ROVER PIPELINE
An ENERGY TRANSFER Company

ROVER PIPELINE LLC

Rover Pipeline Project

RESOURCE REPORT 10
Alternatives

FERC Docket No. CP15-___-000

February 2015

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LIST OF ACRONYMS

Bcf/d	billion cubic feet per day
CGT	Columbia Gas Transmission
DTE	DTE Gas Transportation
EIA	Energy Information Administration
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
FERC	Federal Energy Regulatory Commission
GIS	geographical information system
hp	horsepower
MP	milepost
NEXUS	NEXUS Gas Transmission, LLC
NHD	National Hydrography Dataset
NSA	Noise Sensitive Area
NWI	National Wetlands Inventory
Panhandle	Panhandle Eastern Pipe Line Company, LP
Project	Rover Pipeline Project
REX	Rockies Express Pipeline, LLC
Rover	Rover Pipeline LLC
Texas Eastern	Texas Eastern Transmission, L.P
Trunkline	Trunkline Gas Company
UEO	Utica East Ohio Midstream
Vector	Vector Pipeline L.P.
U.S.	United States
WVDE	West Virginia Division of Energy

RESOURCE REPORT 10 --ALTERNATIVES	
Filing Requirement	**Location in Environmental Report**
• Discuss the "no action" alternative and the potential for accomplishing the proposed objectives through the use of other systems and/or energy conservation. Provide an analysis of the relative environmental benefits and costs for each alternative. (§ 380.12 (*l*) (1))	Sections 10.2 and 10.3
• Describe alternative routes or locations considered for each facility during the initial screening for the project. (§ 380.12 (l) (2)) (i) For alternative routes considered in the initial screening for the project but eliminated, describe the environmental characteristics of each route or site, and the reasons for rejecting it. Identify the location of such alternatives on maps of sufficient scale to depict their location and relationship to the proposed action, and the relationship of the pipeline to existing rights-of-way. (ii) For alternative routes or locations considered for more in- depth consideration, describe the environmental characteristics of each route or site and the reasons for rejecting it. Provide comparative tables showing the differences in environmental characteristics for the alternative and proposed action. The location of any alternatives in this paragraph shall be provided on maps equivalent to those required in paragraph (c)(2) of this section.	Sections 10.5, 10.6 10.7, and 10.8

10.0 ALTERNATIVES

10.1 INTRODUCTION

Rover Pipeline LLC (Rover) is seeking authorization from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act to construct, own, and operate the proposed Rover Pipeline Project (Project). The Rover Pipeline Project is a new natural gas pipeline system that will consist of approximately 711.2 miles of Supply Laterals and Mainlines, 10 compressor stations, and associated meter stations and other aboveground facilities that will be located in parts of West Virginia, Pennsylvania, Ohio, and Michigan. The Project will include approximately 509.1 miles of proposed right-of-way, extending from the vicinity of New Milton, Doddridge County, West Virginia to the vicinity of Howell, Livingston County, Michigan, and will include approximately 202.1 miles of dual pipelines.

The Project will consist of the following components and facilities:

- Supply Laterals:
  - eight supply laterals consisting of approximately 199.7 miles of 24-, 30-, 36-, and 42-inch-diameter pipeline in West Virginia, Pennsylvania, and Ohio,
  - two parallel supply laterals, each consisting of approximately 18.8 miles (for a total of approximately 37.6 miles) of 42-inch-diameter pipeline (Supply Connector Lateral Line A and Line B) in Ohio,
  - approximately 72,645 horsepower (hp) at six new compressor stations to be located in Doddridge and Marshall counties, West Virginia; Washington County, Pennsylvania; and Noble, Monroe, and Harrison counties, Ohio, and
  - two new delivery, 11 new receipt, and two bidirectional meter stations on the Supply Laterals.

- Mainlines A and B:
  - approximately 190.6 miles of 42-inch-diameter pipeline (Mainline A) in Ohio,
  - approximately 183.3 miles of parallel 42-inch-diameter pipeline (Mainline B) in Ohio,
  - approximately 114,945 hp at three new compressor stations to be located in Carroll, Wayne, and Crawford counties, Ohio, and
  - two new delivery meter stations in Defiance County, Ohio.

- Market Segment:
  - approximately 100.0 miles of 42-inch diameter pipeline in Ohio and Michigan,
  - approximately 25,830 hp at one new compressor station to be located in Defiance County, Ohio, and
  - two new delivery meter stations in Washtenaw and Livingston counties, Michigan.

This Resource Report describes alternatives considered by Rover during the development of the Project and includes the No Action Alternative (including energy system alternatives), major route alternatives,

route variations, and aboveground facility alternatives. Each alternative was considered during development of the Project design and in response to stakeholders involved in the FERC's National Environmental Policy Act of 1969 FERC Pre-Filing Review Process. One of the goals of this process is to allow the applicant to receive comments from stakeholders as the project is being developed and before submittal of formal applications to the FERC and other federal and state agencies.

Many stakeholders commented on alternatives throughout the FERC Pre-filing Review Process that began in June 2014 and, the comment period extended through December 18, 2014, in response to FERC's *Notice of Intent to Prepare an Environmental Impact Statement for the Planned Rover Pipeline Project: Request for Comments on Environmental Issues, and Notice of Public Scoping Meetings,* (November 4, 2014 in Docket No. PF14-14-000). Section 1.9.4 in Resource Report 1 summarizes these comments. Most of the comments on alternatives that were received as letters on the public record and/or in comments at the scoping meetings concerned the Market Segment pipeline in Michigan. Commenters suggested denial (or No Action) of the Project;, use of other pipeline systems to accomplish the objectives of the Project; collocation of the Project pipelines within existing pipeline, powerline, or road easements; relocation of the Project facilities elsewhere; and site-specific alternative locations for the Project pipelines on certain properties.

In addition to stakeholder comments received on the public record, Rover also received comments directly from other stakeholders (such as shippers with respect to receipt and delivery points) and landowners who would be directly affected by Project facilities on their land. These commenters also influenced the selection of the proposed location for the Project facilities. Finally, the results of civil and environmental field surveys completed between summer and fall of 2014, as well as Project system design considerations, further refined the location of the proposed pipeline routes and aboveground facilities.

To provide a standard basis of comparison, all alternatives in this resource report were compared using a geographic information system (GIS) for calculations and publicly available GIS datasets to identify federal and state land crossings, road and railroad crossings, length adjacent to existing rights-of-way, tract crossings, land use, nearest noise sensitive receptors, and locations of properties listed in the National Register of Historic Places. National Wetlands Inventory (NWI) mapping was used to identify wetlands, and the National Hydrography Dataset (NHD) was used to identify surface waters. Construction and permanent rights-of-way were calculated using standard construction widths as identified in each of the comparison tables. Residences within 50 feet of construction rights-of-way were estimated using available aerial photography. Therefore, while these data sets provide a basis for evaluating the environmental sensitivity of alternate routes in comparison to the proposed route, these data do not necessarily reflect the same information for the proposed route as provided in other resource reports as the other resource reports are based on detailed civil and environmental surveys.

10.2 PURPOSE AND NEED

As discussed in Section 1.2 of Resource Report 1, this Project is designed to allow producers who have active production and processing capacity, as well as significant volumes of stranded natural gas in the

Marcellus and Utica Shale areas of West Virginia, Pennsylvania, and Ohio, to move their production to markets in the Gulf Coast, the Midwest, and Canada. The Project will have the capacity to transport 3.25 billion cubic feet per day (Bcf/d) of natural gas. Rover held an Open Season that concluded on July 25, 2014, and executed binding precedent agreements with shippers for 3.1Bcf/d.

Rover plans to commence construction in January 2016, pending receipt of all applicable permits and clearances. The Supply Laterals and Mainlines A and B are scheduled to be in-service in December 2016. The Market Segment is scheduled to be in-service no later than June 2017.

As a producer-driven project, the receipt points for the natural gas supplies are determined by the locations of the producer processing plants and the delivery points are determined by the existing pipeline infrastructure, including the hub facilities at Defiance, Ohio and Dawn, Canada. The hub facilities at Defiance allow for the delivery of natural gas to high demand centers in the United States (U.S.) through interconnections with Energy Transfer's existing Panhandle Eastern Pipe Line Company, LP (Panhandle) and ANR Pipeline Company. Extending the pipeline system from the Defiance Hub to the Dawn Hub allows for the delivery of natural gas to markets in and around Detroit, Michigan through interconnections with Consumers Energy Company Vector Pipeline, L.P.. The hub facilities at Dawn provide storage capacity, as well as interconnections with existing pipeline systems for deliveries to the local Canadian market and the U.S. Northeast markets through the TransCanada pipeline interconnections at Niagara Falls.

A number of alternatives were considered in the development of the Project as described in the following sections. While a number of factors (including minimizing environmental impacts) were considered in evaluating each alternative, an alternative to the Project would have to meet the following basic criteria to meet the Project's stated purpose:

- be capable of transporting 3.25 Bcf/d of natural gas produced in the Marcellus and Utica Shale in West Virginia, Ohio, and Pennsylvania to the Defiance and Dawn hubs, and interconnections with the existing pipeline infrastructure in Ohio and Michigan;
- be capable of collecting natural gas supplies from multiple receipt points located at producers' natural gas plants or supply systems into an integrated pipeline system;
- be technically and economically feasible and practicable; and
- meet the Project schedule.

10.3 NO ACTION ALTERNATIVE

If the Project is not authorized by FERC, the short- and long-term environmental impacts resulting from construction and operation of the Project will not occur as part of Rover. However, the objectives of the Project will not be met, producers in the Marcellus and Utica Shale areas of West Virginia, Pennsylvania, and Ohio will have limited additional means to move their production to markets across the U.S. States and Canada (ultimately coming back to the U.S. via existing pipes to the Northeast markets), and the produced gas will be shut in and unavailable. Furthermore, the No Action Alternative will deny U.S. markets valuable infrastructure and a readily available supply of natural gas for local distribution systems

for residential and manufacturing consumption and energy independence. It will also eliminate any economic benefits associated with the new infrastructure; jobs associated with construction and operation of the Project; and monies spent for the purchase of goods during construction and major materials, and millions of dollars for tax revenues generated during construction and operation of the Project.

Although the No Action Alternative may appear to be an alternative, in reality the result of not approving the Project will result in stagnation of the economy, a reduction in promoting the U.S.'s ability to be energy independent, and will result in less opportunities for the U.S. to move from less environmentally-friendly energy sources to natural gas to reduce emissions into the atmosphere. Furthermore, since this source of natural gas is critically important to the U.S., the producers of this gas will find alternative and less environmentally sensitive means and will build or support alternative infrastructure, either on an interstate or intrastate basis, which will simply result in transference of impacts from this Project to another project. Ultimately, the No Action Alternative is not a viable alternative to meet the needs of the U.S., of the producers who have taken out long-term transportation on the pipeline, or of the U.S. citizens who expect and demand reasonably-priced, low-cost energy supplies to fuel their homes and manufacturing facilities and to fuel needed to drive the economy and the future of energy independence.

Table 10.3-1 lists economic benefits for the region that are projected to occur as a result of construction and operation of the Project. These dollar values do not take into account the indirect economic effects associated with jobs generated to support the manufacture of materials (i.e., pipe, station assemblies, etc.); jobs generated to support the construction workforce for food, lodging, and recreation; or the potential development of manufacturing or other industry that may result from the availability of new supplies of domestically produced natural gas.

TABLE 10.3-1
Projected Economic Impacts

Project Economic Factors	Project Total
Project Investment	$3.74 billion
Average Construction Jobs	9,998
Estimated Construction Payroll	$570,000,000
Direct Payments to Landowners	$100 million
Permanent Jobs	38 permanent positions
Sales Tax Revenues Generated During Construction	$15,300,000
Ad Valorem Taxes Paid Yearly During Operation (initial estimate and does not take into account depreciation over time)	$146.9 million

Additionally, the No Action Alternative would inhibit the availability of competitively priced shale gas supplies in Ohio, Michigan and other markets for natural gas in the U.S. that could be used to replace fossil-fueled or coal and fuel oil power generation. Without access to economical gas supplies, existing gas-fired power plants may curtail operations while those burning coal or oil, with higher air emissions, would increase. Without natural gas supplies, new natural gas-fired facilities may not be introduced into the energy mix and natural gas will not be used to displace existing fossil-fueled generation power plants with significantly higher air emissions rates in Ohio and Michigan.

