Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

October 2015

ORION PROJECT

RESOURCE REPORT NO. 1
General Project Description

Submitted by:

Tennessee Gas Pipeline Company, L.L.C.
1001 Louisiana Street
Houston, Texas 77002

RESOURCE REPORT 1 – GENERAL PROJECT DESCRIPTION SUMMARY OF COMMISSION FILING INFORMATION		
Topic	**FERC Reference**	**Report Reference or Not Applicable**
1. Provide a detailed description and location map of the project facilities. • Include all pipeline and aboveground facilities. • Include support areas for construction or operation. • Identify facilities to be abandoned.	§380.12(c)(1)	Section 1.1 Section 1.2 Appendix 1-A
2. Describe any non-jurisdictional facilities that would be built in association with the project. • Include auxiliary facilities. • Describe the relationship to the jurisdictional facilities. • Include ownership, land requirements, gas consumption, megawatt size, construction status, and an update of the latest status of federal, state, and local permits/approvals. • Include the length and diameter of any interconnecting pipeline. • Apply the four-factor test to each facility.	§380.12(c)(2) §2.55(a) §380.12(c)(2)(ii)	Not Applicable
3. Provide current original U.S. Geological Survey (USGS) 7.5-minute-series topographic maps with mileposts showing the project facilities. • Maps of equivalent detail are acceptable if legible (check with staff) • Show locations of all linear project elements, and label them. • Show locations of all significant aboveground facilities, and label them.	§380.12(c)(3)	Appendix 1-A
4. Provide aerial images or photographs or alignment sheets based on these sources with mileposts showing the project facilities.	§380.12(c)(3)	Appendix 1-B
5. Provide plot/site plans of compressor stations showing the location of the nearest noise sensitive areas (NSA) within 1 mile. • Scale no smaller than 1:3,600 • Show reference to topographic maps and aerial alignments provided above.	§380.12(c)(3,4)	Not Applicable
6. Describe construction and restoration methods. • Include this information by milepost.	§380.12(c)(6)	Section 1.3
7. Identify the permits required for construction across surface waters. • Include the status of all permits. • For construction in the federal offshore area be sure to include consultation with the MMS File with the MMS for rights-of-way grants at the same time or before you file with the FERC.	§380.12(c)(9)	Section 1.7 Table 1.7-1
8. Provide the names and address of all affected landowners and certify that all affected landowners will be notified as required in §157.6(d). • Affected landowners • Provide an electronic copy directly to the environmental staff.	§380.12(c)(10) §157.6(d)	Appendix 1-E

Additional Information

Describe all authorizations required to complete the proposed action and the status of applications	Section 1.7
Provide plot/site plans of all other aboveground facilities that are not completely within the right-of-way.	Appendix 1-D
Provide detailed typical construction right-of-way cross-section diagrams showing information such as widths and relative locations of existing rights-of-way, new permanent right-of-way, and temporary construction right-of-way.	Appendix 1-B
Summarize the total acreage of land affected by construction and operation of the project.	Section 1.2 Table 1.2-1
If Resource Report 5, Socioeconomics is not provided, provide the start and end dates of construction, the number of pipeline spreads that would be used, and the workforce per spread.	Section 1.3.1
Send two (2) additional copies of topographic maps and aerial images/photographs directly to the environmental staff of the Office of Energy Projects (OEP).	Appendix 1-A Appendix 1-B

RESOURCE REPORT 1 – GENERAL PROJECT DESCRIPTION

TABLE OF CONTENTS

SECTION **PAGE**

LIST OF TABLES

TABLE **PAGE**

LIST OF APPENDICES

APPENDIX

ABBREVIATIONS AND ACRONYMS

300 Line	Tennessee's existing 300 Line ROW that begins in Mercer County, Pennsylvania and travels east through Pennsylvania, New Jersey, New York, and Connecticut, and ends in Hampden County, Massachusetts
300-1	Tennessee's existing 24-inch outside-diameter pipeline along the 300-Line
300-2	Tennessee's existing looped 30-inch outside-diameter pipeline adjacent to 300-1
ATWS	additional temporary workspace
Btu	British thermal units
CEQ	Council on Environmental Quality
Certificate	certificate of public convenience and necessity
C.F.R.	Code of Federal Regulations
CIAA	Cumulative Impact Assessment Area
Columbia	Columbia Gas Transmission, LLC
Commission	Federal Energy Regulatory Commission
CS	Compressor Station
Constitution	Constitution Pipeline Company, LLC
DOT	U.S. Department of Transportation
Dth/d	dekatherms per day
EI	environmental inspector
EIA	U.S. Energy Information Administration
ER	Environmental Report
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
LDCs	local distribution companies
Loop 322	Approximately 8.23 miles of new 36-inch outside-diameter pipeline looping along Tennessee's existing 300 Line right-of-way in Wayne County, Pennsylvania and crossing into Pike County, Pennsylvania
Loop 323	Approximately 4.68 miles of new 36-inch outside-diameter pipeline looping along Tennessee's existing 300 Line right-of-way in Pike County, Pennsylvania
MAOP	maximum allowable operating pressure
MMSCFD	million standard cubic feet per day
MP	milepost
NED Project	Northeast Energy Direct Project
NWI	National Wetland Inventory
OD	outside-diameter
PA NPDES	Pennsylvania National Pollutant Discharge Elimination System
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PAFBC	Pennsylvania Fish and Boat Commission
PAR	permanent access road
PGC	Pennsylvania Game Commission
PHMSA	Pipeline and Hazardous Materials Safety Administration

PPL	Pennsylvania Power and Light
Project	Orion Project
Project Plan	Orion Project Draft Upland Erosion Control, Revegetation, and Maintenance Plan
Project Procedures	Orion Project Draft Wetland and Waterbody Construction and Mitigation Procedures
Project Shippers	South Jersey Resources Group L.L.C., South Jersey Gas Company, and Cabot Oil & Gas Corporation
psig	pounds-per-square-inch-gauge
ROW	right-of-way
SPCC	Spill Prevention Control and Countermeasure Plan
Support Facilities	staging areas, pipe/contractor yards and access roads
TAR	temporary access road
Tcf	trillion cubic feet
Tennessee	Tennessee Gas Pipeline Company, L.L.C.
TWS	temporary workspace
U.S.	United States
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCP	Winter Construction Plan

1.0 RESOURCE REPORT 1 – GENERAL PROJECT DESCRIPTION

Tennessee Gas Pipeline Company, L.L.C. ("Tennessee") is filing an application seeking the issuance of a certificate of public convenience and necessity ("Certificate") from the Federal Energy Regulatory Commission ("FERC" or "Commission") to construct, install, modify, operate, and maintain the Orion Project ("Project") facilities located in Wayne and Pike counties, Pennsylvania. The Project will allow Tennessee to transport 135,000 dekatherms[1] per day ("Dth/d") of additional firm natural gas transportation capacity on Tennessee's pipeline system. The Project, as designed, will provide the needed capacity from the Gibson receipt point (Meter #47768) located in Wayne County, Pennsylvania to the Milford delivery point (Meter #420245) located in Pike County, Pennsylvania.

The proposed Project involves construction of the following facilities, as described in more detail herein:

- Construct and install Loop 322, approximately 8.23 miles of 36-inch outside-diameter ("OD") pipeline looping[2] along Tennessee's existing 300 Line[3] right-of-way ("ROW") starting in Wayne County, east of Honesdale, and crossing into Pike County before it ties-in to the station suction piping at Compressor Station ("CS") 323 located near Teedyuskung Lake. To the extent that it is practicable, feasible, and legally permitted, Tennessee proposes to locate Loop 322 within and adjacent to the ROW associated with its existing 300 Lines.

- Construct and install Loop 323, approximately 4.68 miles of 36-inch OD pipeline looping along Tennessee's existing 300 Line ROW in Pike County beginning at existing CS 323 and crossing through Pike County until it terminates near Route 590 south of Lackawaxen. To the extent that it is practicable, feasible, and legally permitted, Tennessee proposes to locate Loop 323 within and adjacent to the ROW associated with its existing 300 Lines.

- Appurtenant and auxiliary facilities, including:
  - A new pig[4] launcher at the beginning of Loop 322 and a new pig receiver at the end of Loop 323.
  - Crossover and connecting facilities to both existing Tennessee Lines 300-1 (24-inch) and 300-2 (30-inch) at the launcher and receiver sites.
  - Rewheel/restage Compressor 2A at CS 323 to accommodate increased volumes and changes in station suction pressures.
  - Minor modifications at existing CS 323, as described in Section 1.1.2.2.

Pending receipt of all necessary regulatory approvals, construction of the Project is planned to begin as early as January 2017, with an anticipated in-service date of June 1, 2018.

[1] A dekatherm is a unit of heating value often used by natural gas companies instead of volume for billing purposes. A dekatherm is equivalent to 10 therms or one million British thermal units. For conceptualization purposes only, 180,000 Dth would be sufficient to power roughly 1.8 million homes annually (if it were used solely for residential energy production).

[2] Pipeline loops are those pipeline sections which are laid parallel to another pipeline and used as a way to increase capacity along what is possible on one line. These lines are connected to move a larger flow of gas through a single pipeline section.

[3] In general, the existing 300 Line ROW, which contains the original 24-inch OD pipeline ("300-1") and the looped 30-inch OD pipeline ("300-2"), is referred to herein as the "existing 300 Line", the "300 Line" or the "300 Lines".

[4] Devices known as "pigs" can be inserted (launched) into a pipeline to perform various maintenance operations, cleaning, and even inspections.

Resource Report 1 provides a general description of the proposed Project. Section 1.1 provides an overview of the proposed Project activities, including the purpose and need for the Project, and a description of proposed Project Facilities. Section 1.2 describes the land requirements. Section 1.3 describes the construction and restoration methods that Tennessee will use for the Project Facilities. Section 1.4 addresses operation and maintenance procedures for the Project Facilities. Section 1.5 describes future plans for additional facilities or abandonment. Section 1.6 addresses non-jurisdictional facilities. Section 1.7 identifies the environmental permits required and landowner notifications. Section 1.8 summarizes the cumulative impacts of the Project when added to other past, current, and reasonably foreseeable projects that may occur near the Project area. Lastly, Section 1.9 provides a list of references used in the preparation of this report.

1.1 PROPOSED FACILITIES

1.1.1 Purpose and Need

Tennessee proposes to construct, install, modify, operate, and maintain the Project to increase the transportation capacity of its existing system in order to provide additional firm natural gas transportation service in the northeast United States ("U.S."). Upon completion, the Project will increase natural gas delivery capacity by 135,000 Dth/d. Tennessee has signed a binding precedent agreement with three shippers, South Jersey Resources Group LLC, South Jersey Gas Company, and Cabot Oil & Gas Corporation ("Project Shippers"), for all of the incremental firm transportation capacity that will be created by the proposed Project, which demonstrates the immediate need for all of the capacity. This Project and its in-service date of June 1, 2018 are fully supported by the Project Shippers' commitment to the increased capacity to be provided by the Project.

