

The San Juan Lateral Loops already represent the shortest length of pipeline needed to complete the looping of the San Juan Lateral and would be adjacent to the existing San Juan Lateral right-of-way for a majority of their lengths. No local resource issues that would necessitate a route variation were identified on the proposed San Juan Lateral Loops.

3.5.2 Phoenix Lateral

3.5.2.1 Haystack Estates Variation

The Phoenix Lateral would cross the Haystack Estates subdivision in the Chino Valley area between approximate MPs 30.8 and 31.9. The 50-foot-wide permanent right-of-way of the Phoenix Lateral would abut the existing EPNG right-of-way across the subdivision. Based on information provided in Transwestern's application and on aerial reconnaissances of the Haystack Estates subdivision by the FERC staff on January 11 and May 10, 2006, the subdivision comprises residences situated on large lots with no encroachment on the EPNG right-of-way. Survey information provided by Transwestern indicates that one residence would be located within the proposed construction right-of-way and approximately 77 feet from the pipeline centerline.

In scoping comments and Motions to Intervene, residents of Haystack Estates expressed concern regarding the impacts that could occur if the Phoenix Lateral was constructed across the subdivision as proposed. These concerns included potential construction-related damage to the existing EPNG pipeline, potential damage to wells, reduced access to homes during construction, general safety of residents during construction, dust control, post-construction restoration, and diminished property values.

A route variation that would avoid the subdivision was considered in response to these concerns. The Haystack Estates Variation would leave the EPNG right-of-way at approximate MP 30.2, where it would turn southwest and continue to a section corner, and then turn south to parallel the section line to the southeast corner of that section. From there, the variation would turn southeast to rejoin the proposed route at approximate MP 32.7. The Haystack Estates Variation would be 0.4 mile longer than the proposed route and would require 2.8 miles of new right-of-way. Collocation of utilities is preferred, where possible, to reduce the overall environmental impacts of pipeline construction.

To address residents' concerns, Transwestern would implement special construction methods to reduce impacts on residential areas (see section 4.7.3.1), including restoration, and would also utilize special measures when constructing near existing pipelines and other utilities (see section 2.3.2).

Transwestern would take steps to protect water supply wells and to ensure continued water supply to residents (see section 4.3.1.4), and would implement the measures described in its Dust Control Plan (see Appendix M) to reduce construction-related dust. Transwestern would also implement a Landowner Complaint Resolution Procedure to address problems that may arise during construction (see section 4.7.3.1). After construction, the residents would be able to utilize the permanent right-of-way as described in section 4.7.1.1, although no buildings or other permanent structures could be constructed in the right-of-way. The impact of this encumbrance and potential property devaluation would be a subject of negotiation between the affected landowners and Transwestern, as discussed in sections 4.7.2 and 4.8.5, respectively. Lastly, sections 2.6 and 4.11 discuss general pipeline safety and describe the equipment and procedures that Transwestern would install and implement to ensure the safe operation of the Phoenix Lateral.

Based on the increased environmental impacts that would be associated with creating 2.8 miles of new right-of-way and considering the measures that Transwestern would implement to reduce construction-related impacts and ensure the safe operation of the pipeline, the Haystack Estates Variation is not considered to be environmentally preferable to the proposed route.

3.5.2.2 Prescott Valley Variation

Areas surrounding the Town of Prescott Valley have recently experienced significant residential growth, including some areas that have been built up to the very limits of the EPNG right-of-way. Due to the degree of development next to the EPNG right-of-way, Transwestern originally proposed to deviate from the EPNG right-of-way at then-designated MP 37.0 and construct the pipeline on generally open land along the perimeter of several dense residential developments before returning to the EPNG right-of-way at approximate MP 48.7. This original route, now referred to as the Prescott Valley Variation, was sited in close coordination with and agreement of the landowners of the properties on which the pipeline would have been located.