Assuming the means of providing sufficient transportation for this gas production is not developed (i.e., the Project is not constructed), drilling activities for natural gas could decline in these producing regions, resulting in reduced natural gas production from new wells and stranded natural gas supplies due to lack of takeaway capacity. Unless natural gas demand is reduced to offset this reduction in supply, higher natural gas prices will result. Demand reduction would have to be achieved by either energy conservation or increased utilization of other energy sources and energy alternatives as described below.

Costs associated with the development of other projects to replace the Project as proposed by Rover would be purely speculative as there are a multitude of different scenarios that might occur depending on any number of variables that range from stranding the natural gas supplies to the development of one or several other projects similar to the proposed Project.

10.3.1 Energy Conservation

Energy conservation could help alleviate some of the nation's growing demand for energy and, therefore, potentially offset the need for some increase in natural gas supplies. The Energy Policy Act of 2005 (EPAct) includes guidelines to diversify America's energy supply and reduce dependence on foreign sources of energy, increase residential and businesses' energy efficiency and conservation (e.g., EPA Energy Star Program), improve vehicular energy efficiency, and modernize domestic energy infrastructure (U.S. Congress, 2005). However, the U.S. Energy Information Administration (EIA) indicates that even with the combination of recently enacted energy efficiency policies and the rise in energy prices, U.S. energy consumption will still grow primarily through increased use of natural gas for electricity generation and industrial applications (EIA, 2014). Although energy conservation measures will be important elements in addressing future energy demands, they would be able to meet only a minor portion of that demand within the foreseeable future. Thus, energy conservation does not preclude the need for natural gas infrastructure projects such as the Project.

Several state-led initiatives have contributed to energy conservation in West Virginia, Pennsylvania, Ohio, and Michigan, as discussed below. These programs are intended to reduce the demand for energy in the regions in which they are enacted. The costs associated with development of these programs are included as available.

10.3.1.1 West Virginia

The State of West Virginia developed the 2013-2017 *West Virginia State Energy Plan* (updated every five years) that provides analysis and makes policy recommendations to guide the state in reliably meeting its future energy needs in a cost-effective and sustainable manner while fostering an innovative clean energy economy. Energy recommendations are included for fossil energy (e.g., coal, natural gas, alternative fuels) and renewable energy (e.g., solar, wind, hydroelectric, geothermal, biomass, landfill gas, and poultry litter). The recommendations for natural gas include: (1) monitoring and encouraging development of midstream natural gas gathering and processing facilities as well as pipeline infrastructure; (2) continuing the efforts of the Marcellus to Manufacturing Task Force, West Virginia Department of Commerce, local development authorities, and industry in attracting downstream

petrochemical manufacturing facilities; and (3) determining the potential opportunities for additional value-added energy investments within the state.

In addition, the West Virginia Division of Energy (WVDE) is responsible for the formulation and implementation of fossil, renewable and energy efficiency initiatives that are designed to advance energy resource development opportunities and provide energy services to businesses, communities and homeowners in West Virginia (WVDE, 2015). The role of this agency is to promote the development of fossil energy, renewable energy and energy-efficient projects and programs in West Virginia, attract new energy enterprises to the state, and provide outreach and technical support. Their programs include fossil energy (clean coal technologies), renewable energy (wind, biofuels, solar), and energy efficiency programs for residences, vehicles, schools, and businesses.

10.3.1.2 Pennsylvania

Pennsylvania's energy policy reflects its diverse energy portfolio and an "*All of the Above*" approach (Pennsylvania State Energy Plan, *Energy = Jobs*, January 2014). Core concepts of the state's energy policy are: embracing and fostering a robust market for energy suppliers,; promoting energy independence which leads to national security,; advocating abundant, affordable, and domestic energy supplies,; and protecting the environment while growing the energy sector.

Energy efficiency is a prominent and growing role in meeting the growing energy demands of Pennsylvania consumers. In 2008, the Pennsylvania General Assembly enacted Act 129, which requires the Pennsylvania Public Utility Commission to adopt an energy efficiency and conservation program for the reduction of energy demand and consumption by each Pennsylvania Electric Distribution Company with at least 100,000 customers. The major energy efficiency and conservation provisions of Act 129 include the following: a 3 percent reduction in electricity consumption by 2013,; peak load reduced by 4.5 percent by 2013,; smart meters installed throughout Pennsylvania within 15 years;, and voluntary, flexible electricity pricing schedules for consumers. As of May 2012, utilities have reported almost 3.5 million mega-watt hour in energy efficiency savings and a 500 mega-watt of peak demand reductions through their programs. The Public Utility Commission recently determined that additional potential, cost-effective savings are available in the state and has directed utilities to develop plans that will further reduce electricity usage over three years, starting in June 2013.

10.3.1.3 Ohio

The Ohio Revised Code, Title 49, Chapter 4928 contains a renewable energy portfolio standard that requires that 12.5 percent of electricity sold by Ohio's electric distribution utilities or electric services companies must be generated from renewable energy, including one-half per cent from solar energy resources sources, by 2027.

In addition, The Public Utilities Commission of Ohio's Rules, Chapter 4901:1-40 *Alternative Energy Portfolio Standard* addresses the implementation of the alternative energy portfolio standard, including the incorporation of renewable energy credits, as described in Chapter 4928, sections 64 and 65. Entities affected by these alternative energy portfolio standard rules include all Ohio electric utilities and all

electric services companies serving retail electric customers in Ohio. Any entities that do not serve Ohio retail electric customers are not required to comply with the terms of the alternative energy portfolio standard. The Alternative Energy Portfolio Standard states that all electric utilities and affected electric services companies shall ensure that, by the end of the year 2024 and each year thereafter, electricity from alternative energy resources equals at least 25 per cent of their retail electric sales in the state.

10.3.1.4 Michigan

The Public Act 295 of 2008 established Michigan's Renewable Energy Standard, which requires electric service providers to meet annual energy savings targets. As a result, utilities began offering energy efficiency programs in 2009, demonstrating that, for 2012, electric utilities have achieved 125 percent of their Energy Optimization and have consistently exceeded the energy efficiency goals set out under the Energy Optimization standard. For each dollar spent on utility Energy Optimization programs, customers have benefited from approximately $3.83 in avoided energy costs, and the aggregated simple payback for all measures implemented through Energy Optimization programs is approximately 2.3 years. More than eighty thousand low income residents have benefited from Energy Optimization programs offered by the state's two largest investor-owned utilities (Midwest Energy Efficiency Alliance, 2015).

In addition, *Michigan's 21st Century Electric Energy Plan* provides structure for its growing century economy by enhancing the state's ability to power itself through the use of renewable resources, energy efficiency measures, and the cleanest available utility-built generation. This is Michigan's first electric energy plan in 20 years and projects the state's electric needs for the next two to 20 years (MI Plan, 2007). Michigan reliance on coal and nuclear fueled baseload generation units accounts for approximately 83 percent of its annual electricity production, natural gas for approximately 13 percent, and hydro-power and other sources for approximately 4 percent. Three major policy initiatives are proposed in the MI Plan including: utility-built generation within the context of a comprehensive electric resource portfolio that includes renewable resource and energy efficiency measures; statutorily required renewable energy portfolio standard implemented by the Michigan Public Service Commission with the flexibility to deal with changing circumstances, and cost implementation; and creation of the Michigan Energy Efficiency Program, which would be a comprehensive, statewide energy efficiency program.

10.3.2 Non-Gas Energy Alternatives

The No Action Alternative will require the use of other energy sources to meet the growing demand that would have been met by the Project. Alternate fuel sources could include fossil fuels (e.g., fuel oil and coal), nuclear, and renewable energy including hydropower, wind, municipal solid wastes, wood and other biomass, and solar. However, natural gas has many attributes that make its use more attractive than other energy sources. Overall, natural gas is the most readily available, dependable, economically viable, and environmentally acceptable fuel for residential, commercial, and industrial markets. Natural gas has clear environmental benefits when compared to other fuel alternatives such as coal or liquid fuels, including fewer greenhouse and other emissions, such as nitrous oxide, sulfur dioxide, and carbon dioxide. Using these alternative fuels instead of natural gas to power electric generation likely would result in increased pollutant emissions and associated reductions in air quality. Because energy demand is

projected to increase, it is unlikely that the use of natural gas could be easily or cost effectively replaced by other energy sources in the near term.

10.3.2.1 Fossil Fuels

According to the EIA's *Annual Energy Outlook 2014* with Projections to 2040 reference case (EIA, 2014), fossil fuel consumption as a percentage of total energy consumption is projected to drop from 82 percent of total U.S. energy demand in 2012 to 80 percent in 2040. Coal consumption increases by an average of 0.3 percent/year from 2012 to 2040, remaining between the 2011 and 2012 levels through 2040. A small amount of coal-fired power plant capacity is added; however, capacity retirements total 51 gigawatts between 2012 and 2040, but the remaining coal-fired plants continue to be used extensively. Coal shows a consistent decline in consumption, from 6 percent of the total in 2012 to 5 percent in 2040.

10.3.2.2 Nuclear Power

With regard to the use of nuclear power as an alternative energy source, EPAct included production tax credits aimed at promoting an increase in nuclear power generation infrastructure in the U.S. While some growth in nuclear power generation is possible, nuclear power likely will account for only a small percentage of total U.S. generating capacity due to the prohibitive costs associated with construction of these facilities, stringent regulatory requirements, and public concerns. It is unlikely that new nuclear power plants would be sited and developed to serve the electric generation markets that may be supplied by the Project, and in accordance with Project schedule.

10.3.2.3 Renewable Energy

Renewable energy projects may play an increasing role in meeting U.S. energy demands in the coming years. More specifically, federal, state, and local incentives and continuing research may likely contribute to an increase in the availability and cost effectiveness of other renewable energy sources such as wind, solar, tidal, geothermal, and biomass. Despite existing support for renewable energy, significant long-term investment and further advances in technology and development are necessary before renewable energy could potentially offset any substantial portion of the projected national energy demands. Current or foreseeable renewable energy sources do not provide sufficient energy supplies to replace the need for the Project.

<u>Hydropower</u>

With regard to the use of hydropower as an alternative energy source, although efficiency upgrades at existing hydropower facilities are expected to produce incremental additions of power in the coming years, environmental concerns and a scarcity of new large-scale sites limit the growth of conventional hydropower. Because of these limitations, it is unlikely that new and/or significant sources of hydropower would be a reliable alternative to the Project.

Wind and Solar

Renewable energy sources such as solar photovoltaic and wind continue to dominate new commercial distributed generation capacity in the EIA 2014 reference case, accounting for 62.3 percent of commercial capacity in 2040. Lower prices for photovoltaic inverters and panels, decreasing installation costs, federal investment tax credits, and state and utility rebates all contribute to growth in commercial photovoltaic capacity, which increases by 5.7 percent/year from 2012 to 2040 in the reference case (EIA, 2014). The current 30 percent federal investment tax credit continues through 2016 and then reverts to 10 percent. Electricity generation capacity from residential solar photovoltaic and wind technologies doubled from 2010 to 2012; in the EIA 2014 reference case it doubles again in 2014 and 2016 before slowing considerably as a result of the planned expiration of the investment tax credit after 2016. Without the tax credit available, almost two decades pass before annual additions to residential distributed generation capacity surpass 0.5 gigawatts, as they have in recent years.