According to the U.S. Energy Information Administration ("EIA") reference case, total natural gas consumption in the United States is projected to grow from 26.2 trillion cubic feet ("Tcf") in 2013 to 29.7 Tcf in 2040 (EIA 2015) or an average growth of 13.3 percent. The largest share of the overall growth percentage in natural gas consumption is led by electric generation in the electric power sector, which in the reference case is projected to grow from 8.2 Tcf to 9.4 Tcf (approximately 14.6 percent increase) between 2013 and 2040, followed by the industrial sector change from 9.1 quadrillion British thermal units ("Btu") in 2013 to 11.2 quadrillion Btu projected in 2040 (23.1 percent increase). Commercial sector use of natural gas increases on average of 0.8 percent annually during this time frame. Natural gas consumption in the residential sector is the only sector demonstrating a potential decrease across the United States, largely attributed to more efficient equipment and reduced need for heating due to population shifts. Natural gas consumption is projected at about one third of all fuel used for freight rail and about 7 percent of heavy-duty vehicles (EIA 2015). According to the National Energy Board of Canada, total natural gas demand in Canada will grow at an average rate of 1.7 percent over the projection period of 2013 to 2035, of which the largest increases are in the industrial and power generation sectors (National Energy Board 2013).

The need for the Project arises from the projected (2013-2040) growing demand for energy in the form of cleaner burning natural gas targeted for the Middle Atlantic and New England regions of the United States, and to a lesser extent Canada. Specifically, growth in natural gas demand in the northeast states of the Middle Atlantic and New England is expected to increase 655 billion cubic

feet or 17.2 percent over this time frame (EIA 2015). The target markets are subdivided into five sectors: residential, commercial, industrial, transportation, and power generation. Growth related to power generation is expected to be the fastest growing sector in terms of volume of gas consumed, but less than one percent in terms of annual average percent growth. Growth from the power generation sector will be an important backstop to growing renewable and distributed generation demand and also useful in backfilling the energy demand formerly supplied by coal-fired and nuclear plants that are expected to retire over this time horizon.

Tennessee's interstate pipeline system is fully subscribed in the region of Pennsylvania where the Project is proposed. Therefore, unless Tennessee proceeds with the construction of the Project, it will be unable to satisfy the Project Shippers' expressed need, as reflected in the executed precedent agreements, for additional capacity of 135,000 Dth/d on Tennessee's system.

Additional discussion regarding the purpose and need for the Project is provided in the Public Convenience and Necessity section of the Certificate application.

1.1.2 Location and Description of Facilities

A Project overview map and U.S. Geological Survey ("USGS") topographic maps showing the Project are provided in Appendix 1-A. Detailed aerial photographic based alignment sheets, showing the limits of disturbance, are provided in Appendix 1-B. National Wetlands Inventory ("NWI") maps are provided in Appendix 1-C. Plot plans depicting the appurtenant aboveground facilities are provided in Appendix 1-D. Table 1.1-1 provides a summary of Project facilities by milepost ("MP") location.

The Project encompasses a total of approximately 186 acres of land (total construction workspace area) in Wayne and Pike counties, Pennsylvania (see alignment sheets provided in Appendix 1-B).

Table 1.1-1. Summary of Facilities

Facility Identification	Facility Description	MP
Loop 322	Approximately 8.23 miles of new 36-inch OD pipeline looping parallel and adjacent to Tennessee's existing 300 Line ROW.	0.0 – 8.23
Loop 323	Approximately 4.68 miles of new 36-inch OD pipeline looping parallel and adjacent to Tennessee's existing 300 Line ROW.	8.23 – 12.91
Compressor Station 323	Rewheel/restage Compressor 2A at Station 323 to accommodate increased volumes and changes in station suction pressures. Additional piping, equipment, and gate setting to connect the new line to the existing station.	8.23
Upstream Tie-In Site	Installation of a new pig launcher, crossover facilities, and connecting facilities to the existing Tennessee 300 Lines.	0.0
Downstream Tie-In Site	Installation of a new pig receiving trap, installation of ancillary piping to tie into existing piping, and additional odorant facility at existing CS 323.	12.91

Facility Identification	Facility Description	MP
	Total Pipeline Mileage	12.91 miles

1.1.2.1 *Pipeline*

The proposed Project includes the construction and installation of two pipeline loops. Loop 322 is an approximately 8.23-mile 36-inch OD pipeline looping along Tennessee's existing 300 Line ROW starting in Wayne County, east of Honesdale, and crossing into Pike County before it ties-in to the station suction piping at CS 323. Loop 323 is an approximately 4.68-mile 36-inch OD pipeline looping along Tennessee's existing 300 Line ROW in Pike County beginning at existing CS 323 and crossing through Pike County until it terminates near Route 590 south of Lackawaxen. The proposed loops would be typically offset 25 feet from the existing 300 Lines predominantly along the southern edge of the existing permanent ROW, to the extent practicable, feasible, and legally permitted. Between MPs 6.6 and 8.0, Loop 322 shifts to the northern edge of an existing Pennsylvania Power and Light ("PPL") electrical transmission line ROW.

The maximum allowable operating pressure ("MAOP") of the affected portion of the existing 300 Line will remain at 1,170 pounds-per-square-inch-gauge ("psig"), and the two new loops will also have a MAOP of 1,170 psig. Actual operating pressure for the 300 Line system after the Project is completed will vary depending on shipper receipts and deliveries and the manner in which Tennessee operates its compression to meet shipper demands.

Table 1.1-2 identifies the proposed location of Loop 322 and Loop 323 in relation to the existing 300 Line and PPL ROWs by MP, township, and county.

Table 1.1-2. Pipeline Facilities

Facility	Pipeline OD	MP		Length (miles)	ROW Alignment with Existing 300 Line[a]	Township	County
		Begin	End				
Loop 322	36-inch	0.00	0.95	0.95	Coincide/300-Line	Berlin	Wayne
		0.95	1.19	0.24	Adjacent/300-Line	Berlin	Wayne
		1.19	1.32	0.13	Coincide/300-Line	Berlin	Wayne
		1.32	1.61	0.29	Adjacent/300-Line	Berlin	Wayne
		1.61	4.28	2.67	Coincide/300-Line	Berlin/Palmyra	Wayne
		4.28	4.53	0.25	Adjacent/300-Line	Lackawaxen	Pike
		4.53	6.60	2.07	Coincide/300-Line	Lackawaxen	Pike
		6.60	8.04	1.44	Adjacent/PPL	Lackawaxen	Pike
		8.04	8.23	0.19	Coincide/300-Line	Lackawaxen	Pike
Loop 323	36-inch	8.23	10.37	2.14	Coincide/300-Line	Lackawaxen	Pike
		10.37	11.33	0.96	Adjacent/300-Line	Lackawaxen	Pike
		11.33	11.39	0.06	Outside/300-Line	Lackawaxen	Pike

		11.39	12.91	1.50	Coincide/300-Line	Lackawaxen	Pike
Total Pipeline Facilities				**12.91**			

Notes:
a Coincide = proposed ROW overlaps with existing 300 Line ROW
Adjacent = proposed ROW is adjacent to the existing 300 Line ROW
Outside = proposed ROW is neither coinciding nor adjacent to the existing 300 Line ROW, but within close proximity

During construction, a nominal construction workspace totaling 110 feet in width will be required. Tennessee plans to co-locate the new pipeline loops with Tennessee's existing 300 Line at a typical 25-foot offset from either the 300-1 Line or the 300-2 Line and a typical 25 foot offset from PPL's permanent ROW, as applicable. The construction workspace and permanent easement for the proposed Project does overlap, in certain areas, with existing permanent ROW for the 300 Line, as depicted on the alignment sheets included in Appendix 1-B. In those areas where the construction workspace overlaps with the existing permanent ROW of the existing 300 Line, the overlap ranges up to 110 feet. Where the Project has been co-located with PPL's ROW, the construction workspace overlaps with the existing PPL ROW, as depicted on the alignment sheets included in Appendix 1-B. In those areas where the construction workspace overlaps with the existing permanent PPL ROW, the overlap ranges up to 35 feet. There will be no overlap of permanent ROW between the Project and PPL's easement, except where the proposed pipeline crosses the PPL ROW.

At a minimum, all depth of cover for the two new loops will conform to U.S. Department of Transportation ("DOT") regulations, 49 C.F.R. §192.327. Road and railroad crossings will conform to DOT regulations as well, 49 C.F.R. §192.111. Tennessee will consider population growth potentials, easements, permits, road and railroad crossings, drain tile, agricultural areas (subject to deep cultivation or operating activities), and areas subject to wind or water erosion in determining depth of cover. The minimum depth of cover in typical soils will be 3 feet (36 inches) and in rock will be 2 feet (24 inches).

Resource Report 10 (Alternatives) of this Environmental Report ("ER") discusses route alternatives that Tennessee considered for the proposed Project. As discussed above, Tennessee will generally co-locate the new pipeline loops parallel and adjacent to its existing 300 Line ROW and the PPL ROW, in order to maximize use of previously-disturbed ROW and to minimize the need to disturb new ROW and potentially affect new landowners.

1.1.2.2 *Aboveground Appurtenant Facilities*

Appurtenant work is proposed to be conducted as part of the Project to connect the new loops to CS 323. This work involves the installation of a new gate setting within CS 323 to section the line from the suction and discharge header connections. Specifically, Compressor 2A at CS 323 will be rewheeled/restaged to accommodate increased volumes and changes in station suction pressures; a new gate setting will be added to section the line from the suction and discharge header connections; and new mainline suction and discharge tie-ins, suction line loop, station blow-down line, emergency shutdown silencer, and new valves will be installed. All construction and installation activities at CS 323 will be located within the existing Tennessee compressor station's property. The southern portion of the existing fence will be moved approximately 25 feet to the

southwest and will overlap the new permanent pipeline ROW to enclose and protect the new aboveground piping within CS 323.

In addition, Tennessee also intends on installing a new pig launcher and crossover/connecting facilities to the existing Tennessee 300 Line (Line 300-1 and Line 300-2) at the beginning of Loop 322, as well as a pig receiver and crossover/connecting facilities to the existing Tennessee 300 Line (Line 300-1 and Line 300-2) at the end of Loop 323. Plot plans depicting the appurtenant aboveground facilities are provided in Appendix 1-D.

1.2 LAND REQUIREMENTS

1.2.1 Pipeline and Aboveground Appurtenant Facilities

Land requirements for the proposed pipeline loop are quantified into two categories: construction (temporary) and operational (permanent). Construction land requirements include those areas that will be disturbed by construction activities. Operational land requirements include lands that Tennessee may acquire by easement, lease, or purchase to locate the Project and permanently maintain for the life of the facilities. Operational lands include the permanent ROW for the pipeline loops and any new land required for or at aboveground facilities. A summary of the land requirements associated with the Project is presented in Table 1.2-1.