During the scoping process, numerous comments were received from residents objecting to the Prescott Valley Variation and requesting that an alternative route be identified to reduce impacts on residents. The FERC staff conducted aerial reconnaissances of the Prescott Valley area on January 11 and May 10, 2006 and met with officials from the Town of Prescott Valley and Transwestern on May 10, 2006 to discuss alternatives in the Prescott Valley area. In response to public comments and community input, Transwestern identified the proposed route (see figure 3.5.2-1). As currently proposed, the Phoenix Lateral would deviate to the east from the EPNG right-of-way at MP 32.7 and follow an abandoned railroad right-of-way for approximately 4.2 miles to a section line, at which point it would turn south and follow the section line to MP 45.5 (the termination point of the Prescott Valley Variation).

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Figure 3.5.2-1 Prescott Valley Variation

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Table 3.5.2-1 compares the Prescott Valley Variation and the corresponding segment of the Phoenix Lateral. The disadvantages of the proposed route are that it would be approximately 0.5 mile longer than the Prescott Valley Variation and would be collocated with existing rights-of-way for approximately 1.1 miles less than the Prescott Valley Variation. However, the primary advantage of the proposed route would be to reduce impacts on residences. No residences would be located within 50 feet of the construction work area along the proposed route, whereas 32 residences would be located within 50 feet of the construction work area for the Prescott Valley Variation. Some areas along the proposed route are under consideration for future development; however, the proposed route was sited on land owned by the ASLD, where possible, to minimize impact on future development should it occur.

TABLE 3.5.2-1

Comparison of the Prescott Valley Variation with the Corresponding Segment of the Proposed Phoenix Lateral Route (Mileposts 32.7 to 45.5)

Factor	Prescott Valley Variation	Proposed Route
Length (miles)	12.8 [a]	13.3 [a]
Length Adjacent to Existing Right-of-Way (miles)	5.3 [b]	4.2 [c]
Land Use	Rangeland	Rangeland
Vegetation	Grassland	Grassland
Number of Residences within 50 feet of the Construction Work Area	32	0
Number of Agua Fria River Crossings	1	0

[a] Lengths are based on measured distances, not mileposts.
[b] El Paso Natural Gas Company right-of-way and abandoned railroad right-of-way.
[c] Abandoned railroad right-of-way.

Based on the above analysis and in response to community input, the proposed route for the Phoenix Lateral is considered the preferred alignment through the Prescott Valley area.

3.5.2.3 Black Canyon City Variations

Black Canyon City is situated at the confluence of the Agua Fria River and Black Canyon Creek, and is bounded by the rugged Bradshaw Mountains on the west and the AFNM on the east (see figure 3.5.2-2). As discussed in section 3.4.2.3, construction of the Phoenix Lateral within the AFNM is not considered to be an environmentally preferable alternative. These conditions combine to limit the range of route alternatives to a narrow corridor for north-south linear infrastructure (the existing EPNG pipeline, Interstate 17, and an APS 500 kV transmission line all utilize this narrow corridor). Since construction of the EPNG pipeline about 45 years ago, extensive urban development has occurred including numerous single-family dwellings and other permanent structures such as cinderblock walls (fences), sheds, and garages that have been built adjacent to, and in some cases within, the existing EPNG right-of-way. Numerous residences, driveways, and underground utilities have also been installed adjacent to and within the APS corridor since the electric transmission line was constructed. This development further constrains potential routes through Black Canyon City. The FERC staff conducted aerial reconnaissances of potential route variations in the Black Canyon City area on January 10 and May 10, 2006.

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Figure 3.5.2-2 Black Canyon City Variations

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Transwestern's proposed route would parallel the EPNG right-of-way as it approaches the north side of Black Canyon City. Transwestern proposes two slight deviations from the existing right-of-way between MPs 86.5 and 86.9 and MPs 87.1 and 87.8 (areas where the proposed pipeline would not be adjacent to existing rights-of-way are discussed in section 3.6). At approximate MP 87.9, the proposed route would then diverge in an easterly direction from the EPNG right-of-way to Interstate 17 due to the dense urban development along the EPNG right-of-way described above. The proposed route would be generally adjacent to the Interstate 17 right-of-way before rejoining the EPNG right-of-way at approximate MP 89.9.