10.4 SYSTEM ALTERNATIVES

System alternatives are alternatives to the proposed action that make use of other existing, modified, or proposed pipeline systems to meet the stated objectives of the Project. A system alternative may make it unnecessary to construct all or part of the Project, although modifications or additions to the alternative systems may be required to increase their capacity or provide receipt and delivery capability consistent with that of the Project. These modifications or additions could result in environmental impacts that may be less than, comparable to, or greater than those associated with construction of the Project. System alternatives that could result in significantly less environmental impact might be preferable to the Project. However, a viable system alternative must also be technically and economically feasible and practicable, must have a proponent (e.g., a company willing to expand their system), and must satisfy the anticipated Project in-service date to accommodate commitments made with shippers supporting the development of the Project, the agreed upon and expected transportation rates as well as a viable business deal that is supported by all parties involved in the business deal or transaction. Therefore, a viable system alternative to the Project would be required to meet the basic criteria listed in Section 10.2.

There are a number of existing intrastate and interstate pipelines in Ohio and Michigan. The intrastate pipelines are generally smaller-diameter or lesser capacity sized pipeline systems that are designed to transport natural gas to specific market areas, including residential and commercial consumers, within state lines. The interstate pipelines are generally larger-diameter pipeline systems that transport large volumes of natural gas across state lines from natural gas supply sources to interstate and intrastate pipeline systems, local distribution systems, and other large-scale consumers.

Seven existing pipeline systems were evaluated to transport Project supplies as described in the following sections.

10.4.1 Trunkline Pipeline System

Trunkline Gas Company (Trunkline) operates an interstate pipeline system that extends from points near Premont, Texas and points near Patterson, Louisiana to Trunkline's Longville, Louisiana Compressor

Station in Louisiana. The system then extends north through Louisiana, Arkansas, Mississippi, Tennessee, Kentucky, Illinois, and Indiana to its terminus at the Indiana-Michigan border near Vistula, Indiana (see Figure 10.4-1 in Appendix 10A). As such, this pipeline system carries natural gas supplies from the Gulf of Mexico to the Indiana-Michigan border where other pipeline systems may in turn carry the natural gas into Michigan.

On July, 26, 2012, Trunkline filed with FERC a request for authorization, pursuant to section 7(b) of the Natural Gas Act in Docket No. CP12-491-000, to abandon by sale to an affiliate approximately 770 miles of mainline transmission line and appurtenant facilities for conversion to oil transmission service. Trunkline's rationale for the abandonment was that the interstate natural gas market has continued to change with new sources of gas supply and additional pipeline infrastructure providing Trunkline's customers with alternative service options. The majority of Trunkline's major market area customers have reduced their reliance on the Trunkline pipeline system as compared to long-term service levels of previous years. Trunkline stated that it will continue to meet all firm commitments following the abandonment by utilizing its remaining parallel pipeline and this was confirmed by the FERC's engineering analysis.

On November 7, 2013, the FERC issued an order authorizing the abandonment of the following Trunkline facilities as shown on Figure 10.4-1 in Appendix 10A:

- 45.0 miles of 24-inch diameter Line 100-1, extending east from Mainline 43-1 near Buna, Texas to the Trunkline Longville, Louisiana Compressor Station;
- 725.5 miles of 30-inch diameter Line 100-2, extending northeast from the Longville, Louisiana Compressor Station to the Trunkline Tuscola, Illinois Compressor Station; and
- twelve compressor units, totaling 15,850 hp at compressor stations in Pollock and Epps, Louisiana; Shaw and Independence, Mississippi; and Joppa, Illinois.

Neither Rover, nor its parent and affiliate (e.g., Energy Transfer and Trunkline), sold the abandoned pipeline to Enbridge although several comments were received during the Pre-Filing Process that insinuated that was the case. As shown on Figure 10.4-1, the Trunkline facilities are not located near the proposed Project, and therefore do not have access to the Marcellus/Utica supply sources, nor does Trunkline have any facilities in Michigan to deliver to the Project's contracted delivery locations. The proposed Rover and existing Trunkline pipeline systems are mutually exclusive and provide independent and unrelated services. Therefore, the Trunkline system is not a system alternative for the Project.

10.4.2 Panhandle Eastern Pipe Line Company, LP

Panhandle operates a pipeline system that extends from northern Texas and Oklahoma through Kansas, Missouri, Illinois, Indiana, and the northwest corner of Ohio, to terminate in the Detroit, Michigan area (see Figure 10.4-2 in Appendix 10A). The Panhandle pipeline system does not have facilities or access to the Project Supply (Marcellus/Utica) ;region; therefore, it cannot provide takeaway capacity to transport natural gas supplies in West Virginia, Pennsylvania, and Ohio. While it could move a portion of the 1.3 Bcf/d that will be transported by the Market Segment into Michigan, the Panhandle system is currently at

capacity in this segment. Therefore, it does not meet the Project objective and was eliminated as a system alternative.

10.4.3 Utica East Ohio Midstream

Utica East Ohio Midstream (UEO) operates a pipeline system that extends north from central Harrison County, Ohio through eastern Carroll County, to terminate just north of the Carroll/Columbiana County line (see Figure 10.4-3 in Appendix 10A). The UEO pipeline system provides its customers with rich gas gathering, cryogenic processing, fractionation, NGL storage, rail loading and multiple gas and natural gas liquids redelivery options. In this part of Ohio, the 42-inch-diameter Clarington Lateral and Supply Connector Lines A and B cross the entire length of Harrison County in a south to northwest direction, then cross the southwestern tip of Carroll County before continuing northwest through Tuscarawas County. The UEO pipeline system serves a different purpose in gathering and transporting liquid heavy unprocessed gas to facilities designed to process the NGL components. The design, use, and orientation of the UEO pipeline have no synergies with the Project's intent to move processed transmission quality gas supplies west towards Defiance, Ohio and into Michigan. Therefore, it was eliminated as a viable system alternative.

10.4.4 Columbia Gas Transmission

Columbia Gas Transmission (CGT), a subsidiary of the Columbia Pipeline Group and a NiSource Company, operates a pipeline system that extends from the Gulf of Mexico in Louisiana north through Mississippi, Tennessee, Kentucky, and Ohio (see Figure 10.4-4 in Appendix 10A). In Ohio, the CGT pipeline system is primarily a north-south trunkline pipeline through central Ohio with pipeline laterals extending west and east. While the CGT system might have some capacity available in portions of its various pipeline segments, it does not have available capacity to transport the 3.25 Bcf/d that will be sourced by the Project's Supply Laterals and Mainlines A and B without significant upgrades along the system. Therefore, it does not meet the Project objectives and was eliminated as a system alternative.

CGT is currently expanding its system as part of the Leach XPress Project that will involve construction of approximately 127 miles of pipeline and two loops totaling 30 miles, abandonment of 27 miles of pipeline, three new compressor stations, and modifications at two existing stations. The project will increase CGT's system capacity by 1.5 Bcf/d and will move regional gas supplies to various markets, including interconnections with CGT in Leach, Kentucky (also see discussion in Resource Report 1, Section 1.12). As proposed, this project would not serve the markets that will be served by the Rover Pipeline Project, nor is it sized to carry the Project's 3.25 Bcf/d.

10.4.5 Rockies Express Pipeline, LLC

Rockies Express Pipeline, LLC (REX) owns and operates a 1,698-mile pipeline that stretches from northwestern Colorado to Clarington in eastern Ohio (see Figure 10.4-5 in Appendix 10A for REX pipeline facilities in Ohio). It was designed to carry 1.8 Bcf/d eastward from producers in the Rocky Mountains to supply demand in the Midwest and eastern parts of the country. In June 2014, REX conducted a non-binding open season to solicit interest in east-to-west capacity for Appalachian

producers to move their gas out of the production basin and into Midwest markets. The "Clarington West Project" would provide new firm transportation capacity from receipt points in or around Clarington, Ohio to available delivery points in REX's Zone 3 including deliveries at Lebanon, Ohio and points west as far as Edgar, Illinois. Depending on the results of the Open Season and the binding commitments that REX ultimately secures from prospective shippers, the Clarington West Project could consist of pipeline looping, new or expanded compressor stations, new receipt point facilities, new delivery point facilities, and the expansion of existing delivery point facilities. The expected bidirectional REX system would operate flexibly to meet both existing west-to-east firm transportation commitments from the Rockies supply basins and the new demand for east-to-west firm transportation from Appalachian supply basins.

While this system could provide transportation services westward, it would also require significant system upgrades and expansion as well as new construction of several Supply Laterals, with the possible exception of the Seneca Lateral to reach all of the Project's supply points. Additionally, the REX system traverses the southern portion of Ohio requiring a new build of hundreds of miles of pipeline to deliver gas to the Defiance Hub, Ohio delivery point(s) for the Project, and then on into Michigan to reach contracted Market delivery points. At this time, it is not known if REX is proceeding with its Clarington West Project or the timing for that project. Because the REX pipeline would not meet capacity, timing, or delivery point contractual requirements, it was eliminated as a system alternative.

10.4.6 TransCanada ANR East Pipeline Project

Prior to the Project's initial proposal (in 2013 and into 2014), TransCanada proposed the ANR East Pipeline Project which would have transported natural gas volumes from near Cadiz and Clarington, Ohio into the ANR pipeline system via a combination of new-build segments plus looping and expansion of their existing ANR system in Michigan and their affiliated Great Lakes system, eventually providing service back to Chicago, Illinois or to Dawn, Canada (see Figure 10A-6 in Appendix 10A). As part of Rover's system alternative planning, Rover entered into detailed discussions with TransCanada to join projects from August 2014 to January 2015 to utilize a portion of their planned system or a portion of their existing system in lieu of building certain segments of the Project.

As part of those discussions, it became apparent that sections of the ANR East Pipeline Project proposal from Cadiz/Clarington, Ohio were not feasible, as those sections could not transport the contracted volume subscribed on Rover (3.25 Bcf/d). Additionally, the system being proposed by ANR was very similar to Rover's, and there were no apparent environmental advantages of their route over Rover's. Therefore, their route was considered as one that merely transferred impacts from one group of stakeholders to another with no discernible environmental advantages. Further, there were clear disadvantages to shifting to the ANR route, such as timing limitations as well as ANR's proposed costs and resultant fees (or transportation rates) to transport natural gas volumes on those sections. Based upon commercial discussions with ANR, the transportation costs on ANR were greater than Rover's proposal and contractual commitments, making the use of the ANR system unviable to the commercial commitments as made by Rover to its shippers. With the lack of environmental benefits and the commercial disadvantages, Rover disqualified the section of the ANR proposal from Cadiz/Clarington,

Ohio to Defiance, Ohio as infeasible and not preferable to the Supply Laterals and Mainlines A and B as proposed by Rover.

Rover and TransCanada continued to evaluate the ANR East proposal from Defiance, Ohio to the ANR system and Great Lakes system to Dawn, Canada as a potential system alternative to Rover's proposed Market Segment from Defiance, Ohio to Dawn, Canada. Ultimately, those discussions also failed for several reasons: 1) the ANR system did not eliminate the impacts from Defiance to Dawn and the proposed ANR loops, the new-build and modifications to the ANR system and Great Lakes system, were extensive (approximately 239 miles on ANR's proposal); 2) portions of the ANR system would require substantial upgrades or replacement that were not clearly defined during the negotiations that made Rover concerned that the ANR system could not meet the timing and commercial objectives of Rover's shippers; and 3) the parties were unable to reach a final agreeable transportation rate in the time Rover had available to meet its commercial planning horizon to make its in-service objectives and to meet Rover's contractual obligations to its shippers. Ultimately, this system alternative was dismissed as not viable.

10.4.7 Vector Pipeline System

Vector Pipeline L.P. (Vector) operates a pipeline system that extends for approximately 333 miles from a point south of Joliet, Illinois, continuing east through northern Indiana, Ohio, and southern Michigan to the U.S./Canada border north of Detroit, Michigan (see Figure 10.4-7 in Appendix 10A). The Vector pipeline continues into Canada to the Union Gas Dawn Hub in Ontario. Based upon the Vector's Mainline Expansion Project, it appeared that the Vector pipeline system would have available capacity suitable to meet Rover's transportation expectations. Discussions with Vector included multiple options for the Vector system to transport anywhere from 0.9 Bcf/d up to 1.3 Bcf/d using existing available or unsubscribed capacity requiring no expansion of their system, up to and including expanding their system to transport the proposed volumes for Rover, NEXUS Gas Transmission, LLC's (NEXUS), and any other interested shipper.