Table 1.2-1. Project Land Requirements

Project Component	Land Affected During Construction (acres)a		Permanent Operational ROW (acres)d	
	New[b]	Existing[c]	New[e]	Existing[f]
Pipeline Facilities				
300-3 Line (Loop 322 and Loop 323)	109.31	49.64	44.40	33.80
Additional Temporary Workspace ("ATWS")[g]	13.40	11.13	0.00	0.00
Pipeline Subtotal	**122.71**	**60.77**	**44.40**	**33.80**
Aboveground Appurtenant Facilities				
Pig Launcher Site	0.00	0.20	0.00	0.20
Pig Receiver Site	0.08	0.13	0.08	0.13
CS 323	0.055	0.00	0.055	0.00
Aboveground Appurtenant Subtotal	**0.135**	**0.33**	**0.135**	**0.33**
Support Facilities				
Contractor Yards	7.81	0.68	0.00	0.00
Pipe Yard No. 1	13.32	0.00	0.00	0.00
Pipe Yard No. 2	22.27	0.00	0.00	0.00
Pipe Yard No. 3	15.37	0.00	0.00	0.00
Access Roads[i] (Temporary)	4.00	0.12	0.00	0.00
Access Roads[i] (Permanent)	0.51	0.09	0.51	0.09
Support Subtotal	**63.28**	**0.89**	**0.51**	**0.09**
GRAND TOTAL	**186.13**	**61.99**	**45.05**	**34.22**

Project Component	Land Affected During Construction (acres)a		Permanent Operational ROW (acres)d	
	New[b]	Existing[c]	New[e]	Existing[f]

Notes:

a Includes areas to be disturbed by construction. The Pipeline includes 110-foot-wide construction ROW. For access roads, includes the total acreage of existing plus required widening and construction of new roads.
b For the 12.91-mile Pipeline, includes only new temporary ROW; excludes use of existing ROW for Line 300-1 and Line 300-2. For access roads this includes only newly constructed temporary access roads needed for construction.
c For the 12.91-mile Pipeline, includes existing ROW; excludes use of new temporary ROW.
d Excludes temporary construction ROW; includes permanent operational ROW.
e For the 12.91-mile Pipeline, includes only new permanent operational ROW of 25-foot width; excludes existing ROW.
f For the 12.91-mile Pipeline, includes only existing permanent operational ROW of 25-foot width; excludes new ROW.
g Includes areas where potential ATWS will be required to facilitate construction..
h Acreages for the upstream tie-in site are included in workspace totals for the pipeline facilities.
i See Section 8.1.1.5 for additional details on access roads.

The construction workspace for the Project (*i.e.*, temporary workspace ["TWS"], ATWS[5], permanent operational ROW, access roads, staging areas, pipe/contractor yards, aboveground appurtenant facilities) is 186.13 acres (see Table 1.2-1). Operation of the Project facilities will require 45.05 acres that will be maintained as new permanent operational ROW or as fee property for the aboveground appurtenant facilities (see Table 1.2-1).

As presented in Resource Report 8 (Land Use, Recreation, and Aesthetics) Table 8.1-6 of this ER, the Project requires a total of 82 ATWS areas and the majority of these areas (70) are located more than 50 feet away from identified wetland and stream borders. The remaining 12 ATWS areas have been located to the furthest extent possible from nearby wetland/stream borders; however, Tennessee has not been able to maintain the 50 foot buffer due to a number of constructability issues identified in Table 8.1-6.

Resource Report 8 also provides additional information regarding staging areas and pipe/contractor yard associated with the Project. These areas will be used for equipment, pipe, material storage, potential soil storage and hydrostatic test water discharge areas, as well as temporary field offices and pipe preparation/field assembly areas.

The photographic-based alignment sheets in Appendix 1-B depict the location and configuration of all TWS, ATWS, permanent operational ROW, access roads, and staging areas required for the Project.

1.2.2 Staging Areas, Pipe/Contractor Yards

Tennessee has identified locations in the vicinity of the proposed Project, to the extent possible, for potential use as staging areas, pipe/contractor yards and access roads ("Support Facilities") during construction of the Project. These acreages are included in the overall land requirements for Support Facilities, as detailed in Table 1.2-1, and Table 1.2-2 provides additional details regarding the land requirements for staging areas and the pipe/contractor yards.

[5] ATWS areas typically are required at road, railroad, wetland, and waterbody crossing locations and for areas requiring specialized construction techniques, including steep slopes and agricultural land. The configurations and sizes of ATWS areas will be based on site-specific conditions and vary in accordance with the construction methodology, crossing type, and other construction needs.

Resource Report 8 (Land Use, Recreation, and Aesthetics) of this ER provides additional information regarding staging areas and pipe/contractor yards associated with the Project. These areas will be used for equipment, pipe, material storage, potential soil storage and hydrostatic test water discharge areas, as well as temporary field offices and pipe preparation/field assembly areas.

Table 1.2-2. Pipe/Contractor Yards Proposed for Use During Project Construction

Facility	Nearest MP [a]	Construction Area (acres)	Existing Land Use Type
Pipe Yard No. 2	0.0	22.27	Agriculture
Contractor Yard No. 1	0.0	2.86	Agriculture/Forest
Contractor Yard No. 2	0.6	4.18	Agriculture
Pipe Yard No. 3	0.8	15.37	Industrial/Forest
Pipe Yard No. 1	1.4	13.32	Agriculture
Contractor Yard No. 3	8.2	1.45	Open

Note:
a Approximate closest MP along proposed loop's route rounded to the nearest tenth.

1.2.3 Access Roads

To the extent practicable, Tennessee will use existing public and private roads for temporary construction access to the Project ROW and aboveground facilities.

Resource Report 8 of this ER provides descriptions of each access road. Access roads are shown on Project mapping in Appendix 1-B (alignment sheets). A summary of land requirements for the Project's access roads is presented in Table 1.2-3. Tennessee will seek and obtain the necessary property rights and approvals from landowners and government agencies prior to the use or modifications of such roads when required. Tennessee has inspected all the proposed temporary access roads identified in Table 1.2-3 and has confirmed that these existing roads require no improvements, such widening or culvert improvements/replacements; however, the addition of gravel on the existing road surfaces may be required to fill potholes or improve areas where the gravel layer has been reduced due to normal use. Two new permanent access roads to the pig launcher and pig receiver sites are proposed for this Project. Construction of these permanent roads will require grading and the addition of gravel, and will be conducted in accordance with all applicable state and federal permit requirements.

Table 1.2-3. Access Roads Proposed for Use for the Project

Access Road ID[a]	Nearest MP[b]	Current Length (feet)	Current Width (feet)	Construction Area (acres)	Operation Area (acres)	Existing Surface	Proposed Improvement[c]
PAR-1	0.00	551 new/466 exisitng	20	0.30 new/0.22 existing	0.30 new/0.22 existing	Dirt / Gravel	Grade and create gravel surface / none
TAR-1	0.75	3,063	15	0.74	0.74	Gravel	None
TAR-2	1.20	531	15	0.18	0.18	Gravel	None
TAR-3	2.03	336	15	0.12	0.12	Gravel	None
TAR-4	2.56	1,452	15	0.50	0.50	Gravel	None
TAR-5	3.68	521	12	0.14	0.14	Gravel	None
TAR-6	4.40	622	25	0.36	0.36	Gravel	None
TAR-7	5.38	2,814	15	0.97	0.97	Gravel	None
TAR-8	6.48	1,227	15	0.43	0.43	Gravel	None
TAR-10	8.20	864	20	0.44	0.44	Gravel	None
TAR-9[d]	9.81	465	22	0.24	0.24	Gravel	None
PAR-2	12.90	120	20	0.08	0.08	Existing ROW (Dirt)	Grade and create gravel surface

Notes:
a PAR = permanent access road; TAR = temporary access road
b Approximate closest milepost along the proposed Loop 322 and Loop 323 route rounded to the nearest hundredth
c Proposed Improvement: Gr=grading, S=add stone
d Tennessee will temporarily remove and replace an existing guard rail barrier along TAR-9 to preconstruction conditions

1.2.4 Surveys and Agency Clearances

The area studied during environmental and cultural resources surveys along the proposed Loop 322 and Loop 323 ROW was 400 feet over the centerline of the proposed loops. In addition, portions of ATWS, staging areas, and the pipe/contractor yards that extend beyond the 400-foot-wide corridor were also surveyed in order to identify any sensitive resources warranting protection within or adjacent to the proposed construction area. The area as described above, except for a few property parcels that were identified as "No Access" due to landowner restrictions, was surveyed for streams, wetlands, cultural resources (Phase I), and threatened/endangered species. Areas where surveys have not yet been conducted include MP 6.64 to 6.71 (372 feet) and MP 8.80 to 8.94 (719 feet), as well as Pipe Yards No. 2 and No. 3.

Tennessee will conduct field surveys in these areas, when possible, and provide an addendum to update the survey reports through 2015. Field surveys conducted to date for the Project are summarized in Resource Report 2 (Water Use and Quality), and Resource Report 4 (Cultural Resources).

Project coordination related to threatened/endangered species is ongoing with the U.S. Fish and Wildlife ("USFWS"), Pennsylvania Department of Conservation and Natural Resources ("PADCNR") Natural Diversity Inventory, Pennsylvania Fish and Boat Commission ("PAFBC"), and Pennsylvania Game Commission ("PGC"). Tennessee has received correspondence from these agencies indicating that there are species of concern in the Project area and that additional surveys/information are required in order to determine potential impacts. The status of agency coordination regarding threatened/endangered species is described in Resource Report 3, and copies of related agency correspondence is provided as Appendix 3-A.

The Project is not located within any designated Coastal Zone Management areas.

1.3 CONSTRUCTION PROCEDURES

The Project will be designed, constructed, tested, owned, operated, and maintained by Tennessee to conform with applicable federal, state, and applicable local requirements, including DOT regulations at 49 Code of Federal Regulations ("C.F.R.") Part 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*, and Commission regulations at 18 C.F.R. §380.15, *Siting and Maintenance Requirements*. The requirements set forth in the Commission's *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC 2013a) and the Commission's *Wetland and Waterbody Construction and Mitigation Procedures* (FERC 2013b) will be followed. Tennessee has incorporated the Commission's Plan and Procedures into two Project-specific documents: the Orion Project's draft Upland Erosion Control, Revegetation, and Maintenance Plan ("Project Plan" [Appendix 1-F]) and the Orion Project's draft Wetland and Waterbody Construction and Mitigation Procedures ("Project Procedures" [Appendix 1-G]), with the modifications requested for Commission approval, as set forth in Section 1.3.2.11; and typical construction workspace layout drawings (Appendix 1-B). Proposed Project-specific changes that have been incorporated in the Project Procedures are detailed in Section 1.3.2.11. Additionally, construction will be performed in accordance with the Project's draft Spill Prevention, Control, and Countermeasures Plan ("SPCC" [Appendix 1-I]). Construction methods are summarized in the following subsections. The Final Project Plan, Project Procedures, and SPCC, incorporating comments received from the Commission and other agencies, will be submitted with Tennessee's Implementation Plan prior to construction.

1.3.1 Construction Schedule

Pending receipt of all necessary regulatory approvals, construction of the Project is planned to commence in January 2017. Construction of the Project would commence only after Tennessee has obtained and accepted the Commission's Certificate for the Project. Additionally, construction will not begin until all ROWs and applicable federal and state permits have been acquired and Tennessee has obtained a Notice to Proceed with Construction from the Commission.

All Project facilities are anticipated to be placed in-service no later than June 1, 2018. Tennessee estimates it would commence construction for the pipeline loops using one or more mainline construction spreads and various smaller tie-in crews for Project construction. The anticipated peak workforce would consist of approximately 275 personnel and would take approximately 12-18 months to complete, depending upon weather, seasonal restrictions in sensitive areas, and site-specific conditions.

Tennessee does not anticipate the need for additional permanent staff for operation/maintenance of the new Project, and no new operations offices or district offices would be required for operation of the Project.

1.3.2 General Pipeline Construction

The general procedures for pipeline construction that would be followed for the pipeline loops are described in this section. Tennessee would use conventional techniques for buried pipeline construction and would follow the requirements set forth in the Project's draft Plan (see Appendix 1-F) and Project Procedures (Appendix 1-G) to ensure safe, stable, and reliable transmission facilities consistent with Commission and DOT specifications. At a minimum, Tennessee would perform the following procedures:

- Marking the corridor;
- Clearing and grading;
- Trenching;
- Stringing;
- Pipe preparation (bending, welding, X-ray, weld coating and coating repair) and lowering in;
- Backfilling and grade restoration;
- Hydrostatic testing and tie-ins; and
- Cleanup and restoration.