An advantage of the proposed route is that it would closely follow Interstate 17 in an area where relatively few residences and other structures have encroached up to the edge of the road corridor. Ten residences would be located within 50 feet of the construction work area, one of which (an abandoned home) may require removal. The proposed route would cross the Agua Fria River at a location with gradual contours on both sides of the river that is a favorable location for a large-diameter pipeline crossing. Further, the streets and roads that travel east-to-west through the west side of Black Canyon City typically dead end into the edge of the Interstate 17 corridor, thus minimizing impact on residential traffic.

Table 3.5.2-2 compares the proposed route to variations that would utilize the existing EPNG right-of-way (EPNG Variation) and the existing APS powerline right-of-way (APS Variation) to cross Black Canyon City. The two variations are discussed in detail below and shown on figure 3.5.2-2.

TABLE 3.5.2-2

Comparison of the Black Canyon City Variations with the Corresponding Segment of the Proposed Phoenix Lateral Route (Mileposts 87.6 to 89.9)

Factor	EPNG Variation [a]	APS Variation [a]	Proposed Route
Length (miles)	1.9	2.1	2.2
Length Adjacent to Existing Rights-of-Way (miles)	1.9	2.1	2.1
Number of Residences within 50 feet of the Construction Work Area	25	20	10
Number of Residences that would Require Relocation or Removal	8	0	1 (abandoned)
Number of Churches within 50 feet of the Construction Work Area	0	1	0
Number of High Occupancy Buildings within 50 feet of the Construction Work Area	0	1	0
Conditions at the Agua Fria River Crossing	Favorable	Difficult	Favorable

[a] Information provided for the variations is based on review of aerial photographs and U.S. Geological Survey maps.

EPNG Variation

The EPNG Variation would be located adjacent to the existing EPNG right-of-way for approximately 1.9 miles through Black Canyon City. The variation would be 0.3 mile shorter than the corresponding segment of the proposed alignment but would result in significantly greater impact on residents due to the degree of development up to and within the EPNG right-of-way. Twenty-five residences would be located within 50 feet of the EPNG Variation construction work area, of which 8 homes would require removal or relocation. In comparison, 10 residences would be located within the proposed construction work area of which only 1 (an abandoned home) may require removal. Construction along the EPNG right-of-way would also result in greater disruption of traffic and would create more issues for affected residents to access their homes than would the proposed route. No

churches or high occupancy buildings would be within 50 feet of either construction work area, and the difficulty of the crossing at the Agua Fria River would be comparable for each route.

APS Variation

The APS Variation would be located adjacent to the existing APS right-of-way for approximately 2.1 miles through Black Canyon City. The variation would be 0.1 mile shorter than the corresponding segment of the proposed alignment but would result in a greater impact on residents due to the degree of development up to and within the APS right-of-way. Twenty residences would be located within 50 feet of the APS Variation construction work area whereas 10 residences would be located within the proposed construction work area. None of the homes along the APS Variation would require removal and the only residence along the proposed right-of-way that may require removal is abandoned. Therefore, construction of either alternative would not result in the dislocation of residents. Because the proposed route would parallel the Interstate 17 right-of-way for a majority of its length through Black Canyon City, construction of the proposed route would cause less traffic disruption than would the APS Variation, which would be constructed through mature residential areas of Black Canyon City. The APS Variation would be located within 50 feet of a church and another high occupancy building, whereas there would be no churches or high occupancy buildings located within 50 feet of the construction work area for the proposed route. Transwestern also determined that the APS Variation would pose a more difficult crossing of the Agua Fria River than would the proposed alignment.

During the public scoping process, numerous comments were received from Black Canyon City residents regarding the potential impacts that the project would have on the area. Residents also voiced concerns regarding the safety of operating a natural gas pipeline in developed areas. To address these concerns, Transwestern would implement special construction methods to reduce impacts on residential areas (see section 4.7.3.1), including restoration, and would implement the measures described in its Dust Control Plan (see section 4.10.1.3 and Appendix M) to reduce construction-related dust. Transwestern would also utilize special measures when constructing near existing pipelines and other utilities (see section 2.3.2). After construction, the residents would be able to utilize the permanent right-of-way as described in section 4.7.1.1, although no buildings or other permanent structures could be constructed in the permanent right-of-way. Lastly, sections 2.6 and 4.11 discuss general pipeline safety and describe the equipment and procedures that Transwestern would install and implement to ensure the safe operation of the Phoenix Lateral.