Rover began discussions with Vector in July 2014 ahead of their supplemental Open Season that ran from early October 2014 to early November 2014. During these initial discussions, Rover submitted a Precedent Agreement with certain terms to Vector for long-term firm transportation service as part of the Vector's Mainline Expansion Project. However, the early and initial terms of the Precedent Agreement submittal were not accepted by Vector for various reasons. Therefore, a transportation deal was not agreed upon and Rover continued development of the Market Segment pipeline that extended for approximately 210 miles from Defiance, Ohio through Michigan to the U.S./Canadian border near East China, St. Clair County, Michigan, and an additional 15 miles of pipeline in Canada to the Dawn hub (see Figure 10.4-8 in Appendix 10A).

However, both parties continued to discuss the possibility of finding a mutually agreeable term sheet and Precedent Agreement that would meet the financial and transportation needs of both parties. Under these discussions, Rover would truncate its proposed Market Segment pipeline at the intersection with Vector near the Market Segment milepost (MP) 100.0 in Livingston County, Michigan, essentially eliminating

the need to build approximately 110 miles between that point and the U.S./Canadian border, as well as the approximately 15.0 miles in Canada. The discussions also contemplated reducing the capacity north of the Defiance Compressor Station in Defiance, Ohio from 1.3 Bcf/d to 0.9 Bcf/d. Under these terms, it was expected that Vector could accept the 0.9 Bcf/d with no expansion plans even when contemplating the volumes originating from the proposed NEXUS pipeline system (roughly 0.4 Bcf/d). However, this option was not viable based upon Rover's commercial commitments to move the full volume (1.3 Bcf/d) from Defiance north into the Michigan and Canadian markets, and Vector's reluctance to accept the terms of the proposed Precedent Agreement for price and expectations of transportation service in conjunction with its other customers.

Discussions continued and an agreement between Rover and Vector was reached in January 2015. Under that agreement, Vector will transport Rover's volumes from the interconnection with Vector at Market Segment MP 100.0 to Dawn in Ontario, Canada. No expansion of the Vector pipeline system will be required and Rover eliminated approximately 110 miles of pipeline through a part of Livingston County, and all of Shiawassee, Genesee, Lapeer, Oakland, St. Clair, and Macomb counties, Michigan, as well as the entire Canadian segment. Table 10.4-1 in Appendix 10B provides a comparison of the proposed route in the U.S. as originally designed through January 2015 and as currently proposed with the Vector pipeline transporting Rover's volumes to Canada.

10.4.8 Summary of Pipeline System Alternatives

As evidenced in the above sections, in addition to the complexity of designing a system alternative using one or several existing pipeline systems to meet the Project objectives, any expansion of another pipeline system is dependent on available capacity on that system and participation of the system operator. Therefore, if additional pipeline facilities are required to transport proposed natural gas volumes, the viability of a system alternative is also dependent on whether the system operator has the resources to commit to construction and operation of additional pipeline facilities within the timeframe required by the Project shippers.

While there are numerous existing intrastate and interstate pipeline systems in the Project area, no single pipeline system has the existing facilities capable of receiving the proposed volumes of natural gas from the Marcellus and Utica Shale gas areas in Pennsylvania, West Virginia, and Ohio, or to transport these natural gas supplies to interconnections with other pipeline systems in Ohio, Michigan, and ultimately to the Union Gas Dawn Hub in Ontario, Canada. Further, while one (or several) of the existing interstate pipeline systems could be expanded to meet the Project objectives, that expansion would require the construction of a similar, or greater, number of miles of pipeline and related aboveground facilities to accommodate transportation of the proposed 3.25 Bcf/d of natural gas. Due to these constraints, there is no all-encompassing system alternative to the Project as proposed that would meet the stated Project purpose and schedule.

However, one system alternative was identified for a portion of the proposed route in Michigan. This system alternative involves use of the Vector pipeline system to transport Rover's volumes to Michigan and Canada through an interconnection between Rover and Vector in Livingston County, Michigan, thus

eliminating approximately 110 miles of proposed pipeline and associated facilities. This system alternative has been incorporated into the Rover Pipeline Project.

10.5 MAJOR ROUTE ALTERNATIVES

Major route alternatives are identified to allow for comparison of various environmental and socioeconomic impacts in an effort to select the best overall pipeline alignment. Typically, major route alternatives are identified to maximize use of existing utility corridors, reduce impacts on environmentally sensitive resources (e.g., recreation or designated scenic areas, natural habitat management areas), or avoid specific routing constraints (e.g., population centers, steep or rugged terrain). Locating new pipelines adjacent to existing utility rights-of-way is a generally accepted practice to limit land use impacts by keeping disturbance within established corridors. While a major route alternative must meet the Project objectives and should not significantly increase the overall length of the pipeline, a major route alternative would follow a significantly different alignment. Route alternatives that would result in significantly less impact, while maintaining the committed schedule and economic parameters of the Project, could be preferable to the proposed route.

The following sections provide a discussion of the considerations used in the development of the proposed routes, as well as an overview of major routes evaluated.

10.5.1 General Routing Considerations

The identification of the proposed routes for the Supply Laterals and Mainlines involved several steps. In the development of the preliminary routes for the Project, Rover identified the interconnect locations including all known receipt and delivery points identified by the potential customers at that time to develop the project parameters. Preliminary routes were then drafted using aerial photography, U.S. Geological Survey mapping, and GIS layers of sensitive land uses and existing utility corridors to create a system of pipeline segments that would address the needs of the Project from receipt points to delivery points by the most efficient paths and utilizing as many existing corridors as possible. The resulting system collects natural gas supplies that originate at the receipt points on the Supply Laterals and delivers those supplies to a common pipeline (or mainline) that originates in the vicinity of Leesville, Ohio. The common pipeline in turn extends from the vicinity of Leesville to delivery points in Defiance, Ohio and to the interconnection with Vector in Michigan for ultimate delivery of gas supplies to Michigan and Dawn in Ontario, Canada. Because the primary purpose of the Project is to transport natural gas supplies from the Utica/Marcellus shale areas to domestic markets in Ohio and Michigan, a direct route across Lake Erie to Dawn in Ontario, Canada was eliminated.

Once the receipt and delivery points had been identified, potential corridors between these points were selected with a focus on the following routing considerations:

- Minimizing the overall length of each pipeline segment, thus reducing overall costs and disruption;

- Maximizing use of existing pipeline, electric power transmission, or utility corridors for siting of the pipelines to minimize fragmentation of the land;
- Avoidance of population centers;
- Avoidance of rock outcrops and severe terrain (cliffs, etc.);
- Minimizing overall length of side slope crossings;
- Avoidance of designated land uses (federal, state, or conservation land, population centers, abandoned mines, hazardous waste sites, landfills, etc.);
- Minimizing crossings of extensive wetland systems through review of the National Wetlands Inventory (NWI) database;
- Avoidance of known cultural resources (documented cultural sites, historic landmarks, cemeteries, etc.)
- Minimizing or avoiding crossings of designated wildlife habitats (Wildlife Management Areas, designated rare, endangered, and threatened species habitats);
- Minimizing the number of waterbody crossings via review of the National Hydrography Dataset (NHD);
- Minimizing impacts on landowner property; and
- Selecting the best crossing location for features that could not be avoided (recreational areas, parks or trails, residential subdivisions or trailer parks, commercial/retail areas, and planned highway, housing or other commercial/industrial developments).

Locating a new pipeline right-of-way adjacent to existing utility rights-of-way is generally considered to have less environmental impact than siting a new pipeline on new (or greenfield) right-of-way as it reduces environmental impacts associated with fragmentation of forest habitat, and concentrates utility corridors in one location. However, the placement of multiple utilities adjacent to one another imposes a greater impact on landowners who may be burdened with multiple easements and multiple restrictions associated with those easements on their land. Collocation (or placement of the pipeline within an existing easement) also imposes operational constraints on the operators responsible for maintaining safe and reliable service.

Following initiation of the civil surveys in June 2014 and comments received during the FERC Pre-Filing Review Process, further refinements were incorporated into the preliminary routes and the entire proposed pipeline system was flown via helicopter multiple times to review problematic areas and finalize the preliminary route. These preliminary routes were continually refined during civil surveys to address constructability concerns and site-specific comments from landowners and agencies.

To the extent feasible, the proposed routes are located adjacent to existing pipeline rights-of-way. Design considerations associated with the use of existing rights-of-way are provided in the following sections.

10.5.1.1 Existing Pipeline Rights-of-Way

Pipeline rights-of-way are typically easements and not owned in fee by the operator. The width of the easement varies and can range from 10 to 100 feet or more depending on the diameter of the pipeline and the number of pipelines within the easement. While temporary workspace for the Rover pipelines can be

located within an adjacent pipeline easement, each operator maintains its own permanent easement for necessary pipeline operation and maintenance activities so it is normal practice for the permanent pipeline easements of foreign pipelines to abut each other.

In many areas, residential and commercial development has encroached along existing pipeline easements or topography, such as severe side slopes or other natural features, make it infeasible to install a new pipeline adjacent to an existing one. In many cases, the route of the first pipeline installed in rugged terrain is chosen to minimize construction and operation on side slopes and other extreme terrain. When designing a new pipeline adjacent to the original line in such cases, the new pipeline would be pushed further onto the side slopes where it is more difficult to construct and maintain the easement during operations. In some areas, extreme changes in topography have forced Rover to deviate from existing pipeline rights-of-way, although Rover has remained adjacent to the existing pipelines wherever possible.

10.5.1.2 Existing Powerline Rights-of-Way

Electric powerlines may be installed in easements or the right-of-way may be owned in fee by the operator. In rugged terrain and in certain situations, the development of a pipeline route adjacent to an existing powerline must consider the feasibility of installing the pipeline in such locations. While terrain may have presented some difficulty during construction of the powerline, the powerline can take advantage of the terrain and span across significant changes in elevation. Powerline structures can be placed on the high points with the powerline conductors strung across bluffs and rock outcrops. Actual ground disturbance is typically limited to the structure sites and tree-clearing along bluffs or steep slopes can be avoided. Development of a pipeline right-of way along this type of existing corridor would result in significant modification of the landscape, since pipeline construction could require significant grading along the entire route to achieve a level surface from which to install the pipeline. This means that the pipeline often needs to be rerouted around bluffs, side slopes, and steeper terrain that can be spanned by a powerline. Similar to pipeline operators, powerline operators maintain their easements for operational and maintenance activities and, where easements are owned in fee, powerline operators may hold these easements for future expansion of the electric power system.

10.5.1.3 Interstate Rights-of-Way

Interstate highways are typically owned in fee and these easements are fenced to prevent unauthorized access onto the highway. Use of these interstate rights-of-way for the pipeline would involve placing the pipeline in an easement adjacent to the interstate right-of-way or collocation of the pipeline within the interstate easement. If adjacent, the pipeline typically needs to be rerouted around congested population centers through which the interstate passes, and around interchanges and commercial or residential development that may be located along the interstate. Placement of the pipeline within the interstate easement involves additional design considerations when crossing interchanges and under overpasses where the bridge structure could be compromised. Placement of the pipeline either adjacent to the road within the interstate easement or within the median also involves construction issues associated with moving equipment and materials onto limited access highways where the speed is 55 or 65 miles per

hour. Construction activities may also present a safety hazard for motorists, as would maintenance of the system during operations.

10.5.2 Supply Laterals

The receipt points for the Supply Laterals were determined by the shippers in that the receipt point had to be in proximity to the shipper plants, which are the sources of the natural gas supply, or a location to which the shippers could connect. The start points for the Sherwood, Seneca, Berne, Majorsville, Cadiz, and Burgettstown Laterals are determined by proximity to shipper plants. The start point for the CGT Lateral is downstream of the Sherwood Compressor Station and its end point at the nearest interconnection with the CGT pipeline system. The start point for the Clarington Lateral is based on proximity to multiple receipt points. The pipeline laterals were then developed as the most cost efficient routes to collect the supplies from the receipt points and carry those supplies to a common point, which was defined as Mainline Compressor Station 1.