The above-listed procedures would typically be performed in the sequence listed. Areas requiring special construction techniques may include crossings of: unusual topographies such as unstable soils and trench conditions, steep slopes, or side slopes; residential areas; agricultural areas; roads and railroads; utilities; environmental restricted construction window areas or environmental mitigation techniques; waterbodies, streams, and wetlands; areas requiring rock removal and areas; impacted by severe weather.

1.3.2.1 *Marking the Corridor*

Affected landowners will be notified before the preconstruction survey and staking commence. After these notifications, a land survey crew will survey and stake the outside limits of the proposed construction ROW and ATWS areas, the centerline of the pipeline, wetlands, streams, drainages, highway and railroad crossings, and access roads. Existing utility lines (*e.g.*, cables, conduits, and pipelines) will be located and marked with flags, stakes, or other devices to prevent accidental damage during pipeline construction. Avoidance areas such as wetland boundaries, cultural resource sites, and sensitive species habitat will be marked with appropriate fencing or flagging based on agency approvals and permit conditions.

1.3.2.2 *Clearing, Erosion and Sediment Control, Grading, and Fencing*

The construction corridor will be cleared and graded to remove brush, trees, roots, and other obstructions such as large rocks and stumps. Tree felling activities will be conducted in accordance with the permit conditions and Tennessee's draft Migratory Bird Impact Assessment and Conservation Plan (Appendix 3-C), Indiana and Northern long-eared bat tree felling timing restrictions (*i.e.*, October 1 through March 31), and any agency-directed conservation plans, if

required. Non-woody vegetation may be mowed to ground level. Temporary fences and gates will be installed as needed to restrict non-authorized access. No cleared material will be placed within wetland/stream areas.

Tennessee anticipates disposal of trees cleared from the ROW using several different methods. Trees, if suitable, may be taken off site by the clearing contractor and used for timber. Trees may be chipped on site and removed. Chipped material not removed may be spread across the ROW within upland areas in a manner that does not inhibit revegetation. Wood chips will not be left within agricultural lands, wetlands, or within 50 feet of wetlands/streams. Also, wood chips will not be stockpiled in a manner that they may be transported into a wetland/stream.

Timber not designated for other uses will be disposed of by Tennessee's contractor, as designated by the full-time environmental inspectors ("EIs") assigned to the Project, or agreements with individual landowners. Timber will not be stacked in drainage ways or left within wetlands. Tennessee does not plan to use timber stacks as wildlife habitat.

Access to the construction corridor will normally be obtained via public roads that intersect the ROW. Permission will be obtained from landowners for the use/modification of any non-public access roads that lead to the construction corridor. At the request of a landowner, Tennessee will erect temporary gates along access roads where necessary.

Immediately following clearing of the construction ROW, vegetation debris will be primarily chipped and mulched and left to overwinter as an erosion control measure during the spring snowmelt. If vegetation debris remains on the ROW after clearing, Tennessee will consult with appropriate agencies to determine if temporary erosion control installation would be necessary immediately after clearing. If not required immediately after clearing, then, prior to construction, Tennessee will install appropriate temporary erosion controls, in accordance with the Project's draft Plan and Procedures. Typically, staked straw bales and/or silt fence barriers are positioned along the limit of wetland boundaries within the construction workspace. To ensure that appropriate erosion and sediment control measures are maintained until the construction workspace is fully stabilized, the EI will inspect all disturbed areas of the construction spread(s) (*e.g.*, construction ROW, pipe storage yards, temporary contractor yards) that have not been permanently stabilized: (1) on a daily basis in areas of active construction; (2) on a weekly basis in areas with no construction or equipment operation; or (3) within 24 hours of the end of a storm event that is 0.5 inches or greater.

Grading of the construction workspace will allow for the movement of heavy equipment and the safe passage of work crews. Grading will include removing rock outcrops, tree stumps, ridges, and topographic irregularities. Generally, machinery would operate on one side of the trench (working side) with excavated materials stockpiled on the other (nonworking side). Grading activities will be scheduled to minimize the time between initial clearing operations and the actual installation of pipe.

As appropriate, the clearing and grading operations will incorporate special construction procedures to minimize the amount of vegetation removed from stream banks and slopes, prevent undue disturbance of the soil profile, restore the original contours of the natural ground, and prevent topsoil erosion. To minimize impact to the soil profile on agricultural lands and wetlands, up to 12 inches of topsoil will be segregated from subsoil during trenching and would remain

segregated during construction to avoid loss due to mixing with subsoil material. Tennessee will utilize either full ROW topsoil segregation or ditch plus spoil side topsoil segregation, as requested by the landowner, as required by the Wayne and Pike County Conservation Districts, or as appropriate based upon site-specific conditions. Upon the completion of backfilling operations, the topsoil will be properly replaced over the graded area. Grading activities will be scheduled to minimize the time between initial clearing operations and the actual installation of pipe.

1.3.2.3 *Trenching*

In most areas characterized by normal soils, the trench for the pipeline will be excavated by crawler-mounted, rotary wheel-type trenching machines or track–mounted excavators. The trench generally would be approximately 14 inches wider than the diameter of the pipe and of sufficient depth to allow for the minimum cover requirements to the top of the pipe in accordance with DOT regulations pursuant to the Natural Gas Pipeline Safety Act of 1968. Landowner requests or permitting requirements may dictate greater depth.

Crossing of third-party pipelines will generally require the pipeline to be buried at greater depths depending upon the depth of the third-party pipeline. A minimum of 12 inches of clearance will be maintained when crossing third-party pipelines, utilities, or other structures. Pipeline burial depths in areas requiring special construction techniques through rock will be in accordance with DOT requirements, 49 C.F.R. Part 192. Prior to the commencement of construction activities, the "Pennsylvania One Call" system, as well as the national "811" call system, will be contacted to have underground utilities and third-party pipelines identified and marked. Trenching in the vicinity of these third-party utilities will begin only after completing the appropriate notification procedures.

In accordance with the Project Plan, measures would be employed to minimize erosion during trenching operations and construction activities. Measures also will be taken to minimize the free flow of water into the trench and through the trench into waterbodies. Compacted earth for temporary trench breakers and sandbags or foam for permanent trench breakers may be installed within the trench to reduce erosion.

1.3.2.4 *Pipe Stringing*

The stringing operation involves moving the pipe into position along the prepared ROW. Pipe will be delivered to the Project area's pipeline storage areas typically by truck and then moved by truck from the pipeline storage areas to the construction zone, where it will be placed along the ROW in a continuous line in preparation for subsequent lineup and welding operations. Individual joints of pipe will be strung along the ROW parallel to the centerline and arranged so they are easily accessible to construction personnel. The amount of pipe necessary for wetland, stream, or road crossings will be stockpiled in pipeline storage areas in the vicinity of each crossing. Stringing activities will be coordinated with the advance of the trenching and pipe-laying crews to minimize the potential impact to the resources.

1.3.2.5 *Pipe Preparation and Lowering-In*

Each welder will be qualified in accordance with federal regulations using approved welding procedures. The pipe joints will be welded together using qualified welding procedures. Qualified

inspectors will perform inspection of the pipe welding. Bending, welding, and coating in the field will comply with DOT regulations, 49 C.F.R. Part 192. The pipe will be protected with an external coating designed to protect the pipe from corrosion. Except for a small area at both ends of each pipe joint, this coating is generally applied at the pipe mill before shipment to the site. The weld locations are coated in the field with similar or compatible materials. The pipe coating will be inspected for defects and repaired, if necessary, prior to lowering-in.

Once the pipeline has been welded together, coated and inspected, the pipe will be lowered into the trench. If the bottom of the trench is rocky, methods to protect the pipe will be used, including the possible use of sandbags or support pillows at designated intervals along the trench. Trench dewatering may be required in certain locations to prevent the pipe from floating and also to perform certain limited activities in the trench. Trench dewatering will be performed in accordance with the Project's draft Plan and Procedures.

1.3.2.6 *Backfilling and Grade Restoration*

After lowering the pipe into the trench, the trench will be backfilled. Backfill usually consists of the material originally excavated from the trench, including rock to the existing rock profile; however, in some cases, additional backfill from other sources may be required. Any excess excavated materials or materials unsuitable for backfill will be handled, as approved by landowner or land management agency, or disposed of in accordance with applicable regulations. In areas where topsoil has been segregated, the subsoil will be placed in the trench first and then the topsoil will be placed over the subsoil. Backfilling will occur to approximate grade. However, a soil crown may be placed above the trench at the discretion of the Tennessee inspector and landowner to accommodate any future soil settlement.

1.3.2.7 *Clean-up and Restoration*

After the completion of backfilling, disturbed areas will be graded, and any remaining trash and debris would be properly disposed of in compliance with federal, state, and local regulations. The construction corridor would be protected through the implementation of erosion control measures including site-specific contouring, permanent slope breakers, mulching, and reseeding or sodding with soil-holding vegetation. Contouring would be accomplished using acceptable excess soils from construction. If sufficient soils are not available, additional soil would be imported and inspected by Tennessee prior to use.

Tennessee would restore the construction workspace in accordance with the Project's draft Plan and Procedures (see Appendix 1-F and Appendix 1-G, respectively), and with information regarding applicable seed mix requirements from the U.S. Department of Agriculture, National Resources Conservation Service ("USDA/NRCS") or the Wayne and Pike County Conservation Districts and relevant landowner agreements.

1.3.2.8 *Hydrostatic Testing and Tie-Ins*

Hydrostatic testing procedures are described in Section VII of the draft Project Procedures (Appendix 1-G) and in the draft Project Plan (Appendix 1-F). The pipeline will be tested hydrostatically in accordance with DOT regulations, 49 C.F.R. Part 192. The pipeline will be filled with water and maintained at a test pressure and duration in compliance with Tennessee's

engineering standards and applicable federal regulations. Water will be obtained from local water sources and in accordance with all state, federal, and local permit requirements.

After completion of a satisfactory test, the water will be discharged to the ground through a containment structure to a vegetated upland area. Tennessee will seek coverage under the Pennsylvania National Pollutant Discharge Elimination System ("PA NPDES") for hydrostatic test water discharge. Hydrostatic test water will be discharged within an upland area through a filter structure in accordance with typical workspace configurations (Appendix 1-B). The discharge rate of the test water will be regulated using valves and/or energy dissipation devices to prevent erosion. Tie-in locations will be cleaned and restored after hydrostatic testing. Resource Report 2 provides additional information regarding hydrostatic pressure testing and anticipated water volumes.

1.3.2.9 *Cathodic Protection & Alternating Current Mitigation*

Design of the cathodic protection and alternating current mitigation systems for the Project will be done during detailed design. Tennessee plans to use a very conservative approach while modeling and designing the systems to reduce the likelihood of modifications to the installed system after the pipeline is placed in service. Tennessee will conduct pre and post testing to identify any areas requiring modification. Tennessee will work with the agencies and landowners as needed to install these facilities when known.

1.3.2.10 *Specialized Construction Procedures*

Dependent upon site conditions, Tennessee may implement the following special pipeline construction methods in residential, agricultural, and environmentally sensitive areas.