Based on the above analysis and considering the measures that Transwestern would implement to reduce construction-related impacts and ensure the safe operation of the pipeline, we conclude that construction of the proposed route would result in the least impact on the community of Black Canyon City.

3.5.2.4 Waste Management Arizona Variation

The Phoenix Lateral would be within an existing powerline easement that bisects Waste Management Arizona, Inc.'s (WMA) Northwest Regional Landfill from approximate MPs 126.0 to 127.5.

In comments filed with the FERC, WMA raised safety and operational concerns regarding the installation of a natural gas pipeline within its active landfill facility. Specifically, WMA noted that heavy earthmoving equipment frequently crosses the powerline easement and haul roads within the powerline easement are constantly graded without inspection or survey control. This grading can result in a surface elevation change of 1 to 3 feet during any shift depending on ground conditions and haul road grade requirements. These activities are expected to increase as the landfill expands in the future. WMA also stated that the proposed pipeline would complicate the construction of planned environmental

mitigation measures such as a landfill gas collection system, and would prevent WMA's proposed future expansion of the landfill after the existing powerline easements expire in 2028.

WMA proposed a route variation to alleviate its safety and operational concerns regarding the proposed alignment. This variation, referred to as the Waste Management Arizona Variation, would deviate from the proposed route at MP 126.0, traverse the southeastern, southern, and southwestern limits of the WMA property, and rejoin the proposed route at approximate MP 127.5. The Waste Management Arizona Variation would be approximately 1 mile longer than the corresponding segment of the proposed alignment but would be located entirely on WMA property.

Based on the information provided by WMA, construction of the proposed alignment across the Northwest Regional Landfill would appear to pose significant safety and operational concerns for both the pipeline and the landfill facility. The Waste Management Arizona Variation would appear to alleviate those concerns. It is not known, however, whether the Waste Management Arizona Variation would create other concerns, impact sensitive resources, or potentially affect other landowners. **Therefore, the FERC staff recommends that:**

- **Transwestern shall prepare a report of the land requirements, other potentially affected landowners, and impacts that the Waste Management Arizona Variation would have on cultural, biological, and other resources. Transwestern shall include in the report further justification for the proposed alignment, including a detailed description of the specific construction and operational measures that would be implemented to alleviate WMA's concerns about the crossing of its Northwest Regional Landfill and ensure the integrity of the pipeline if the proposed alignment is approved. This report shall be filed with the Secretary <u>during the draft EIS comment period</u> for analysis in the final EIS.**

3.5.2.5 Pinal County EPNG Collocation Variations

The Phoenix Lateral would cross Pinal County for 42.3 miles between MPs 212.8 and 255.1 and would be located within a new 50-foot-wide permanent right-of-way that would abut existing EPNG right-of-way or fee property for approximately 36.7 of the 42.3 miles (87 percent). Approximately 4.8 miles of the 5.6 miles that the Phoenix Lateral would deviate from the EPNG right-of-way in Pinal County would occur in the City of Casa Grande (see section 3.4.2.6).

Comments were received expressing concern that the proposed alignment would have a detrimental effect on developments that are approved or proposed for construction along the existing EPNG right-of-way. "Approved" developments are those projects that have at least filed applications for preliminary plat approval from a municipal or county planning agency and "proposed" developments are those projects at an earlier stage in the planning and approval process. Based on information filed by Transwestern, excluding developments along The Wash in the City of Casa Grande (see section 3.4.2.6), the permanent right-of-way of the Phoenix Lateral would cross or abut 11 approved and 4 proposed developments in Pinal County for a total distance of 16.6 miles (see table 4.7.3-2). Only two of these developments appeared to be under construction (graded) on an aerial video of the proposed route taken by Transwestern on January 16, 2007.

The primary concern raised by commentors was the potential placement of the permanent right-of-way on lots, which could affect the constructability and value of the lots. Pinal County and the City of Casa Grande are also concerned that the loss of a substantial number of lots could affect the character of the developments and that the proposed alignment would cause developers and local governments to incur significant time and resources to replan developments that have already been approved and engineered.