Also considered in the development of the proposed routes were existing pipeline utility systems, such as those operated by UEO, Texas Eastern Transmission, L.P. (Texas Eastern), CGT, Dominion Gas Transmission, East Ohio Gas, and others, where these pipeline or powerline rights-of-way would be compatible with the routing objectives of the Project.

10.5.2.1 Sherwood West Alternate

The Sherwood West Alternate was designed to accommodate potential interconnects with shipper receipt points in the Wayne National Forest Proclamation Boundary and followed a northwesterly route from the Sherwood Plant in the vicinity of the Sherwood Compressor Station to the Seneca Plant in the vicinity of the Seneca Compressor Station (see Figure 10.5-1 in Appendix 10A). The potential interconnects did not materialize and, once those shippers dropped out, it was inefficient to move the natural gas supplies from Sherwood west to Seneca and then east to Clarington, although an alternate route from Seneca to Cadiz was considered (see Section 10.5.2.5). Therefore, while the proposed Sherwood Lateral followed the Sherwood West Alternative for about 25 miles, the Sherwood Lateral continues in a more northerly direction to an intersection with the Seneca Lateral at Seneca Lateral MP 16.67.

The Sherwood West Alternate is approximately 2.1 miles shorter than the proposed route, resulting in approximately 32.5 fewer acres of land impacts during construction, including 20.9 fewer acres of forest impacts (see Table 10.5-1 in Appendix 10B). The alternate would also cross 9 fewer perennial streams and 19 fewer roads. However, Sherwood West Alternate would affect 1.25 more acres of scrub-shrub wetlands and 0.1 more acre of forested wetlands, and would cross 21 more intermittent streams. It would also cross 1.3 miles of land currently owned and managed by the U.S. Forest Service.

Approximately 24 miles of the Sherwood West Alternate follows a similar route with approximately 25.5 miles of the proposed Sherwood route. The Sherwood West Alternate then deviates from the proposed route and continues northwest approximately 27.9 miles to the Seneca Compressor Station. The proposed Sherwood Lateral continues generally north approximately 28.5 miles to the Sherwood Tie-in along the

Seneca Lateral. Therefore, the two routes are comparable with the proposed Sherwood Lateral being a slightly longer route. The Sherwood Lateral is preferable from a design perspective and requires less compression at the Seneca Compressor Station. Since the Sherwood West Alternate crossed more land within the Wayne National Forest Proclamation Boundary, was not considered preferable from a system perspective, and offered no significant environmental advantage, it was eliminated from further consideration.

10.5.2.2 CGT Alternate

The CGT Alternate Route begins at the existing Sherwood Plant in the vicinity of the Sherwood Compressor Station. It then continues northeast to follow the proposed route for the CGT Lateral to the initial delivery point on the CGT pipeline system, located approximately 0.6 mile southwest of the proposed CGT Meter Station. The proposed CGT Lateral begins approximately 1.3 miles north of the Sherwood Compressor Station and continues in a northeasterly direction to the CGT Meter Station, the preferred delivery point on the CGT pipeline. The CGT Alternate and proposed CGT Lateral are shown on Figure 10.5-2 in Appendix 10A.

The CGT Alternate is approximately 0.3 mile shorter than the proposed route, and would affect 2.5 fewer acres of land during construction, and 1.9 fewer acres of land during operation (see Table 10.5-2 in Appendix 10B. It would also affect 3.9 fewer acres of forest. The proposed route would cross two fewer intermittent streams than the CGT Alternate and would cross 3 fewer roads. No NWI wetlands were documented on either route. While the CGT Alternate would have fewer environmental impacts, this alignment did not accommodate the preferred receipt and delivery points, and it was eliminated from further consideration.

10.5.2.3 Seneca Alternate

The Seneca Alternate would begin in the vicinity of the Berne Meter Station and would follow an existing pipeline right-of-way located about 0.5 mile south of the proposed route to the vicinity of the Clarington Compressor Station at which point it would turn north on new right-of-way for approximately 0.8 mile to terminate at the Clarington Compressor Station (see Figure 10.5-3 in Appendix 10A). The proposed Seneca Lateral generally parallels the Texas Eastern pipeline right-of-way for its entire length from the Seneca Compressor Station to the Clarington Compressor Station.

The Seneca Alternate would be 0.2 mile longer than the proposed route, affect 29.3 more acres of land during construction, and cross 1 less perennial and 1 more intermittent stream than the proposed route (see Table 10.5-3 in Appendix 10B). However, it would affect 6.4 fewer acres of forest. While feasible, the Seneca Alternate would also require relocation of the Hall and Gulfport Meter Stations. For these reasons, the Seneca Alternate was eliminated from further consideration.

10.5.2.4 Berne Alternate

The Berne Alternate was designed to connect the original receipt point to the original location of the Seneca Compressor Station. As such, it began east of the proposed Berne Lateral, continued west and north to parallel the Berne Lateral, and then turned south to the original location of the Seneca Compressor Station near the Seneca plant (see Figure 10.5-4 in Appendix 10A).

The Berne Alternate is approximately 0.4 mile longer than the proposed route and would affect 5.7 more acres of land during construction, and require crossings of one more intermittent stream, one more perennial stream, and one more road (see Table 10.5-4 in Appendix 10B). However, it would affect 2.6 fewer acres of forest. No NWI wetlands were crossed on either route. The proposed route for the Berne Lateral has slightly fewer environmental impacts, has taken into consideration constructability issues and better serves the purpose of the lateral with respect to receipt and delivery locations. Therefore, the Berne Alternate was eliminated from further consideration.

10.5.2.5 Clarington West Alternate 1

The Clarington West Alternate 1 was originally evaluated as part of an eastern pipeline route that originated near the proposed Seneca Compressor Station, to allow receipts along that route, and then continued north to terminate at or near the Cadiz Compressor Station. The Clarington East Alternate 2 (or Belmont County Alternative) was also evaluated in the early planning stages to accommodate a customer receipt near Adena, Ohio, while also transporting natural gas supplies collected from the Seneca, Sherwood, and Majorsville Laterals north to Cadiz. These Alternates and the proposed Clarington Lateral are shown on Figure 10.5-5 in Appendix 10A.

The Clarington West Alternate 1 would be approximately 3.4 miles longer than the proposed route, and would affect 32.8 more acres of land during construction. Changes in construction acreage per land use would include 152.4 more acres of forest, 5.3 more acres of emergent wetlands, 0.7 more acres of scrub-shrub wetlands, and 0.01 more acre of forested wetlands (see Table 10.5-5 in Appendix 10B). It would also require crossings of 23 more intermittent streams, six more roads, and would cross 4.6 miles of federal and state land managed as part of the Egypt Valley Wildlife Area and Seneca Lake. This alternate could potentially avoid construction of approximately 13.0 miles of the Seneca Lateral between Seneca Lateral MP 3.7 (Hall Meter Station) and MP 16.7 (Sherwood Tie-In). However, the Seneca Lateral as designed provides access to multiple future natural gas receipts that are not available along the Clarington West Alternate 1. This consideration, in conjunction with the crossings of federal and state land, led to the elimination of the Clarington West Alternate 1 from further consideration.

The Clarington East Alternate 2 would be approximately 11.3 miles longer than the proposed route, and would affect 149.9 more acres of land during construction. Changes in construction acreage per land use would include an additional 120.2 acres of forest, 1.6 more acres of scrub-shrub wetland, and 2.3 more acres of forested wetlands. It would also require crossings of 23 more perennial streams, ten more roads, and five more railroads (see Table 10.5-5 in Appendix 10B). However, the Clarington East Alternate 2 would eliminate approximately 5.6 miles of the Majorsville Lateral between Majorsville Lateral

approximate MPs 18.3 and 23.9. Even so, the Clarington East Alternate Route 2 would result in greater environmental impacts and, since it was no longer needed to interconnect with a customer, it was eliminated.

10.5.2.6 Majorsville Alternate

The Majorsville Alternate was the original route considered between the then-identified receipt point and the Clarington Lateral (see Figure 10.5-6 in Appendix 10A). It would be approximately 1.2 miles shorter than the proposed route, and would affect 14.9 fewer acres of land during construction (see Table 10.5-6 in Appendix 10B). However, in comparison to the proposed route, the Majorsville Alternate would affect 4.1 more acres of forest, 0.08 more acres of emergent wetland, 0.11 more acres of scrub-shrub wetland, and 0.19 more acre of forested wetlands. It would also require crossings of two more roads. While the proposed Majorsville Lateral is longer, it does reduce environmental impacts and accommodates the desired customer receipt. Therefore, the Majorsville Alternate was eliminated from further consideration.

10.5.2.7 Cadiz Alternate

Similar to the Majorsville Alternate, the Cadiz Alternate was the initial route considered in October 2014 to connect the Cadiz Compressor Station site at that time and the Clarington Lateral (see Figure 10.5-7 in Appendix 10A). It would be approximately 0.08 mile shorter than the proposed route, and would affect 1.2 fewer acres of land during construction. Changes in construction acreage per land use would include 0.5 fewer acres of forest (see Table 10.5-7 in Appendix 10B). No NWI wetlands would be crossed on either the Cadiz Alternate or the Cadiz Lateral, and both would cross the same number of intermittent and perennial streams. Because the proposed route for the Cadiz Lateral best meets the needs of the Project without significantly greater environmental impacts, the Cadiz Alternate was eliminated from further consideration.

10.5.2.8 Supply Connector Alternate

The Supply Connector Alternate was the initial route considered in May 2014 (see Figure 10.5-8 in Appendix 10A). It would be approximately 2.25 mile shorter than the proposed route, and would affect 41.0 fewer acres of land during construction. Changes in construction acreage per land use would include 1.7 fewer acres of forest, and 1.5 fewer acres of emergent wetlands (see Table 10.5-8 in Appendix 10B). The Supply Connector Alternate would cross an additional 1.2 acres of scrub-shrub wetlands, one more intermittent stream, one more perennial stream, and one more road than the proposed route. It would also require a 1.7-mile-long crossing of Tappan Lake Park and Tappan Lake Reservoir. For this reason, the Supply Connector Alternate was eliminated from further consideration.

10.5.2.9 Burgettstown Alternate

The Burgettstown Alternate was the initial route considered in May 2014 between the receipt identified at that time and the Supply Connector (see Figure 10.5-9 in Appendix 10A). It would be approximately 5.5 miles shorter than the proposed route, and would affect 9.9 fewer acres of land during construction.

Changes in construction acreage per land use would include 28.7 fewer acres of forest, 0.5 more acres of emergent wetlands, 1.5 more acres of scrub-shrub wetland, and 1.25 more acres of forested wetland; would require a 0.5 mile long crossing of the Leesville Lake Wildlife Area; would require one additional intermittent stream crossing; and would be within 50 feet of five more residences. (see Table 10.5-9 in Appendix 10B). It would also cross 6 fewer perennial streams and 17 fewer roads than the proposed route. However, it would affect While the proposed route is 5.5 miles longer than the Burgettstown Alternate Route, 4.3 miles of this longer length is associated with an extension that was incorporated on the east end of the proposed route to connect to the supplier's receipt point. Overall, the proposed route was considered to have fewer environmental impacts and the Burgettstown Alternate was eliminated from further consideration.

10.5.3 Mainlines A and B

The route for Mainlines A and B was determined by the location of Mainline Compressor Station 1, which was the final receipt point for all the volumes collected from the Supply Laterals, and the Defiance Compressor Station, which was the delivery point for various interconnections to the Midwest and Michigan. The proposed route was then developed as the most cost efficient route to transport the volumes between those two points taking into consideration constructability, and landowner and environmental concerns.