Steeply Sloped Topography

Steeply sloped topography is present along portions of the proposed pipeline loop (see Resource Report 6 for specific locations sloped topography). Permanent trench breakers consisting of sandbags or foam (gravel or cement filled sacks may also be used) will be installed in the ditch over and around the pipe in areas of slope with high erosion potential. Trench breakers will be used to isolate wet areas and to minimize channeling of groundwater along the ditch line. In areas along the ROW where steep, rugged topography is encountered and the pipeline is to be constructed on the side slope, two-tone cut and fill construction methods will be utilized for equipment and/or personnel safety considerations. ATWS is necessary at these locations to accommodate excavated material from the temporary cut and fill areas while allowing for the temporary storage of trench spoil, excess rock material, cut timber, and in some cases salvageable topsoil. In addition, rock that is currently situated on the ROW from construction of the existing 300 Line will have to be accounted for in this need for ATWS requirement.

When side slopes that require special construction are encountered, the following techniques will be used. During grading, the up-slope side of the pipeline ROW would be cut. The material removed from the cut will be used to fill the down-slope edge of the ROW to provide a safe and level surface from which to operate the heavy equipment. During grade restoration, the spoil is placed back in the cut and compacted. Any springs or seeps found in the cut will be carried down-

slope through polyvinyl chloride (commonly referred to as PVC) pipe and/or gravel French drains installed as part of the cut restoration.

In the areas of construction where the slope exceeds 28 degrees, a special means of manipulating the construction equipment may be utilized. The preferred method will be "winching" the equipment. This process consists of placing and anchoring a tractor at the top of the slope and using a winch to manipulate the equipment up and down the slope. Table 1.3−1 identifies areas along the proposed Project where slopes greater than 28 degrees would be encountered and the specialized construction techniques noted above may be implemented. In areas of sloped topography, ROW restoration will begin within 10 days of final pipeline installation to minimize potential erosion and sedimentation control problems.

Table 1.3-1. Steep Slopes (>28 Degrees) Crossed by the Pipeline Loops

Facility	Beginning MP	Distance (feet)[a]
Loop 322 and Loop 323	0.09	246
	0.17	114
	0.24	50
	1.01	36
	7.66	212
	7.75	53
	9.19	44
	10.40	982
	10.92	193
	11.41	86
	11.53	110
	Project Total	**2,126**

Note:
a Slope accessed through use of PAMAP Program 3.2 ft Digital Elevation Model of Pennsylvania data. Only areas of over 10 linear feet over 28 degrees slope were included to exclude areas of steep slope caused by roadside ditches, *etc*. These excluded areas were verified using aerial imagery.

Residential Areas

Detailed information relative to construction within residential areas, including techniques and mitigation measures to be implemented are discussed within the draft Project Plan (Appendix 1-F). Additionally, site-specific drawings have been developed that identify measures to minimize disruption and maintain access to occupied residential buildings within 25 feet of the construction workspace which are addressed in Resource Report 8.

Temporary construction impacts on residential areas could include inconvenience caused by noise and dust generated by construction equipment, personnel, and trenching of roads or driveways; ground disturbance of lawns; removal of trees, landscaped shrubs, or other vegetative screening between residences; potential damage to existing septic systems or wells; and removal of aboveground structures such as fences, sheds, or trailers from the ROW.

Construction through or near residential areas will be done in a manner to ensure that all construction activities minimize adverse impacts on residences and that cleanup is prompt and thorough. Affected landowners will be notified at least three to five days before construction

commences, unless more advance notice is required pursuant to a landowner agreement. Access to homes will be maintained, except for the brief periods essential for laying the new pipeline. Tennessee will implement the following general measures to minimize construction-related impacts on all residences and other structures located within 50 feet of the construction ROW, including:

- Maintain, where feasible, a minimum distance of 25 feet between any residence and the edge of the construction work area. Any residences where this cannot be obtained, a site-specific residential construction plan will be developed;
- Install a safety fence at the edge of the construction ROW for a distance of 100 feet on either side of the residence;
- Install a fence at the boundary of the construction work area to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- Restore all lawn areas and landscaping within the construction ROW consistent with the Project's draft Plan following backfilling.
- Leave landscaping and mature trees that are located outside of the permanent easement intact but within the construction work area unless the trees and landscaping interfere with the installation techniques or present unsafe working conditions;
- Ensure piping is welded prior to excavation of the trench and installed as quickly as reasonably possible to minimize the amount of time a neighborhood is affected by construction;
- Backfill the trench within 10 days after the pipe is laid or temporarily place steel plates over the trench; and
- Complete final cleanup, grading, and installation of permanent erosion control devices within 10 days after backfilling the trench, weather permitting.

To ensure that the trench is backfilled within 10 days after pipeline installation through residential areas, Tennessee will use a typical pipeline construction sequence in which the pipeline installation crew is followed by a separate backfill crew. Tennessee will require its contractor, by contractual agreement, to backfill trenches in residential areas as soon as practical after the installation of the pipeline. The minimal length of each construction spread will not require construction crews to be separated by significant distances during pipeline construction. Pipeline construction crews will be in close proximity to each other and will be able to efficiently communicate during the entire construction phase of the Project.

Topsoil in landscaped lawns will be segregated and replaced, or will be imported. Immediately after backfilling, residential areas will be restored and all construction debris will be removed. Compaction testing will be performed and soil compaction mitigation will be performed in severely compacted areas. Lawns will be raked, with topsoil added as necessary, and restored per landowner agreements. Ornamental shrubs will be replaced, when possible.

Private property such as mailboxes, fences, and gates that are removed will be restored, to the extent that such private property does not interfere with the safe operation of the pipeline. Sidewalks, driveways, and roads disturbed by pipeline construction would be restored to original or better condition upon completion of construction activities. Additionally, Tennessee will test water wells within 150 feet of the construction workspace, both before and after construction. After restoration is complete, a Tennessee representative will contact landowners to ensure that

conditions of all agreements have been met and that the landowner has been compensated for damage incurred during construction.

If the construction ROW crosses a road or driveway, Tennessee will maintain existing access or provide alternative access so residents have ingress/egress to their homes. If the road is open cut, one lane will remain open during construction or traffic will be detoured around the work area through the use of adjacent roadways. Traffic safety personnel will be present during construction periods, and signage and safety measures will be developed in compliance with applicable state and local roadway crossing permits. To the maximum extent practicable, Tennessee will schedule work within roadways to avoid commuter traffic and impacts on school bus schedules. In general, Tennessee will implement the following practices during construction within residential areas.

- **Stove-Pipe Construction Method** - The stove-pipe construction method is typically used when the pipeline is to be installed in very close proximity to an existing structure and an open trench would have an adverse impact. The technique involves installing one joint of pipe at a time in which the welding, weld inspection, and coating activities are all performed in the open trench, thereby reducing the width of the construction ROW. At the end of each day, the trench is backfilled and/or covered with steel plates or timber mats. The length of excavation performed each day would typically not exceed the amount of pipe installed.

- **Drag-Section Method** - The drag-section construction method is another method that reduces the width of the construction ROW and is normally preferred over the stove-pipe method. This technique involves the trenching, installation, and backfill of a prefabricated length of pipe containing several pipeline sections all in one day. As in the stovepipe method, the trench is backfilled and/or covered with steel plates or timber mats at the end of each day after the pipe is lowered in.

Agricultural Lands

To preserve soil productivity in agricultural lands, up to 12 inches of topsoil will be segregated and stored separately from subsoil during construction. Tennessee will utilize full ROW topsoil segregation, as required by landowner agreement or by the Wayne and Pike County Conservation Districts, or as appropriate based upon site-specific conditions. Rock will be removed from the top 12 inches (topsoil layer) or to the existing subsoil horizon during initial clean-up to a level such that the construction ROW is similar to surrounding areas. During the backfilling and restoration phases, topsoil will be replaced, and any stones removed from the top 12 inches (topsoil layer) will be handled in accordance with the Project;s draft Plan or in accordance with individual landowner agreements. Any drain tiles damaged during construction will be repaired or replaced, and a crop-monitoring program will be implemented to ensure that crop productivity is restored to pre-construction conditions. Refer to Resource Report 8 for additional information regarding agricultural land crossed by the Project.

Road and Railroad Crossings

Prior to construction, Tennessee will locate all existing underground utilities and make provisions for traffic management in work areas as necessary. Road and railroad crossings will be completed using standard open-cut or conventional boring methods. Conventional boring entails drilling a

hole beneath travel arteries through which the pipe would pass. Resource Report 8 provides additional information regarding the crossing of roadways associated with the Project.

Utility Crossings

Crossing of third-party pipelines will generally require the pipeline to be buried at greater depths depending upon the depth of the third-party pipeline. A minimum of 12 inches of clearance will be maintained when crossing third-party pipelines, utilities, or other structures. Pipeline burial depths in areas requiring special construction techniques through rock will be in accordance with DOT requirements, 49 C.F.R. Part 192. Prior to the commencement of construction activities, the "Pennsylvania One Call" system, as well as the national "811" call system, will be contacted to have underground utilities and third-party pipelines identified and marked. Trenching in the vicinity of these third-party utilities will begin only after completing the appropriate notification procedures.

Horizontal Directional Drill Technology

Tennessee does not plan to use horizontal directional drill ("HDD") technology during the Project at this time. Should the use of HDD technology become necessary after consultations with relevant federal, state, and local agencies, Tennessee will prepare site-specific drawings and an HDD contingency plan that establishes procedures for addressing potential impacts associated with a release of drilling fluid through hydraulically induced fractures during the HDD process.

Waterbody and Wetland Crossing Construction

Tennessee will utilize one or more of the following methods for installing the pipeline across waterbodies during construction.

- **Open-Cut Crossing** - Minor waterbodies with no flow at the time of construction may be crossed using the open-cut crossing method. A detailed description of this waterbody crossing method is located in Resource Report 2.

- **Dry Flume Crossing** - A flumed or dry crossing of a stream directs the flow of a stream through an alternate mechanism to allow for the trenching and pipe installation to occur in dry conditions. Where practical, this allows for drier trenching, pipe installation, and restoration while maintaining continuous downstream flow. A detailed description of this waterbody crossing method is located in Resource Report 2.

- **Dam and Pump Method** - The dam and pump method may be used for crossings of waterbodies where pumps can adequately transfer stream flow volumes around the work area and there are no concerns about sensitive species passage. A detailed description of this waterbody crossing method is located in Resource Report 2.

- **Cofferdam** -The cofferdam method, typically used on large streams/rivers, involves the installation of a cofferdam to isolate and divert flow around the work area in two phases. The first phase consists of the cofferdam installation on one of the banks and approximately halfway into the river to allow safe and dry installation of the pipeline across the river. The second phase involves the same process but from the opposite

bank. This method allows continuous flow around the work area and there are no concerns about sensitive species passage. A detailed description of this waterbody crossing method is located in Resource Report 2.

Tennessee will utilize one or more of the following methods for installing the pipeline across wetlands during construction.

- **Drag Section Technique –** This technique involves carrying a prefabricated section of pipe into the wetland for placement into the excavated trench, if soil conditions permit. This technique requires the installation of equipment support along the working side of the trench to provide a stable work surface and minimize soil disturbance and rutting. A detailed description of this wetland crossing method is located in Resource Report 2.