To reduce impacts on approved and proposed developments, Pinal County and other commentors recommended that the Phoenix Lateral be located within the EPNG right-of-way or within SRP's approved PW-SEV/BRG powerline right-of-way. To assist in its evaluation of the proposed project and alternatives in Pinal County, the FERC staff attended an informational open house in Casa Grande on January 12, 2006; held a public scoping meeting in Casa Grande on February 28, 2006; conducted aerial reconnaissances of the proposed route in Pinal County on January 10 and May 10, 2006; and attended meetings with Pinal County and other stakeholders on June 28 and December 13, 2006. As discussed in section 3.4.2.6, we determined that the SRP PW-SEV/BRG alignment is not an environmentally preferable or economically viable alternative to the proposed route through Pinal County.

Regarding the suggestion to collocate the proposed pipeline within the existing EPNG right-of-way, some commentors suggested that Transwestern and EPNG share the existing EPNG right-of-way to the greatest extent physically possible, including in areas that are not approved or proposed for development. The advantage of this alignment would be to eliminate any new permanent right-of-way that would be required for the project, thus avoiding most potential conflicts with future development. However, whereas pipeline companies often install new pipeline in close proximity to their own existing pipelines, the installation of high pressure natural gas pipelines that are owned and operated by different companies within the same right-of-way is not a common industry practice, primarily due to increased safety and reliability concerns. For example, collocation within the same right-of-way could limit future pipeline construction, such as looping by either company in response to increasing natural gas demand, or pipeline replacement as may be required by DOT regulations due to the increased population associated with the approved and proposed developments. Although both companies would take all appropriate measures to operate within the same right-of-way in a safe manner, such an alignment could affect the response of either company to a problem and could threaten the reliability of both systems should a significant problem develop on one of the systems. Therefore, we do not support an alignment for the Phoenix Lateral that would require Transwestern and EPNG to share the existing EPNG right-of-way in all areas of Pinal County regardless of surrounding land use or development plans.

In a March 19, 2007 letter to the Commission, Pinal County recommended that Transwestern be required to collocate the proposed pipeline facilities within existing utility rights-of-way where the pipeline would traverse approved master planned communities. Pinal County specifically requested that the proposed pipeline avoid impacts on two developments that the County and landowners have worked on for years, have received tentative plat approval, and are in the final stages of engineering design. These two developments are Terrazo (MPs 220.3 to 221.0) and Solano Ranch North (MPs 230.5 to 231.5). In a February 20, 2007 letter to the Commission, the City of Casa Grande also expressed specific concern regarding potential impacts on Vista Canyons (MPs 238.0 to 238.5), a master planned community that has received preliminary plat approval from the City. In addition, Motions to Intervene were filed on behalf of the developers of Terrazo, Solano Ranch North, and Maratea (MPs 235.8 to 236.5). Representatives from these developers have also attended meetings with the FERC staff and other stakeholders.

Regarding project impacts on the Terrazo, Solano Ranch North, Maratea, and Vista Canyons developments, Transwestern indicates that the permanent right-of-way would cross 11, 47, 16, and 35 lots in these developments, respectively. Based on a review of Transwestern's alignment sheets and plat plans for the referenced developments, it appears that direct impact (i.e., the placement of permanent right-of-way on lots) on the referenced developments could be avoided by slight variations in Transwestern's proposed alignment. We anticipate that this could be accomplished by a combination of narrowing Transwestern's permanent right-of-way and partially overlapping the proposed permanent right-of-way with the existing EPNG right-of-way, although other variations may be implemented to accomplish the intended reduction in direct impact on the developments. **Therefore, the FERC staff recommends that:**

- **Transwestern shall work with EPNG to develop variations of the Phoenix Lateral that would avoid the placement of permanent right-of-way on platted lots within the Terrazo, Solano Ranch North, Maratea, and Vista Canyons developments. Transwestern shall file alignment sheets depicting the variations with overlays of the plat plans for each development with the Secretary <u>during the draft EIS comment period</u> for analysis in the final EIS.**

Regarding potential project impacts on other approved and proposed developments in Pinal County, the effect that a pipeline easement may have on property is a damage-related issue that would be negotiated between the landowner and Transwestern during the easement acquisition process, as discussed in section 4.8.5. Transwestern has engaged in negotiations to secure the proposed right-of-way and has resolved potential conflicts with some of the developers and landowners. Transwestern has also committed to work with landowners and developers to minimize the impact that the proposed alignment would have on approved and proposed developments.