10.5.3.1 Mainlines A and B Alternate

The Mainlines A and B Alternate was the initial route evaluated in May 2014 (see Figure 10.5-10 in Appendix 10A). The Mainlines A and B Alternate would be approximately 6.8 miles shorter than the proposed route; would affect 141.2 fewer acres of land during construction and 3.4 fewer acres of emergent wetlands; and would cross 3 fewer intermittent streams, 6 fewer perennial streams, 37 fewer roads, and 1 fewer railroad (see Table 10.5-10 in Appendix 10B). In comparison to the proposed route, the Mainlines A and B Alternate would affect 120.8 more acres of forest, and be within 50 feet of 72 more residences and within 500 feet of two schools or hospitals. Both routes would cross the Tuscarawas River and the Ohio and Erie Canal National Heritage Area for a 0.1-mile-long crossing. The Mainlines A and B Alternate would also cross 0.8 mile of the Killbuck Marsh Wildlife Area. While the proposed route is longer than the alternate, it affects fewer acres of upland and wetland forest, and reduces impacts on nearby residences. As it also incorporates a number of adjustments to minimize impacts on landowners and environmental resources, the alternate route was eliminated.

10.5.3.2 Mainlines A and B – NEXUS Alternative

NEXUS is developing a project designed to transport up to 1.5 Bcf/d of natural gas from the Appalachian Basin to customers in the U.S. Midwest and Ontario. The NEXUS Gas Transmission Project (NEXUS Project) will involve construction of approximately 200 miles of greenfield (of up to 42-inch-diameter) pipeline and four new compressor stations that would be located in Columbiana, Stark, Summit, Wayne, Medina, Lorain, Erie, Sandusky, Wood, Lucas, and Fulton counties, Ohio; and approximately 50 miles of greenfield pipeline in Lenawee, Monroe, and Washtenaw counties, Michigan. The NEXUS Project will

also include firm capacity on the Texas Eastern system in Ohio and Pennsylvania; the DTE Gas Transportation (DTE) system in eastern Michigan extending to the U.S./Canada border; and the Vector Pipeline system in Michigan, northern Indiana, and eastern Illinois, and extending across the U.S./Canada border into western Ontario. NEXUS received authorization from FERC to initiate the FERC Pre-Filing Process on January 9, 2015 in Docket No. PF15-10-000. Texas Eastern will submit its Pre-filing request for the portion of the NEXUS project with which it is involved in the near future. The DTE expansion will be subject to the jurisdiction of Michigan Public Service Commission. NEXUS plans to file its 7(c) application in November 2015 to meet an anticipated in-service date of November 1, 2017.

Due to the general proximity of the planned NEXUS pipeline and Mainlines A and B, placement of Mainlines A and B adjacent to the planned NEXUS might be considered preferable to creation of two new pipeline rights-of-way. The NEXUS Project pipeline begins in the Kensington, Ohio area, approximately 30 miles north-northeast of approximate Mainlines A and B MP 6.0. From Kensington, the planned NEXUS pipeline continues north and west, paralleling Mainlines A and B at a distance of between 20 and 30 miles to the north. At the southern end of Lucas County, Ohio (approximately 18 miles north of MP 182.0 on Mainlines A and B), the planned route for the NEXUS pipeline would turn north and continue north to the Detroit, Michigan area.

The NEXUS Alternate would begin at approximate Mainlines A and B MP 52.4, and would turn north on a new greenfield route for approximately 26 miles to the planned NEXUS route (see Figure 10.5-11 in Appendix 10A). It would then follow the planned NEXUS route north and east for approximately 97 miles at which point it would leave the NEXUS route and continue east for approximately 47 miles to rejoin Mainlines A and B at MP 203.6.

The NEXUS Alternate would be approximately 19.2 miles longer than the corresponding segment of the proposed route, and would affect 303.1 more acres of land during construction. Changes in construction acreage per land use would include an additional 131.7 acres of forest, 2.1 more acres of scrub-shrub wetlands, and 5.2 more acre of forested wetlands (see Table 10.5-11 in Appendix 10B). It would also require crossings of 7 more perennial streams, 13 more roads, and 11 more railroads. The NEXUS Alternate would 57 fewer intermittent streams than the corresponding segment of the proposed route.

As stated in Section 10.2, the purpose of the Rover Pipeline Project is to transport natural gas supplies from the Marcellus and Utica Shale areas of West Virginia, Pennsylvania, and Ohio to interconnections with existing pipeline systems at Defiance, Ohio. Rerouting Mainlines A and B adjacent to the NEXUS pipeline would add a minimum of 19.2 miles to the overall length of this segment with associated additional impacts on environmental resources and landowners. Further, the route for the NEXUS pipeline is still under development and likely will not be finalized until sometime in 2015. At that point, it will be subject to environmental review and further modifications. Therefore, it is not feasible to relocate Mainlines A and B to the NEXUS pipeline route and still meet the Project schedule. Further, the NEXUS Alternate offers no environmental advantage over the proposed route and would actually increase impacts on landowners who would end up with three large diameter pipelines on their property.

10.5.4 Market Segment

The purpose of the Market Segment is to transport natural gas from the Defiance Compressor Station to delivery points in Michigan and ultimately to Dawn, Canada for delivery to both Canadian and U.S. markets. Routing considerations included avoidance of the large metropolitan areas of Detroit, Ann Arbor, and Flint, while minimizing impacts to suburban residential development that has grown up along the interstates between these cities.

10.5.4.1 Market Segment Alternate

Two major route alternatives were initially evaluated before selection of the proposed route during the Pre-filing Process that extended from June 2014 to February 2015. The preliminary (or July 2014) route for the Market Segment extended from the Defiance Compressor Station in Defiance, Ohio for approximately 210 miles to the U.S./Canada border north of East China, Michigan. At Market Segment MP 100, this preliminary route turned east to generally follow the existing Enbridge Line 6B pipeline right-of-way through Livingston, Oakland, Macomb, and St. Clair counties, thus maximizing the length adjacent to existing utility rights-of-way while also avoiding the metropolitan areas of Ann Arbor, Pontiac, and Detroit. Although this route represented the shortest route between Market Segment MP 100.0 and the U.S./Canadian border and maximized placement of the pipeline adjacent to existing rights-of-way, landowners identified multiple concerns with the route, most of which were centered around the addition of another pipeline adjacent to Line 6B, renewed land disturbance following recent construction activities along Line 6B, and safety concerns associated with multiple pipelines in close proximity to residences.

In response to these comments and following more detailed review of the route along Line 6B, Rover determined that there was insufficient space for the Market Segment pipeline through several congested areas and no obvious alternate routes that would reduce impacts on residential land without merely transferring those impacts to other residents. Therefore, a second route was developed for the Market Segment that involved continuing north from Market Segment MP 100.0 to Shiawassee County, then turning east through Genesee (south of Flint, Michigan) and continuing east-northeast through the north end of Oakland County and southern Lapeer County before turning south through Macomb and St. Clair counties to the U.S./Canada crossing at East China. Although this route was approximately 17 miles longer than the preliminary (July 2014) route, it was generally located in less congested residential areas and was submitted as the proposed route in August 2014. Landowners along this route cited similar concerns with disruption of land for installation of the pipeline and safety. Following an agreement with Vector in February 2015, Rover eliminated the route north of Market Segment MP 100.0 (see Section 10.4.5, Figure 10.4-8 in Appendix 10A, and Table 10.4-1 in Appendix 10B).

The Market Segment Alternate is the initial route considered in May 2014 between Market Segment MPs 0.0 and 100.0 (see Figure 10.5-12 in Appendix 10A). The Market Segment Alternate would be approximately 1.7 miles shorter than the proposed route; would affect 1.7 fewer acres of land during construction. Changes in construction acreage per land use would include 0.8 fewer acres of forest and 1.9 fewer acres of forested wetlands; and would cross one less intermittent stream, 29 fewer roads, and 8

fewer railroads (see Table 10.5-12 in Appendix 10B). However, it would affect 10.5 more acres of emergent wetlands, 4.0 more acres of scrub-shrub wetlands, and would cross two more perennial streams.

While the Market Segment Alternate is shorter, the proposed route incorporates landowner requests with respect to the siting of the pipeline on their properties and addresses design and constructability concerns without a significant increase in environmental impact. For these reasons, the Market Segment Alternate was eliminated from further consideration.

10.5.4.2 Planned Market Segment Route Alternatives

In response landowner comments that the pipeline be placed within existing utility rights-of-way, Rover is proposing to incorporate the following three Planned Route Alternatives (Planned Route Alternatives 1, 3, and 4) into the proposed route pending completion of civil and environmental survey and negotiations with the utility companies. Rover is also proposing a fourth alternative (Planned Route Alternative 2) to address the Village of Pinckney's concerns about the crossing of the Village's municipal sewage treatment plant. Map books showing the construction details for each planned variation are provided in Volume IIB, Attachment 1A.

Planned Market Segment Route Alternative 1

Planned Market Segment Alternative 1 would deviate west from the proposed route at Market Segment MP 67.99, just north of Pleasant Lake Road. It would then continue adjacent to a pipeline and powerline rights-of-way before turning west to rejoin the proposed route at Market Segment MP 81.75 (see Figure 10.5-13 in Appendix 10A. It would be approximately 0.24 mile shorter than the corresponding segment of the proposed route, and would affect 2.7 fewer acres of land during construction. Changes in construction acreage per land use would include 5.4 fewer acres of forest, 1.4 fewer acres of emergent wetlands, 2.6 fewer acres of forested wetlands, and. 4.6 more acres of scrub-shrub wetlands (see Table 10.5-13 in Appendix 10B).

Planned Market Segment Route Alternative 2

Planned Market Segment Alternative 2 would deviate away from the proposed route and an existing powerline right-of-way at Market Segment MP 83.90. It would then continue north on new right-of-way (west of the proposed route and the Village of Pinckney's sewage plant) and rejoin the proposed route at Market Segment MP 86.84 (see Figure 10.5-14 in Appendix 10A). It would be approximately 0.02 mile shorter than the corresponding segment of the proposed route, and would affect 1.4 fewer acres of land during construction. Changes in construction acreage per land use would include 10.7 acres of forest, 6.8 fewer acres of emergent wetlands, 1.3 fewer acres of scrub-shrub wetlands, and 1.0 fewer acres of forested wetlands (see Table 10.5-14 in Appendix 10B). It would also avoid a 0.64-mile-long crossing of the Village of Pinckney's municipal sewage treatment plant.

Planned Market Segment Route Alternative 3

Planned Market Segment Variation 3 would cross to the south side of the existing powerline right-of-way at Market Segment MP 88.24, continue along the south side before turning north to minimize impacts on the Golden property (see Table 10.6-3 in Appendix 10B). It would then rejoin the proposed route at

Market Segment MP 89.27 (see Figure 10.5-15 in Appendix 10A). It would be approximately 0.03 mile longer than the corresponding segment of the proposed route, and would affect 0.7 more acres of land during construction. Changes in construction acreage per land use would include 0.85 more acres of forest, 0.2 more acres of scrub-shrub wetlands, 0.1 fewer acres of emergent wetland, and 1.2 fewer acres of forested wetlands, and would be within 50 feet of one less residence(see Table 10.5-15 in Appendix 10B). .

Planned Market Segment Route Alternative 4

Planned Market Segment Variation 4 would deviate to the west side of an existing powerline right-of-way at Market Segment MP 93.28. It would then continue within the existing powerline right-of-way to a point approximately 0.9 mile south of the Vector Meter Station, where it would turn northwest and continue north to Market Segment MP 100.0 at the Vector Meter Station (see Figure 10.5-16 in Appendix 10A). It would be approximately 0.23 mile shorter than the corresponding segment of the proposed route, and would affect 5.4 fewer acres of land during construction. Changes in construction acreage per land use would include 1.5 fewer acres of forested wetlands , 0.4 more acres of emergent wetlands, 4.3 more acres of scrub-shrub wetlands, and 3.4 more acres of forest (see Table 10.5-16 in Appendix 10B). However, it would significantly reduce the number of landowner tracts if negotiations are successful and Rover can collocate within the powerline right-of-way.

10.6 ROUTE VARIATIONS

Route variations differ from system alternatives or major route alternatives in that they are identified to reduce impacts on specific localized features, are typically shorter in length than major route alternatives, generally less than 1,000 feet from the original proposed route, and entail typically localized environmental considerations such as reducing or avoiding impacts on specific features. Two route variations were considered in the development of the proposed Project routing.