- **Push/Pull Technique –** This technique is generally used only in wetlands with standing water or soils that are saturated to the surface. The trench may be excavated using either a backhoe (working on equipment support in the wetland) or a dragline or clamshell dredge (working either in the wetland or from the edge of the wetland, depending on wetland size and extent of soil saturation). A prefabricated pipe is pushed from the edge of the wetland and/or pulled (*e.g.*, with a winch) from the opposite bank of the wetland into the excavated trench. Floats may be attached to the pipe to give it positive buoyancy, allowing it to be "floated" into place over the excavated trench. Once the pipe is positioned, these floats will be removed and the pipe will settle to the bottom of the trench and the trench will then be backfilled. The push/pull technique enables the pipeline to be installed with minimal equipment operating in the wetland. A detailed description of this wetland crossing method is located in Resource Report 2.

All waterbody and wetland crossings will comply with the applicable state and local regulations. All applicable permits for construction within waterbodies will be obtained, including Section 401 Water Quality certification from the Pennsylvania Department of Environmental Protection ("PADEP") Regional Bureau of Watershed Management. Additionally, wetland obstruction and encroachment permits will be obtained from the PADEP. The draft Project Plan, which addresses erosion and sediment control, will be reviewed and approved by the Wayne and Pike County Conservation Districts prior to Project construction.

Rock and Bedrock

Tennessee anticipates that shallow bedrock will generally be removed using mechanical equipment such as hydraulic excavators, rock-ditching machines, rock saws, hydraulic rams, jack hammers, dozer drawn rippers, or other techniques in lieu of blasting. Uses of these mechanical techniques are directly dependent on the extent of the rock and its qualities. Where these methods are either unsuccessful or inadequate, blasting may be required. Where necessary, blasting controls will be implemented to limit stresses on existing Tennessee pipelines that parallel the Project area, as well as other nearby facilities and structures. All blasting activity will be performed according to strict guidelines designed to control energy release. Field surveys and a review of aerial photographs revealed that there are residential and outbuildings and other underground infrastructure (*e.g.*, petroleum and natural gas pipelines) within 500 feet of the Project area, which will be taken into

account when implementing blasting controls. Special care will be taken to monitor and assess blasting within 150 feet of residences and private or public water supply wells.

Tennessee has developed a Project-specific draft Blasting Plan (Appendix 6-A in Resource Report 6) that establishes procedures and safety measures, including the measures discussed above, that Tennessee's contractor will be required to adhere to while implementing blasting activities along the pipeline ROW during Project construction. Tennessee will also obtain all the necessary federal, state, or local blasting permits prior to construction. Tennessee's construction contractor will be required to submit a detailed Blasting Specification Plan to Tennessee that is consistent with the provisions of the Orion Project Draft Blasting Plan and Kinder Morgan[6] Construction Specifications. The construction contractor's plan, when approved by Tennessee, will be incorporated into the contractor's scope of work. Tennessee's Project-specific draft Blasting Plan is provided as Appendix 6-A.

Winter Construction

Construction and restoration activities for Project, including tree felling, may occur during winter conditions. Tennessee includes a draft Winter Construction Plan ("WCP") in Appendix 1-H which addresses the special considerations and concerns associated with construction and restoration efforts conducted during winter conditions, including site stabilization measures to be implemented if restoration activities are delayed until spring/early summer. The Final WCP, incorporating comments received from the Commission and other agencies, will be submitted with Tennessee's Implementation Plan prior to construction.

1.3.2.11 *Modifications to the Commission's Procedures*

Tennessee is requesting Project-specific revisions to the Commission's Procedures, which are included in the modified draft Project Procedures in Appendix 1-G. The modifications of the Commission's Procedures, reflected in the draft Project Procedures, for which Tennessee is seeking approval are provided below:

1. If access to upland areas between wetlands is not available along construction ROW, an adequate travel way may be constructed that would support multiple trips through wetlands. The EI would determine the limit, type, and frequency of equipment that would be allowed access to the travel way. If installed, the travel way would be completely removed and the wetland restored during cleanup (Procedures, at Section VI.B.1.d).
2. Tennessee proposes that permanent slope breakers may not always be appropriate for installation at wetland boundaries. At the discretion of the EI and Tennessee's contractor, permanent slope breakers that may alter the permanent overland flow characteristics, consequently altering the wetland's characteristics, would not be installed. Tennessee proposes the use temporary slope breakers at the wetland boundaries until restoration is complete to ensure the wetland characteristics would remain intact in situations that permanent slope breakers are not used. This exception applies only to the use of a permanent slope breaker (Procedures, at Section VI.C.2.).

[6] Tennessee is an indirect wholly-owned subsidiary of Kinder Morgan, Inc. ("Kinder Morgan") and is a member of Kinder Morgan's natural gas pipeline group.

3. Tennessee proposes to restore disturbed wetlands as required by Pennsylvania agencies in accordance with the draft Project Procedures (Appendix 1-G) or as recommended by County Conservation District Offices through consultation and application of applicable permits (Procedures, at Section VI.C.3).
4. Tennessee proposes to increase the 75-foot construction ROW (Procedures, at Section VI.A.3) through three wetland areas based on previous construction experience through the same wetlands and site-specific comments/recommendations received from agency (PADEP and U.S. Army Corps of Engineers ["USACE"]) personnel. Specifically, Tennessee proposes to add an additional 10 feet of temporary workspace to wetlands W20a (MP 3.63), W11b (MP 6.34), and W30a (MP 11.90) based on the saturated soil conditions and the need to provide extra space for segregating the topsoil and subsoils during construction. Previous construction activities through these wetlands exceeded the defined/authorized workspace limits resulting in the need for agency coordination and emergency permits during construction. Tennessee will attempt to limit work activities to the 75-foot construction ROW; however, if conditions at the time of construction warrant the need for additional workspace Tennessee has identified the additional 10 feet in this ER.

1.3.3 Aboveground Facilities

All construction activities associated with CS 323 will be performed entirely within Tennessee's existing property boundary. The modifications to CS 323 will be constructed and installed in accordance with Tennessee's specifications and DOT requirements. Tennessee will incorporate environmental requirements into construction documents, conduct environmental training, and provide routine monitoring during construction, cleanup, and restoration. Preliminary plot plans that detail the proposed modifications to CS 323 are provided in Appendix 1-D. The duration of construction for the modifications to CS 323 is 120 days, and Tennessee anticipates approximately 60 workers will be required for construction of the proposed modifications to CS 323.

Preliminary plans that detail the mainline valves and pig launcher / receiver are provided within Appendix 1-D. These appurtenant facilities will be constructed within the permanent pipeline ROW in accordance with industry standards. Construction of appurtenant facilities will coincide with construction of Loop 322 and Loop 323.

1.3.3.1 *Clearing and Grading*

The sites for the appurtenant facilities will be cleared of vegetation and graded as necessary to create level surfaces for the movement of construction vehicles on the sites and to prepare the areas for the building foundations. Tennessee will install erosion control devices around disturbed areas, as appropriate to the land, soil, and weather conditions, to minimize the potential for erosion and for impacts to off-site wetlands and waterbodies. Erosion and sediment controls will conform to Commission requirements.

1.3.3.2 *High Pressure Piping*

Tennessee proposes to design and construct the high pressure piping to meet DOT regulations, 49 C.F.R. Part 192. Tennessee proposes to design the high pressure station yard gas piping to

have a MAOP of 1,200 psig, which is slightly higher than the MAOP of 1,170 psig for each new loop being constructed. Actual operating pressure for the 300 Line system after the Project is completed will vary depending on shipper receipts and deliveries and the manner in which Tennessee operates its compression to meet shipper demands. Tennessee proposes to coat all piping for protection against corrosion.

1.3.3.3 *Pressure Testing*

Prior to placing each of the appurtenant facilities in-service, Tennessee proposes to conduct pressure testing of the piping system. Tennessee proposes to conduct this test in accordance with applicable state and local code or regulatory requirements.

1.3.3.4 *Final Grading and Restoration*

Tennessee will perform final grading and restoration of the areas that will be disturbed during construction, as will be set forth in the final construction drawings to be submitted with the Implementation Plan. No new visual screening is proposed for the existing compressor station modifications or launcher/receiver areas.

1.3.3.5 *Erosion Control Procedures*

During construction of the Project, Tennessee will adhere to the applicable provisions of the Project's draft Plan (Appendix 1-F) and Procedures (Appendix 1-G) and permit requirements/conditions. As set forth in the above-referenced documents, Tennessee proposes to install appropriate erosion controls (*e.g.*, silt fence and or hay bales) to minimize the potential for erosion from construction of the Project facilities.

1.3.4 Supervision and Inspection

Tennessee will use a minimum of one qualified, full-time EI for the pipeline during Project construction. The EI responsibilities will be supported by either station personnel or a Project craft inspector. Tennessee conducts in-house EI training to ensure that the EIs can carry out their duties as described in this document, and that construction activities would be in compliance with (1) the Project's draft Plan and Procedures requirements, (2) the requirements of applicable federal, state, and local environmental permits and approvals, and (3) environmental requirements in landowner easement agreements. Additionally, Tennessee will conduct environmental training in advance of construction, and the EIs would perform all duties as specified in the Project's draft Plan and Procedures. The level of training will be commensurate with the types of duties of the Project personnel.

1.4 OPERATION AND MAINTENANCE PROCEDURES

The Project will be owned, operated, and maintained by Tennessee. Tennessee will operate and maintain the newly constructed pipeline in the same manner as it currently operates and maintains its major interstate pipeline facilities in accordance with the requirements of the Commission, the DOT's Pipeline and Hazardous Materials Safety Administration ("PHMSA"), 49 C.F.R. Part 192, and industry-proven practices and techniques. The Project will be operated and maintained in a manner such that pipeline integrity is protected to ensure that a safe, continuous supply of natural

gas reaches its ultimate destination. Maintenance activities will include regularly scheduled gas-leak surveys and measures necessary to repair any potential leaks. The latter may include repair or replacement of pipe sections. All fence posts, signs, marker posts, aerial markers, and decals will be painted or replaced to ensure that the pipeline locations will be visible from the air and ground. The pipeline and aboveground facilities will be patrolled on a routine basis, and personnel well qualified to perform both emergency and routine maintenance on interstate pipeline facilities will handle maintenance.

1.4.1 Pipeline Facilities

The pipeline will be patrolled from the air on a periodic basis (see Section 1.4.1.3). This will provide information on possible leaks, construction activities, erosion, exposed pipe, population density, possible encroachment, and any other potential problems that may affect the safety and operation of the pipeline. In addition, Tennessee is a participant in the "Pennsylvania One Call" system for utility companies in Pennsylvania, as well as the national "811" call system. Under the "Pennsylvania One Call" system, anyone planning excavation activities must call a single number to alert all utility companies.

When a call to the Pennsylvania One Call system is made, representatives of the utility companies that may be affected then visit the site and mark their facilities so that the excavation can proceed with relative certainty as to the location of all underground lines. Other maintenance functions would include: (1) periodic seasonal mowing of and/or application of herbicide on the ROW, in accordance with the Project's draft Plan and Procedures; (2) terrace repair, backfill replacement, and drain tile repair as necessary; (3) periodic inspection of water crossings; and (4) maintenance of a supply of emergency pipe, leak repair clamps, sleeves, and other equipment needed for repair activities. Tennessee will not use herbicides or pesticides within 100 feet of a wetland or waterbody unless approved by applicable state and local agencies.

1.4.1.1 *Cleared Areas*

A typical post-construction operational ROW of 50 feet will be used for the new pipeline in accordance with the Project Plan. This operational ROW will generally consist of 25 feet within the existing maintained easement of the 300 Line and 25 feet of new operational ROW. Maintaining a cleared ROW is necessary for the following reasons:

- Access for routine pipeline patrols and corrosion surveys;
- Access in the event that emergency repairs of the pipeline are needed;
- Visibility during aerial patrols; and
- To serve as a visual indicator to the public of an underground pipeline utility and easement.