3.5.3 Customer Laterals

As discussed in section 3.4.3, all of the proposed customer laterals represent the shortest distance between the Phoenix Lateral and the meter stations that would be installed within or adjacent to the existing customer facilities that Transwestern would serve. The analysis of the affected environment included in section 4.0 did not identify any significant or unique resources along the proposed customer laterals that would necessitate a route variation.

3.6 DEVIATIONS FROM EXISTING RIGHTS-OF-WAY

To reduce environmental impacts associated with the creation of new pipeline right-of-way, the San Juan Lateral Loop A would be collocated for 75 percent of its total length (2.2 miles would not be collocated) and the San Juan Lateral Loop B would be collocated for 100 percent of its total length. The Phoenix Lateral would be collocated for 80 percent of its total length (52.6 miles would not be collocated). The customer laterals would not be collocated. The need for deviations away from existing utility rights-of-way was based on site-specific terrain conditions, existing structures, federal special-use designations, or residential/commercial development that has occurred along these existing rights-of-way. Table 3.6-1 lists each location where the San Juan Lateral Loop A, the Phoenix Lateral, and customer laterals would deviate from existing rights-of-way and be within a new corridor. Also provided are the reasons for each deviation. Of the 31 deviations, 21 are less than 1 mile in length and 20 are less than 1,000 feet (0.2 mile) in distance from an existing utility right-of-way.

Twenty-seven of the 31 deviations are associated with the Phoenix Lateral. Three of these 27 deviations account for approximately 35.4 miles (67 percent) of the length that the Phoenix Lateral would not be adjacent to existing rights-of-way: the proposed alignment in the Town of Prescott Valley (12.7 miles); the AFNM area (17.9 miles); and the City of Casa Grande (4.8 miles). These three major deviations are discussed in sections 3.5.2.2, 3.4.2.3, and 3.4.2.6, respectively. The remaining areas where the Phoenix Lateral would not be adjacent to existing rights-of-way are distributed between the other 24 deviations.

TABLE 3.6-1

Locations Where the Pipeline Facilities Would Deviate From Existing Rights-of-Way [a]

Facility/ Beginning Milepost (MP)	Ending MP	Crossing Length (miles) [b]	Reason For Deviation	Maximum Distance from Existing Right-of-Way (feet)
San Juan Lateral Loops				
Loop A				
1.0	1.9	0.9	San Juan River crossing.	800
5.1	5.5	0.4	Kutz Canyon Wash contains, reportedly, subsurface water flow creating a "Quick Sand"-like construction work area. By relocating east of existing pipelines, greater separation would be attained in the event the soil conditions force a wider excavation.	100
Loop B			- None -	
Phoenix Lateral				
17.8	18.3	0.5	The proposed route through the bottom of Hell Canyon would offer a better construction location. The original El Paso Natural Gas Company (EPNG) route is impacted by obstacles remaining from previous construction. The proposed route would avoid a limestone headwall on the south side of the bottom of the canyon.	300
32.8	45.5	12.7	Prescott Valley route in response to community input.	New corridor
47.1	48.6	1.5	Transition from powerline right-of-way to the EPNG pipeline right-of-way in Prescott Valley.	New corridor
50.2	51.3	1.1	Congested area with encroachments on existing EPNG right-of-way renders the area impractical for installation of a 42-inch-diameter pipeline. The deviation impacts lands owned by the Arizona State Land Department that are currently undeveloped.	1,300
56.1	56.3	0.2	The proposed route would mitigate an anticipated environmental impact on Galena Gulch. The proposed route would also avoid the construction issue of shale headwall of approximately 9 feet in height directly on the original EPNG route.	150
56.6	57.0	0.4	The proposed route would provide a perpendicular crossing of U.S. Highway 69 at a steep angle and would minimize the need for significant dirt work due to side cuts and extremely deep bore pits at the location of the highway crossing as well as shortening the road bore by approximately 200 linear feet.	800
60.6	60.8	0.2	A large rock (shale) outcrop is directly on line with the original EPNG route. The proposed route would mitigate blasting and subsequent handling of a substantial amount of rock.	100
64.0	65.2	1.2	The proposed route would deviate from the EPNG pipeline easement to avoid residential and commercial structures that have encroached up to the existing 60-foot-wide EPNG easement. Installing the new pipeline adjacent to the existing EPNG pipeline would pose a potential safety risk due to the blasting that would likely be required for rock located on both sides of U.S. Highway 69. This deviation would also address concerns of a local resident.	1,900
65.6	66.5	0.9	The proposed route would deviate from the EPNG pipeline easement to avoid going through a housing subdivision currently under construction (Bensch Ranch). Although construction of homes is not complete, work is proceeding with infrastructure, including underground utilities and streets. The proposed route is located on land managed by the Prescott National Forest and the Bureau of Land Management land, and is favorable for construction.	1,150