10.6.1 Route Variations Considered but Eliminated

10.6.1.1 Sherwood Variation 1

Sherwood Variation 1 is the original crossing of the Ohio River and begins at approximate MP 32.9 on the Sherwood Lateral and generally extends northwest to a point north of Paden City, at which point it turns west to cross under the Ohio River and the northern end of Paden Island using a horizontal directional drill. It would then continue west to rejoin the proposed route at Sherwood Lateral MP 36.9 (see Figure 10.6-1 in Appendix 10A). Paden Island is managed by the U.S. Fish and Wildlife Service as one of the Ohio River Islands National Wildlife Refuges.

Sherwood Variation 1 would be approximately 0.6 mile shorter than the corresponding segment of the proposed route, would affect 9.8 fewer acres of land during construction. Changes in construction acreage per land use would include2.6 fewer acres of forest, would cross two fewer perennial streams, and five fewer roads crossed (see Table 10.6-1 in Appendix 10B). It would, however, affect 0.2 more acres of forested wetland and cross 1 more intermittent stream than the corresponding segment of the proposed

route. While the proposed route is longer, it would provide additional buffer during construction between the pipeline and the Paden Island National Wildlife Refuge. For this reason, Sherwood Variation 1 was eliminated from further consideration.

10.6.1.2 Market Segment Variation 1

Market Segment Variation 1 begins at approximate Market Segment MP 44.45 and continues directly north before turning east to rejoin the proposed route at MP 45.07 (see Figure 10.6-2 in Appendix 10A). The variation would be 0.01 mile shorter than the proposed route, would affect 0.2 fewer acres of land during construction, and would cross 0.45 fewer acres of emergent wetlands and 0.39 fewer acres of scrub-shrub wetlands (see Table 10.6-2 in Appendix 10B). It would, however, affect 3.25 more acres of forest and 0.5 more acres of NWI forested wetland. It would also cross an additional ten landowner tracts. Wetland surveys have been conducted along both the proposed route and the Market Segment Variation 1. The proposed route would cross no forested wetlands; the Market Segment Variation 1 would cross two forested wetlands with a total crossing length of approximately 241 feet. Because the Market Segment Variation would affect more wetlands and more landowners, it was eliminated from further consideration.

10.6.2 Responses to Landowner Requests for Route Variations

Seventy nine landowners suggested route variations in comments to the FERC to minimize or avoid impacts on their properties (see Table 10.6-3 in Appendix 10B). Of these, 43 properties have been eliminated as a result of the Vector System Alternative (see Section 10.4.7) and 7 properties were never affected. Rover is evaluating route variations on 18 properties as shown on aerial maps provided in Appendix 10C. For the remaining 11 properties, Rover identified no route variation that was feasible and would not result in impacts on additional new landowners. However, Rover will continue to work with these affected landowners to identify a route that would minimize impacts on these properties.

10.7 COMPRESSOR STATION ALTERNATIVES

10.7.1 Compressor Station Electric Alternative

Rover conducted a study of the potential use of electric motor-driven compressors at the proposed compressor stations. The electric load for an all-electric compressor station design would be of a magnitude serviceable only by a high voltage, 69 kilovolt (kV) or 138 kV, transmission system. A review of aerial photography and available information indicates that the nearest potential interconnection points at any station would be a material distance away and would bear a high cost to construct, especially in the Supply Lateral area given the rugged terrain, and would further burden landowners and increase the potential environmental impacts of the Project. Additionally, it has not been verified that the existing powerlines have the additional capacity available to supply the load a compressor station requires, the largest of which would be potentially be 40 kV or higher at the Mainline Compressor Stations. For example a 45,000-hp compressor station requires approximately 34 megawatts of electricity which is a substantial load. Typically, utilities do not design and build their infrastructure to include the potential for

an incremental load that large. When adding an electric load of that size to a utility system, infrastructure upgrades are done specifically to meet that project's needs. The timing required for electric utilities to upgrade the infrastructure to support the load of large electric motor-driven compressor stations is typically in the 2- to 5-year range, which is well beyond the target operating date.

Alternatively, a gas design requires substantially less power; therefore, local distribution lines are adequate to meet the station needs with minimal upgrades. The cost of electricity in this market area substantially exceeds the fuel gas cost and is unable to comply with a fuel cost cap imposed by the contracts (see Table 10.7-1). The electric system expansion costs, the inability of the price to meet the contractual requirements, and the inability to meet the schedule eliminates this option from consideration.

TABLE 10.7-1
Comparison of the Electrical Requirements for Compressor Stations

Compressor Station	Number of Motors	Load Estimate (MVA)	Minimum Distance to Utility Transmission Line (miles)	Transmission Line Voltage (kV)
Sherwood	3 x 5000 hp	1.3	2	138
Seneca	4 x 5000 hp	1.4	0.5	Substation
Clarington	1 x 1750 hp + 2 x 5000 hp	1.2	2.5	69
Majorsville	2 x 4000 hp	1.1	0.5	69 / 138
Cadiz	1 x 1750 hp + 3 x 5000 hp	1.4	0.5	69 / 138
Burgettstown	3 x 1750 hp	1.1	1	69 / 138
CS1	3 x 5000 hp + 4 x 8000 hp	2.7	2.5	69 / 138
CS2	2 x 5000 hp + 3 x 8000 hp	2.2	0.5	69 / 138
CS3	2 x 5000 hp + 3 x 8000 hp	2.2	0.5	69 / 138
Defiance	2 x 5000 hp + 2 x 8000 hp	1.8	27.1	69 / 138

10.7.2 Compressor Station Site Alternatives

Rover identified the location for each of its compressor stations based largely on design considerations for the general location of the station, and then by environmental criteria (e.g., avoidance of sensitive resource areas) and the availability of land for purchase. Additional consideration was given to locations that were remote from development, residences, and other noise sensitive receptors, while taking into account existing road and utility infrastructure to avoid development of new access roads or utility lines with their associated environmental impacts.

The initial screening for the selection of the compression station sites involved hydraulic modeling to identify locations by MP and hp that best optimized compression and fuel requirements while maintaining design delivery pressures (pounds per square inch gauge) and throughput (Bcf/d), while accounting for the initial pressure of the gas being supplied at each processing plant. The lower the compression and fuel requirements, the lower the noise and air emissions and the lower the resulting costs to shippers and ultimately consumers. The hydraulic modeling identified a unique configuration by MP and hp that best met hydraulic requirements for the throughput and design pressure while still accommodating other

required stations on the system. While there is some latitude in the precise location of each station, each station must be situated within approximately one mile of the model's selected MP for the configuration to work. Otherwise, the system hydraulics, hp, and fuel requirements would be markedly different. Once the preferred MP locations were identified, the next step was the identification of properties in the vicinity that met the environmental criteria and would be available for purchase.

On the Supply Laterals and Market Segment, the compressor stations had to be located near the start of the pipelines to move the gas forward. One of the issues involved in the siting of the compressor stations on the Supply Laterals was the identification of sites that were convenient to the shippers for the start of the laterals and also available for purchase given the rapid development of the natural gas industry in the region. In several cases, Rover identified multiple properties in the vicinity of the preferred compressor station locations and narrowed the choices by environmental or landowner responses to inquiries. On Mainlines A and B, the compressor stations had to be more or less evenly distributed along the length of the dual pipelines between Compressor Station 1 and the Defiance.

10.7.2.1 Sherwood Compressor Station

The proposed Sherwood Compressor Station is located at MP 0.0 on the Sherwood Lateral in Doddridge County, West Virginia (see Figure 10.7-1 in Appendix 10A). The 136.09-acre site consists of forest (108.90 acres), agriculture (18.64 acres), and open land (8.56 acres) (see Table 10.7-1 in Appendix 10B). Access to the site will be via a new permanent access road off of County Route 18/6. Adjacent land uses include a plant northeast of the site, and mostly forested areas with isolated residences. The nearest noise sensitive area (NSA) is a residence is approximately 1,120 feet east of the center of the site. No significant environmental concerns were identified with this site.

Three alternate sites were evaluated for this station. Sherwood Alternate 1 Site is located approximately 1 mile north of the proposed Sherwood Compressor Station and is a 67.8-acre site consisting of 52.3 acres of forest and 14.6 acres of agriculture, and 0.9 acre of open land. The Sherwood Alternate 2 Site is a 17.0-acre site that was originally considered and was ultimately entirely encompassed within the northern part of Alternate 1 Site. The nearest NSA is a residence located approximately 1,360 feet northwest of the center of Sherwood Alternate 1 site. Buckeye Creek runs through the northern part of the Sherwood Alternate 1 Site. This site was not available for purchase and was therefore eliminated from further consideration.

Sherwood Alternate Site 3 is located approximately 0.2 mile northwest of Sherwood Alternate 1 Site and is a 16.7-acre site comprised of 9.8 acres of forest and 6.9 acres of agricultural land. The nearest NSA is a residence located 635 feet west of the center of the site. This site was also not available for purchase and was eliminated from further consideration.

10.7.2.2 Seneca Compressor Station

The proposed Seneca Compressor Station is located at Seneca Lateral MP 0.0 in Noble County, Ohio (see Figure 10.7-2 in Appendix 10A). The 44.08-acre site consists of forest (37.31 acres), agriculture (3.65

acres), and open land (3.12 acres) (see Table 10.7-2 in Appendix 10B). The site is relatively level in an area of similar uses with isolated residences along the roads, pipeline and powerline rights-of-way, and a newly developed industrial site southwest of the site. The nearest NSA is a residence located approximately 720 feet west of the center of the site. No significant environmental concerns were identified with this site.

Seneca Alternate Site 1 is located approximately 0.9 mile west of the proposed Seneca Compressor Station in Noble County, Ohio within a 29.6-acre site consisting of 23.3 acres of forest and 6.3 acres of open land. The site is relatively level in an area of crossed by utility rights-of-way. The nearest NSA is a residence, located approximately 1,280 feet north of the center of the site. This site was not available for purchase and it added about 1 mile to the length of the Seneca and Berne Laterals. For these reasons, it was eliminated from further consideration.

Seneca Alternate Site 2 is located approximately 1.0 mile south of the proposed Seneca Compressor Station on a 10.4 acre site consisting of 9.0 acres of forest and 1.4 acres of open land. A developed plant is west of the site and isolated residences are located along the road north of the site and south of the site. The nearest NSA is a residence located approximately 365 feet north of the center of the site. While this site was initially considered, it is not available for purchase and would also increase the length of the Seneca and Berne Laterals. It was, therefore, eliminated from further consideration.

10.7.2.3 Clarington Compressor Station

The Clarington Compressor Station is located at MP 0.4 on the Clarington Lateral in Monroe County, Ohio (see Figure 10.7-3 in Appendix 10A). The 114.99-acre site consists mostly of forest (81.75 acres), along with agricultural (25.23 acres) and open land (8.01 acres) (see Table 10.7-3 in Appendix 10B). Access to the site will be via a new permanent access road off of German Ridge Road. The nearest NSA is a residence located 1,660 feet south of the center of the property.

Three alternate sites were evaluated for this station. Clarington Alternate 1 Site is located approximately 0.1 mile south of the proposed site and is a 46.4-acre site consisting of 35.0 acres of agriculture, 9.8 acres of forest, and 1.6 acres of open land. The nearest NSA is a residence located approximately 540 feet west of the center of the site. Clarington Alternate 2 Site is located approximately 0.5 mile east of the proposed site and is a 16.6-acre site consisting of approximately 15.6 acres of agriculture and 1.0 acre of forest. The nearest NSA is a residence located 800 west of the center of the property. Clarington Alternate 3 Site was the first site evaluated and consisted of approximately 16.8 acres located within the proposed Clarington Compressor Station site.

All of the sites are within an area characterized by a mix of forest and open land, and isolated rural residences. Because the proposed site is large enough to accommodate the Clarington Compressor Station, provides a good buffer between the station and adjacent residences, and is available for purchase, the other alternate sites were eliminated from further consideration.