Vegetation maintenance of Tennessee's permanent ROW in upland areas will be conducted on a frequency of approximately once every 5 to 7 years to maintain an herbaceous to low scrub-shrub cover state. Within emergent wetlands, Tennessee will maintain only a 10-foot operational ROW centered over the Project loops, allowing the balance of Tennessee's construction area to revert back to its natural, preconstruction vegetated cover state. Additionally, within forested wetlands, Tennessee will maintain a 30-foot operational ROW centered over the Project loops.

Following construction of the proposed pipeline, areas used for TWS and ATWS will be allowed to revert to their preconstruction land use/land cover with no further vegetation maintenance by Tennessee. Additionally, crop production will be allowed to continue in agricultural areas, immediately following construction or the following growing season.

1.4.1.2 *Erosion Control*

Erosion problems on the pipeline ROW will be reported to the local operations supervisor. These reports may originate from landowners or company personnel performing routine patrols. Corrective measures will be conducted as needed.

1.4.1.3 *Periodic Pipeline and ROW Patrols*

The pipeline and ROW will be patrolled on a periodic basis following construction. The frequency of the patrol of the pipeline by either aerial or ground surveys is determined by the size, operating pressure, class, terrain, weather and other relevant factors. The interval between patrols may not be longer than prescribed in Table 1.4-1.

Table 1.4-1. Maximum Interval between Pipeline and ROW Patrols

Class Location of Line	At Highway and Railroad Crossings	At All Other Places
1 and 2	7.5 months, but at least twice each calendar year	15 months, but at least once each calendar year
3	4.5 months, but at least four times each calendar year	7.5 months, but at least twice each calendar year
4	4.5 months, but at least four times each calendar year	4.5 months, but at least four times each calendar year

Additional ground surveys will be conducted on an as-needed basis to respond to issues such as landowner concerns and third-party encroachments. During ROW patrols, all permanent erosion control devices that are installed during construction will be inspected to ensure they are functioning properly. Additionally, attention will be given to:

- Existing stormwater outfalls along the alignment;
- Erosion and washouts along the ROW;
- Water control devices such as diversions;
- Condition of banks at drainage ditch crossings;
- Fallen timber or other threats to the pipeline;
- Shrubs and other vegetation planted during construction; and
- Any other conditions that could endanger the pipeline.

The local operations supervisor will be notified of any conditions that need attention. Corrective measures will be performed as needed.

1.5 FUTURE PLANS AND ABANDONMENT

The addition of the pipeline, modifications to the existing compressor stations, and the installation of associated appurtenant facilities that comprise the Project are necessary to efficiently meet market needs, as discussed in Section 1.1.1, Purpose and Need, and in the Certificate application for the Project. The Project is being proposed in direct response to increased demand for firm natural gas pipeline transportation capacity in the northeast U.S.

This Project is a stand-alone project, and does not require or necessitate the construction of any pipeline or compression facilities that are proposed as part of any pending or current project or anticipated to be proposed for any future project. Tennessee will proceed with this Project even if no other expansion projects are proposed and/or approved by the Commission. Any future expansion of the facilities proposed as part of this Project will be dependent upon a showing of additional demand for natural gas transportation.

As discussed herein, Tennessee is proposing other separate projects with distinct purposes and needs on the existing 300 Line. Tennessee is currently in the pre-filing process of its proposed Northeast Energy Direct Project ("NED Project"). Tennessee filed a request to utilize the Commission's pre-filing procedures on September 15, 2014 for the NED Project and the Commission issued a notice granting Tennessee's request on October 2, 2014 (Docket No. PF14-22-000). The proposed NED Project includes the construction and installation of pipeline, compression, and meter facilities in Pennsylvania, New York, Massachusetts, New Hampshire, and Connecticut. Proposed pipeline facilities to be located in Pennsylvania consist of approximately 39 miles of pipeline looping on Tennessee's 300 Line in Bradford and Susquehanna counties and approximately 40 miles of new pipeline proposed to be generally co-located with the Constitution Pipeline Company, LLC ("Constitution") project, approved by the Commission in a Certificate order issued December 2, 2014 in Docket No. CP13-499-000, 149 FERC ¶ 61,199 (2014).

The approximately 39 miles of pipeline looping on the 300 Line proposed as part of the proposed NED Project includes Loop 317-3 (approximately 29 miles in length, located immediately east of CS 317) and Loop 319-3 (approximately 10 miles in length, located immediately east of CS 319). In addition, approximately 40 miles of new pipeline in Pennsylvania proposed to be generally co-located with the Constitution pipeline. As part of the NED Project, Tennessee also proposes to modify the existing CS 319, as well as add one new natural gas-powered compressor station in Susquehanna County, Pennsylvania. Proposed modifications to CS 319 include upgrades to its piping systems to accommodate the new 36-inch OD pipeline looping sections. These modifications are proposed within the existing fenceline of CS 319. Tennessee owns the property where CS 319 is located as well as the surrounding property (29.2 acres in total). The new compressor station, Supply Path Head Station, will be constructed in Susquehanna County. Tennessee proposes to install two Mars 100 turbines, designed for 32,000 horsepower at the new compressor station. Tennessee anticipates submitting a certificate application to the Commission for the NED Project in the fourth quarter 2015. The anticipated in-service date for the proposed NED Project is November 2018.

Upon completion, the proposed NED Project could provide up to 1.3 billion cubic feet per day of additional natural gas transportation capacity to meet the growing energy needs in the northeast United States, particularly in New England. This includes needs of local distribution companies

("LDCs"), gas-fired power generators, industrial plants, and other New England consumers. Tennessee has executed precedent agreements for approximately 500,000 Dth/d of long-term firm transportation capacity on the Market Path Component (Wright, New York to Dracut, Massachusetts) of the proposed NED Project with several shippers, which demonstrates the market need for the Project capacity. Negotiations continue with additional shippers for both the Supply Path (Pennsylvania to Wright, New York) and Market Path Components of the proposed NED Project. The proposed NED Project and its in-service date of November 2018 are supported by the shippers committed to the proposed NED Project's capacity. The facilities that are proposed for the Orion Project will not require modifications to the pipeline loops, compressor station modifications and appurtenant facilities proposed as part of the proposed NED Project.

On April 2, 2015, Tennessee filed a Certificate application with the Commission for the Susquehanna West Project in Docket No. CP15-148-000. The Susquehanna West Project involves the construction of approximately 8.1 miles of pipeline looping and modifications to three existing compressor stations on Tennessee's 300 Line in Tioga and Bradford counties, Pennsylvania. All of the capacity to be created by the Susquehanna West Project has been subscribed by one shipper under a long-term, binding precedent agreement and will support a different market need than the proposed Project. The anticipated in-service date for the Susquehanna West Project is November 2017. None of the facilities required for the Susquehanna West Project require any modifications to the pipeline looping, compressor station modifications or appurtenant facility work that is part of this Project.

On June 19, 2015, Tennessee filed a Certificate application with the Commission for the Triad Expansion Project in Docket No. CP15-520-000. The Triad Expansion Project involves the construction of approximately 7.0 miles of new 36-inch outside-diameter pipeline looping along Tennessee's existing 300 Line ROW in Lennox and Clifford Townships, Susquehanna County, Pennsylvania. All of the capacity to be created by the Triad Expansion Project is anticipated to be subscribed by one shipper under long-term, binding precedent agreement. The anticipated in-service date for the Triad Expansion Project is November 1, 2017. None of the facilities required for the Triad Expansion Project require any modifications to the pipeline looping, compressor station modifications or appurtenant facility work that is part of this Project.

Tennessee includes information regarding cumulative impacts for the proposed NED Project, Susquehanna West Project, and Triad Expansion Project, to the extent there are such impacts, within the ER for this Project, as well as in the ERs that have been or will be prepared for each of the three identified projects, to allow the Commission to perform a meaningful analysis of the cumulative impacts of these projects. In addition, Tennessee has or will also include in its cumulative impacts analysis for the proposed NED Project, Susquehanna West Project, and Triad Expansion Project other past, present, or reasonably foreseeable projects identified in the areas of impact for resources impacted by this Project.

1.6 NON-JURISDICTIONAL FACILITIES

Tennessee is not aware of any non-jurisdictional facilities being constructed by others, as a direct result of this Project.

1.7 PERMITS AND APPROVALS

1.7.1 Permits, Licenses, and Certifications

Tennessee will submit applications for all necessary federal, regional, state, and local approvals or opinions for the Project, as provided in Table 1.7-1. A list of regulatory contacts is included in Table 1.7-1. Tennessee has initiated a planning and coordination process with federal and state regulatory agencies, resource agencies, and Native American tribes. As of the date of this resource report, most of the coordination process has involved letter requests for resource information, telephone discussions, and email communications. Resource Reports 3, 4, and 8 discuss agency consultation regarding sensitive species, cultural resources, and land use and future development activities, respectively. Correspondence received as of the date of this resource report is provided as appendices to those resource reports.

On July 30, 2015, Tennessee conducted an introductory Project meeting with USACE, PADEP, Wayne County Conservation District, and Pike County Conservation District. In addition, Tennessee conducted a pre-application meeting with PADEP and the County Conservation Districts on September 3, 2015 concerning the Joint Permit Application process for wetland and waterbody permitting and the Erosion and Sediment Control General Permit-2 process, and a pre-application meeting with the USACE on September 4, 2015 to review/discuss the Section 404 permitting requirements. Tennessee also met with the PAFBC on May 4, 2015 to discuss the requirements for additional timber rattlesnake surveys within the proposed Orion Project area, and the USFWS regarding bat species of concern in the Project area and potential mitigation requirements on September 2, 2015.

Tennessee will obtain all necessary permits, licenses, and clearances related to the construction, installation, operation, and maintenance of the proposed Project. Tennessee will require its contractor and EI to become familiar with all Project permits, licenses, and clearances, and the contractor will be required to comply with all applicable construction and restoration requirements and mitigation measures. Tennessee or its contractor will procure all necessary hauling and other operating permits and licenses, pay all charges and fees, and give all notices required for the construction, installation, operation, and maintenance of the proposed Project.