TABLE 3.6-1 (cont'd)

Locations Where the Pipeline Facilities Would Deviate From Existing Rights-of-Way [a]

Facility/ Beginning Milepost (MP)	Ending MP	Crossing Length (miles) [b]	Reason For Deviation	Maximum Distance from Existing Right-of-Way (feet)
68.4	86.3	17.9	The proposed route would deviate from the EPNG pipeline easement to avoid following the existing pipeline through the Agua Fria National Monument located on the east side of Interstate 17 (I-17).	New corridor
86.5	86.9	0.4	The proposed route would deviate to the east of the EPNG pipeline to avoid crossing a dry wash where the existing pipeline has been previously exposed due to water scouring. Currently, hardened bags of concrete provide cover over the existing pipeline. The proposed deviation moves the new line away from this location that is prone to scouring, and also eliminates two crossings of Maggie Mine Road.	225
87.1	87.8	0.7	The proposed route would deviate from the EPNG pipeline, beginning its transition away from the EPNG easement toward the I-17 easement, continuing through Black Canyon City.	750
87.9	88.1	0.2	The proposed route would deviate to avoid residential structures that have encroached up to the existing EPNG easement and abuts the I-17 right-of-way.	500
88.7	88.9	0.2	The proposed route would shift from I-17 at the Agua Fria River to provide additional workspace for the deeper trench.	90
89.7	89.9	0.2	The proposed route would deviate from I-17 to cross I-17 and rejoin the EPNG pipeline right-of-way.	400
92.5	92.7	0.2	The proposed route would deviate from the EPNG right-of-way to create a more favorable crossing of I-17.	300
112.2	112.5	0.3	The proposed route would deviate from the Arizona Public Service (APS) easement to take advantage of the more level terrain and allow for a more constructible and favorable location to cross under the Hayden-Rhodes aqueduct.	250
117.4	117.6	0.2	The proposed route would deviate from transmission line corridors, as it transitions from the APS easement to the Salt River Project Agricultural Improvement and Power District (SRP) powerline easement near the Westwing substation.	300
122.8	124.3	1.5	The proposed route would deviate from the SRP easement to avoid the existing McMicken Dam structure, owned by the Flood Control District of Maricopa County.	New corridor
152.6	154.5	1.9	The proposed route would deviate from the SRP easement to avoid the existing drainage canal and dam structures (Buckeye Flood Retarding Structures No. 1), owned by the Flood Control District of Maricopa County.	New corridor
160.7	162.6	1.9	The proposed route would deviate from the SRP easement because of restricted access across the Palo Verde Nuclear Plant property.	New corridor
174.2	175.8	1.6	The proposed route would deviate from the existing EPNG pipelines to allow for a straight river crossing, and also to avoid being adjacent to existing pipelines crossing the west side rock bluff. The proposed route ranges from approximately 200 feet to 900 feet south of the southernmost existing pipeline.	900
180.1	180.2	0.1	The proposed route would avoid crossing under an existing EPNG meter station site.	200
221.5	221.9	0.4	The proposed route would shift 60 feet further from the existing EPNG pipelines to improve the constructability across a man-made drainage basin.	110
238.6	238.7	0.1	The proposed route would avoid a structure while transitioning from east-west running pipelines to north-south running pipelines.	175