10.7.2.4 Majorsville Compressor Station

The Majorsville Compressor Station is located at MP 1.1 on the Majorsville Lateral in Marshall County, West Virginia (see Figure 10.7-4 in Appendix 10A). The 37.35-acre site consists of forest (33.63 acres) and open land (3.72 acres) (see Table 10.7-4 in Appendix 7B). Access to the site will be via a new permanent access road off of County Route 32. The nearest NSA is a residence located approximately 1,400 southeast of the center of the property. Adjacent land use is mostly forested area and includes land that is under development for gas related facilities. No significant environmental concerns were identified with the proposed site.

Two alternate sites were evaluated for the Majorsville Compressor Station: Majorsville Alternate 2 Site, a smaller 16.3-acre site, was originally identified as the preferred location for the station. Following discussions with the landowner, the site was expanded to 40.9 acres and identified as Majorsville Alternate 1 Site. Majorsville Alternate 1 Site is located approximately 1.0 mile east of the proposed site and is a 40.9 acre site consisting of 33.9 acres of forest and 7.0 acres of open land. The nearest NSA is a residence located approximately 1,240 feet southeast of the center of the site. Since this site is not available for purchase, it was eliminated from further consideration.

10.7.2.5 Cadiz Compressor Station

The Cadiz Compressor Station is located at MP 0.0 on the Cadiz Lateral in Harrison County, Ohio. The 28.16-acre site consists entirely of agricultural or open land, south of a gas plant. Access to the site will be via a new permanent access road off of Industrial Park Drive. The nearest NSA is a residence located 3,970 feet northeast of the center of the site. No significant environmental concerns were identified with this site.

A total of four alternate sites were evaluated beginning with Cadiz Alternate 1 and 2 Sites that are located near the Cadiz Tie-In for the Clarington and Cadiz Laterals and Supply Connector Lines A and B (see Figure 10.7-5, Sheet 1 of 2, in Appendix 10A). Cadiz Alternate 1 Site, one of the first sites evaluated, is located approximately 2.9 miles northwest of the proposed Cadiz Compressor Station and 0.4 mile east of Supply Connector Lines A and B. It is a 35.3-acre site consisting of 33.1 acres of forest and 2.3 acres of open land (see Table 10.7-5 in Appendix 10B). An NWI wetland encroaches on a small part of the western boundary of the site. The nearest NSA is a residence located approximately 1,720 feet south of the center of the site. Cadiz Alternate Site 2 is located at the Cadiz Tie-In and is an 18.6-acre site, consisting of 1.9 acres of forest and 16.7 acres of agricultural land. The nearest NSA is a residence located approximately 810 feet south of the center of the site. Both sites were eliminated as compressor station sites because the design required compression at the beginning of the Cadiz Lateral and neither site met those criteria.

Cadiz Alternate 3 and 4 Sites are clustered in the vicinity of the proposed Cadiz Compressor Station at Cadiz Lateral MP 0.0 (see Figure 10.7-5, Sheet 2 of 2, in Appendix 10A). Cadiz Alternate 3 Site is a 15.8-acre site comprised entirely of agricultural or open land. Approximately 2.7 acres of NWI emergent wetland encroaches into the western edge of the site (see Table 10.7-5 in Appendix 10B). The nearest

NSA is a residence located approximately 5,040 feet northeast of the center of the site. This site was eliminated from further consideration because of the presence of the wetland.

Cadiz Alternate 4 Site is a 21.0-acre site comprised entirely of agricultural or open land. The nearest NSA is a residence located approximately 4,370 feet northeast of the center of the site. This site encroached onto the entrance road for the gas plant and was eliminated from further consideration for that reason (see Figure 10.7-5, Sheet 2 of 2, in Appendix 10A).

10.7.2.6 Burgettstown Compressor Station

The Burgettstown Compressor Station is located at MP 0.0 on the Burgettstown Lateral in Washington County, Pennsylvania (see Figure 10.7-6, Sheet 1 of 2, in Appendix 10A). The 15.68-acre site consists of open land (14.63 acres) and forest (1.05 acres). Access to the site will be via a new permanent access road off of Point Pleasant Road. The nearest NSA is a residence located approximately 1,150 feet south of the center of the site (see Table 10.7-6 in Appendix 10B). Adjacent areas are a similar mix forest and open land. There are no significant environmental issues associated with this site.

The Burgettstown Alternate 1 Site was originally considered during development of the Project when this area was under consideration as the start of the Burgettstown Lateral. It is located at approximate MP 5.2 on the Burgettstown Lateral and consists of a 25.6-acre forested site (see Figure 10.7-6, Sheet 2 of 2, in Appendix 10A). The nearest NSA is a residence located approximately 990 feet east of the center of the site. When this site no longer accommodated the producer, it was eliminated from further consideration.

10.7.2.7 Mainline Compressor Station 1

Mainline Compressor Station 1 is located at MP 18.8 on Mainlines A and B in Carroll County, Ohio (see Figure 10.7-7 in Appendix 10A). The 54.9-acre site consists of agriculture (38.1 acres), forest (14.5 acres), and open land (2.3 acres) located west of a processing plant (see Table 10.7-7 in Appendix 10B). Access to the site will be via a new permanent access road off of Azalea Road. The nearest NSA is a residence located 705 feet south of the center of the site. Adjacent areas are mostly forested with isolated cleared tracts. An alternate site consisting of a smaller 39.7-acre site located within the proposed site was also evaluated. Since the landowner preferred to sell the larger site and the proposed site was optimally placed for the pipeline system design, no other alternate sites were evaluated.

10.7.2.8 Mainline Compressor Station 2

Mainline Compressor Station 2 is located at MP 77.3 on Mainlines and B in Wayne County, Ohio (see Figure 10.7-8 in Appendix 10A). The 46.33-acre site consists of agriculture (44.17 acres) and open land (2.15 acres) (see Table 10.7-8 in Appendix 10B). Access to the site will be via a new permanent access road off of South Elyria Road. An NWI wetland encroaches on southwest corner of the site but would not be located near any station facilities. The nearest NSA is a residence located 890 feet northeast of the center of the site. Adjacent areas are agricultural with isolated tracts of forest scattered within the fields and along field edges. While a smaller alternate 26.6-acre site that only included the lower half of the site

was originally considered, the landowner preference was to sell the larger site. Since there are no significant environmental issues associated with the site, no other alternate sites were evaluated.

10.7.2.9 Mainline Compressor Station 3

Mainline Compressor Station 3 is located at MP 127.9 on Mainlines A and B in Crawford County, Ohio (see Figure 10.7-9 in Appendix 10A). The 38.23-acre site consists of agricultural (38.23 acres) and open land (0.03 acre) (see Table 10.7-9 in Appendix 10B). Access to the site will be via a new permanent access road off of Albaugh Road. Adjacent areas are agricultural with isolated tracts of forest scattered within the fields and along field edges. The nearest NSA is a residence located approximately 870 feet north of the center of the site. A larger 59.7-acre site that included additional land south of the proposed site was originally considered but was eliminated due to the landowner's preference not to sell that portion of the tract. Since there are no significant environmental issues associated with the site, no other alternate sites were evaluated.

10.7.2.10 Defiance Compressor Station

The Defiance Compressor Station is located at MP 0.0 on the Market Segment in Defiance County, Ohio (see Figure 10.7-10 in Appendix 10A). The 28.40-acre site consists of agriculture (23.60 acres) and open land (4.80 acres) (see Table 10.7-10 in Appendix 10B). Access to the site will be via a new permanent access road off of Ohio Route 66. There is a residence on the southern edge of the property that will be acquired with the property. The nearest NSA is a residence located approximately 850 feet southeast of the center of the site. Adjacent and nearby areas are similarly agricultural with scattered remnant forested areas, and include commercial properties to the east and existing natural gas pipeline aboveground facilities. While a larger 32.6-acre site was originally considered that included the tract north of the proposed site, that tract is not available for sale. Because there are no significant environmental issues associated with the site, no other alternate sites were evaluated.

10.8 METER STATION SITE ALTERNATIVES

The following sections provide a discussion of the siting of the eight meter stations for the Project that are not included within the footprints of the compressor station sites.

10.8.1 Supply Laterals

10.8.1.1 CGT Meter Station

The CGT Meter Station is located at CGT Lateral MP 5.7 in Doddridge County, West Virginia within a 1.86-acre site consisting of agriculture (1.78 acres) and open land (0.08 acre) (see Figure 10.8-1 in Appendix 10A and Table 10.8-1 in Appendix 10B). Adjacent and nearby areas include an existing pipeline and a small compressor station facility, and similar open and forested areas, including scattered residences. During development of the Project, a 0.5-acre site was considered at the same location but eventually eliminated as being too small for the proposed facilities. Because there are no significant

environmental issues associated with the site and the site is the most suitable for interconnection with CGT, no other alternate sites were evaluated.

10.8.1.2 Berne Meter Station

The Berne Meter Station is located at MP 0.0 on the Berne Lateral in Monroe County, Ohio (see Figure 10.8-2 in Appendix 10A). The 3.34-acre site consists of agriculture (2.97 acres) and forested land (0.37 acres) (see Table 10.8-2 in Appendix 10B). Access to the site will be via County Route 44. One alternative site was evaluated during development of the Project. The Berne Meter Station Alternative was located approximately 490 feet east of the proposed site and consisted of 1.5 acres of forest. Adjacent and nearby areas to both sites include an existing compressor station to the south, and various other aboveground facilities associated with natural gas development. While the proposed site would affect 1.8 more acres of land, it would affect 1.1 fewer acres of forest in comparison to the Berne Meter Station Alternative. Therefore, the alternative site was eliminated from further consideration.

10.8.1.3 Hall Meter Station

The Hall Meter Station is located at MP 3.7 on the Seneca Lateral in Monroe County, Ohio. The 2.03-acre site consists of open land (1.75 acres) and forest (0.28 acres). Access to the site will be via Ohio Route 78. Because there are no significant environmental issues associated with the site and the site best meets interconnection requirements, no alternate sites were evaluated.

10.8.1.4 Gulfport Meter Station

The Gulfport Meter Station is located at MP 21.9 on the Seneca Lateral in Monroe County, Ohio. The 1.21-acre site consists of agriculture (0.94 acres), forest (0.20 acres), and open land (0.07 acres). Access to the site will be via Township Highway 2192. Because there are no significant environmental issues associated with the site and the site best meets interconnection requirements, no alternate sites were evaluated.

10.8.1.5 Majorsville Meter Station

The Majorsville Meter Station is located at MP 0.0 on the Majorsville Lateral in Marshall County, West Virginia (see Figure 10.8-3 in Appendix 10A). The 4.0-acre site consists of forest (3.02 acres) and open land (0.98 acres) (see Table 10.8-3 in Appendix 10B). Access to the site will be via Township Highway 2192. During development of the Project, the Majorsville Meter Station was originally located within the Majorsville Alternate 2 Site for the Majorsville Compressor Station. Both sites are located within a generally forested area that is under development for gas processing facilities. Because the alternate site for the Majorsville Compressor Station is not available for purchase, the Majorsville Meter Station Alternative was eliminated from further consideration.

10.8.2 Mainlines

10.8.2.1 ANR Meter Station

The ANR Meter Station is located at MP 208.9 on Mainline A in Defiance County, Ohio (see Figure 10.8-4 in Appendix 10A). The 12.79-acre site consists entirely of agricultural and open land, of which approximately 4.6 acres will be maintained for the meter station (see Table 10.8-4 in Appendix 10B). Access to the site will be from State Route 66. The proposed site is immediately adjacent to the north side of the existing ANR compressor station facility. During the early phases of development of the Project, the ANR Meter Station was located within the Defiance Compressor Station site, which is approximately 745 feet northwest of the currently proposed site. However, customer delivery contracts and an interconnecting party agreement required Rover to deliver gas to both the suction and discharge side of the ANR compressor station; therefore, the ANR Meter Station was sited adjacent to the ANR Compressor Station.

10.8.2.2 Consumers Energy Meter Station

The Consumers Energy Meter Station is located at Market Segment MP 67.86 in Washtenaw County, Michigan within a 2.32-acre site consisting of open agricultural land. Adjacent and nearby areas are agricultural land with scattered forest patches and residences. Immediately to the west is the Consumers Energy Compressor Station. Because there are no significant environmental issues associated with the site, no alternate sites were evaluated