TABLE 3.6-1 (cont'd)

Locations Where the Pipeline Facilities Would Deviate From Existing Rights-of-Way [a]

Facility/ Beginning Milepost (MP)	Ending MP	Crossing Length (miles) [b]	Reason For Deviation	Maximum Distance from Existing Right-of-Way (feet)
239.5	244.3	4.8	The proposed route would deviate approximately 1 mile south of the existing pipelines to follow the City of Casa Grande's proposed Greenbelt Utility Corridor; this deviation would avoid routing near to the existing EPNG pipelines.	New corridor within the City of Casa Grande Greenbelt Utility Corridor
254.8	255.1	0.3	The proposed route would deviate to the north of the existing EPNG pipelines to avoid congestion entering the proposed and the existing meter station sites.	200
APS Redhawk Lateral				
0.0	0.4	0.4	The proposed lateral would follow the shortest path between the Phoenix Lateral and the proposed ADS Redhawk Meter Station site location within the APS Redhawk Power Plant.	New corridor
SRP Desert Basin Lateral				
0.0	0.6	0.6	The proposed lateral would follow existing pipelines to the proposed SRP Desert Basin Meter Station site. The rights-of-way do not abut the lateral because it would be placed 95 feet from the section line to accommodate future city plans to expand/widen Burris Road.	95

[a] Five of the customer laterals total approximately 0.2 mile in length. These laterals would not abut existing rights-of-way but would follow the shortest path between the Phoenix Lateral and the proposed meter station sites.

[b] These lengths were calculated using the difference between the mileposts, and may not represent the true distance between the mileposts.

At 1 of these 24 locations, the Phoenix Lateral would deviate to the west from an existing SRP powerline right-of-way between MPs 152.6 and 154.5 to avoid a flood control structure operated by the Flood Control District of Maricopa County. As discussed in section 3.4.2.5, the deviation would cross Desert Creek, a planned but not constructed development, for a distance of approximately 1 mile. A Motion to Intervene was filed on behalf of the developer of Desert Creek expressing concern that the proposed route would disrupt the development plans. Because the deviation to avoid the flood control structure is warranted, **the FERC staff recommends that:**

- **Transwestern shall work with the developer of Desert Creek to develop measures to avoid or minimize impacts on the Desert Creek development. A report describing these measures shall be filed with the Secretary <u>during the draft EIS comment period</u> for analysis in the final EIS.**

We have determined that all of the other proposed deviations from existing rights-of-way are warranted as well.

3.7 ABOVEGROUND FACILITY SITE ALTERNATIVES

All compressor station piping modifications would be located within Transwestern's existing, developed compressor station sites. Therefore, no alternative sites were evaluated for the compressor station modifications.

The Ash Fork Facility would be located at the beginning of the Phoenix Lateral and at the intersection of Transwestern's mainline system and the existing EPNG pipeline. As discussed in sections 3.4.2.1 and 3.4.2.2, no environmentally preferable alternatives were identified for the start of the Phoenix Lateral.

The 11 proposed meter station sites would permanently impact a total of 8.2 acres of land, of which 5.1 acres are rangeland, 1.5 acres are agricultural land, and 1.6 acres are developed land. Therefore, the overall impact of the meter station sites would be minimal. In addition, the locations of the proposed meter stations were primarily determined by the location of agreed-upon customer delivery points; the meter stations would be located either adjacent to the permanent right-of-way for the Phoenix Lateral or adjacent to or within existing customer facilities. Other aboveground facilities including valves, pig launchers/receivers, and taps would generally be located within the permanent right-of-way of the Phoenix Lateral. The location of many of these aboveground facilities are determined, in large part, by agreed-upon customer delivery points and DOT safety regulations (such as for the placement of valves). Based on the above information, no environmentally preferable or practical alternatives were identified for the location of the proposed aboveground facilities.