Table 1.7-1. Permits, Approvals, Consultations, and Tribal Notifications

Regulatory Agency/ Organization	Permit/Approval	Agency Contact	Date Submitted / *Anticipated Submittal*	Date Received / *Anticipated Receipt*
Federal				
Federal Energy Regulatory Commission	Certificate of Public Convenience and Necessity	Office of Energy Projects 888 First Street, NE Washington, DC 20426	*October 2015*	*December 2016*
U.S. Army Corps of Engineers, (USACE) Philadelphia District	Section 404 of the Clean Water Act – Wetland and Waterbody Crossing Permit; Federal 401 Water Quality Certification	Frank Cianfrani, Chief of Regulatory Branch Philadelphia District The Wanamaker Building 100 Penn Square East Philadelphia, PA 19107-3390	*October 2015*	*October 2016*

Regulatory Agency/ Organization	**Permit/Approval**	**Agency Contact**	**Date Submitted / *Anticipated Submittal***	**Date Received / *Anticipated Receipt***
U.S. Fish and Wildlife Service, PA Office	Clearance under Section 7 the Endangered Species Act	U.S. Fish and Wildlife Service, Pennsylvania Field Office, 110 Radnor Road, Suite 101, State College, PA 16801-4850 814-234-4090	Initial Letter Sent April 3, 2015; *On-going coordination regarding Indiana and Northern Long-eared Bats; Submit Survey Reports October 2015.*	*July 2016*
U.S. Fish and Wildlife Service, PA Office	Project review under Migratory Bird Treaty Act	U.S. Fish and Wildlife Service Pennsylvania Field Office 110 Radnor Road, Suite 101 State College, PA 16801-4850 814-234-4090	*October 2015*	*July 2016*
Advisory Council on Historic Preservation / Pennsylvania Historical and Museum Commission	Section 106, of the National Historic Preservaton Act	Division of Archaeology & Protection Pennsylvania Historical and Museum Commission State Museum Building 300 North Street Harrisburg, PA 17120	Initial Letter Sent April 23, 2015; *On-going coordination regarding cultural resources; Submit Survey Reports October 2015.*	*July 2016*
U. S. Environmental Protection Agency	Air Quality Planning and Standards, Preconstruction Permit *State Implementation Plan*	PADEP, Bureau of Air Quality Office, 2 Public Square Wilkes-Barre, PA 18701-1915 570-826-2511	*October 2015*	*June 2016*
Commonwealth of Pennsylvania				
PA Department of Environmental Protection (PADEP), Northeastern Region	Pennsylvania Water Obstruction and Encroachment Permits (wetland/waterbody crossings)	PADEP, Northeast Regional Office, 2 Public Square Wilkes-Barre, PA 18701-1915 570-826-2511	*December 2015*	*December 2016*
PADEP, Northeastern Region	State 401 Water Quality Certification	PADEP, Northeast Regional Office, 2 Public Square Wilkes-Barre, PA 18701-1915 570-826-2511	*September 2015*	*February 2016*
PADEP, Northeastern Region	License to Occupy Submerged Lands	PADEP, Northeast Regional Office, 2 Public Square Wilkes-Barre, PA 18701-1915 570-826-2511	*December 2015*	*December 2016*
PADEP, Northeastern Region	Hydrostatic Test Water Discharge	PADEP, Northeast Regional Office, 2 Public Square Wilkes-Barre, PA 18701-1915 570-826-2511	*December 2015*	*December 2016*
PADEP, Northeastern Region	Request for Determination, Bureau of Air Quality	PADEP, Northeast Regional Office, 2 Public Square Wilkes-Barre, PA 18701-1915 570-826-2511	*October 2015*	*June 2016*
PADEP Northeastern Region	Erosion and Sediment Control Permit (ESCGP-2)	PADEP, Northeast Regional Office, 2 Public Square Wilkes-Barre, PA 18701-1915 570-826-2511	*December 2015*	*December 2016*
PennDOT	Highway Occupancy Permit	PennDOT Engineering District 3-0 715 Jordan Avenue PO Box 218 Montoursville PA, 17754 570-368-8686	*December 2015*	*90-120 days*

Regulatory Agency/ Organization	**Permit/Approval**	**Agency Contact**	**Date Submitted / *Anticipated Submittal***	**Date Received / *Anticipated Receipt***
Pennsylvania Department of Conservation and Natural Resources	Notification Letter/Request, Pennsylvania Endangered/Threatened Species Regulations	DCNR Bureau of Forestry, Ecological Services Section 400 Market Street PO Box 8552 Harrisburg, PA 17105	Initial Letter Sent April 3, 2015; *On-going coordination for plant species of concern; Plant Survey Report Submit October 2015.*	*July 2016*
Pennsylvania Fish and Boat Commission	Notification Letter/Request, Pennsylvania Endangered/Threatened Species Regulations	PAFBC 450 Robinson Lane Bellefonte PA, 16823 814-359-5194	Initial Letter Sent April 3, 2015; *On-going coordination regarding timber rattlesnake.*	*August 2016*
Pennsylvania Game Commission	Notification Letter/Request, Pennsylvania Endangered/Threatened Species Regulations	PAGC Bureau of Wildlife Habitat Management 2001 Elmerton Avenue Harrisburg PA, 17701 570-787-6957	Initial Letter Sent April 3, 2015 – deferred to USFWS; *On-going consultation regarding Indiana and Northern Long-eared Bats; Submit Survey Reports October 2015.*	July 2016
Pennsylvania Fish and Boat Commission	Permit to Install Floating Structures and Private Aids to Navigation	PAFBC Division of Environmental Services 450 Robinson Lane Bellefonte PA, 16823 814-359-5194	*December 2015*	*60 – 100 days*
Pennsylvania Fish and Boat Commission	In-Stream Blasting Permit	PAFBC Division of Environmental Services 450 Robinson Lane Bellefonte PA, 16823 814-359-5194	*December 2015*	*60 – 100 days*
Pennsylvania Fish and Boat Commission	Permit to Draw Off Water from Impoundments	PAFBC Division of Environmental Services 450 Robinson Lane Bellefonte PA, 16823 814-359-5194	*December 2015*	*180 days*
PA Historical and Museum Commission	State Historic Preservation Officer Clearance Letter	Pennsylvania Historical and Museum Commission State Museum Building 300 North Street Harrisburg PA, 17120 717-783-8946	*October 2015*	*30 – 45 days*
PA Historical and Museum Commission	State Historic Preservation Officer Application – Phase I Report	Pennsylvania Historical and Museum Commission State Museum Building 300 North Street Harrisburg PA, 17120 717-783-8946	Initial Letter Sent April 23, 2015; *On-going coordination regarding cultural resources; Submit Survey Reports October 2015.*	*90 days*
County / Townships				
Wayne County Conservation District	Notice of Intent (NOI) for Erosion and Sedimentation Control General Permit Plan approval	Wayne County Conservation District 470 Sunrise Ave Honesdale PA, 18431 570-253-0930	*December 2015*	*180– 270 days*

Regulatory Agency/ Organization	Permit/Approval	Agency Contact	Date Submitted / *Anticipated Submittal*	Date Received / *Anticipated Receipt*
Pike County Conservation District	Notice of Intent (NOI) for Erosion and Sedimentation Control General Permit Plan approval	Pike County Conservation District 556 PA-402 #1 Hawley PA, 18428 570-226-8220	*December 2015*	*180– 270 days*
Berlin Township	Act 14 Notification; Township Road Use Permit	Berlin Township Supervisor Berlin Township PO Box 61 Beach Lake PA 18405 570-729-8073	*September 2015; December 2015*	*December 2016*
Lackawaxen Township	Act 14 Notification; Township Road Use Permit	Lackawaxen Township Supervisor 116 Township Road Lackawaxen PA 18435 570-685-7288	*September 2015; December 2015*	*December 2016*
Palmyra Township	Act 14 Notification; Township Road Use Permit	Palmyra Township Supervisor City Government Office 115 Buehler Road Paupack PA, 18451 570-226-0373	*September 2015; December 2015*	*December 2016*
Tribal Nations				
Delaware Nation	Coordination with Federally Recognized Indian Tribes	31064 State Highway 281 Anadarko, OK 73005	Initial Project Letter/Notification sent April 30, 2015. *On-going coordination.*	--
Absentee-Shawnee Tribe of Oklahoma	Coordination with Federally Recognized Indian Tribes	2025 S. Gordon Cooper Drive Shawnee, OK 74801	Initial Project Letter/Notification sent April 30, 2015. *On-going coordination.*	--
Delaware Tribe of Indians	Coordination with Federally Recognized Indian Tribes	1200 Commercial Street Roosevelt Hall, RM 212 Emporia State University Emporia, KS 66801	Initial Project Letter/Notification sent April 30, 2015. *On-going coordination.*	--
St. Regis Mohawk Tribe	Coordination with Federally Recognized Indian Tribes	412 State Route 37 Akwesasne, NY 13655	Initial Project Letter/Notification sent April 30, 2015. *On-going coordination.*	--
Shawnee Tribe	Coordination with Federally Recognized Indian Tribes	29 South 69a Highway Miami, OK 74354	Initial Project Letter/Notification sent April 30, 2015. *On-going coordination,*	--
Eastern Shawnee Tribe of Oklahoma	Coordination with Federally Recognized Indian Tribes	P.O. Box 350 Seneca, MO 64865	Initial Project Letter/Notification sent April 30, 2015. *On-going coordination.*	--
Stockbridge-Munsee Community Band of Mohican Indians	Coordination with Federally Recognized Indian Tribes	W13447 Camp 14 Road PO Box 70 Bowler, WI 54416	Initial Project Letter/Notification sent April 30, 2015. *On-going coordination.*	--

Regulatory Agency/ Organization	Permit/Approval	Agency Contact	Date Submitted / *Anticipated Submittal*	Date Received / *Anticipated Receipt*
Other				
Delaware River Basin Commission	Surface Water Withdrawal Permit, if required	DRBC 25 State Police Drive PO Box 7360 West Trenton, NJ 08628-0360 609-883-9522	*December 2015*	*December 2016*

1.7.2 Landowner Notifications

The names and mailing addresses of the landowners whose property will be directly affected by the Project, or are abutting the Project, are provided in Appendix 1-E, located in Volume IV (Privileged and Confidential). At this time, Tennessee has contacted all the affected landowners and has informed them of the proposed Project. As the compressor station is an existing facility and requires only minor modifications as part of the Project, landowners within 0.5 mile of the compressor station are not included in Appendix 1-E. However, Tennessee is scheduled to hold meetings with the public in November 2015 and these meetings will be open to all residents in the area.

In accordance with Section 157.6(d) of the Commission's regulations, 18 C.F.R. §157.6(d), Tennessee will:

- Place an electronic copy of the Certificate application in a public library in both Wayne and Pike counties, identified in Table 1.7-2, within three business days of a docket number being issued (Table 1.7-2).
- Provide Project notification to all directly affected and abutting landowners, towns, communities, and local, state, and federal government agencies within three business days following issuance of a Notice of Application by the Commission.
- Publish a notice of the filing of the certificate application twice in two general circulation newspapers, identified in Table 1.7-2 below, no later than 14 days after the Commission assigns a docket number to the application (Table 1.7-2).

Table 1.7-2. Public Libraries and Newspapers in the Project Area

Library	Newspaper
Pike County Public Library 119 East Harford Street Milford, PA 18337 570-296-8211	**The Pike County Courier** 406 Broad Street Milford, PA 18337 570-296-0700
Wayne County Public Library 1406 Main Street Honesdale, PA 18431 570-253-1220	**Wayne Independent** 220 8th Street Honesdale, PA 18431 570-253-3055

1.8 CUMULATIVE IMPACTS

To support an informed decision by the Commission, Tennessee assessed the potential cumulative impacts associated with the Project. Per the Council on Environmental Quality ("CEQ")

regulations, a cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 C.F.R. §1508.7). "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. §1508.7).

Cumulative impacts may occur when the environmental effects associated with the Project are added to either temporary (construction-related) or permanent (operation-related) impacts associated with other past, present, and reasonably foreseeable future actions. Reasonably foreseeable future actions are those projects within the geographic scope and timeframe of the Project that are beyond mere speculation (*e.g.*, projects with an existing proposal, commitment of resources or funding, or those for which the permitting process has begun).

The geographic scope of the other actions that may contribute to cumulative impacts varies depending on the resource being considered. For each resource, the geographic scope is defined by the Cumulative Impact Assessment Area ("CIAA") (see Section 1.8.1). Potential cumulative impacts on a given resource will result from the combined effect of construction and operation of the Project with other past, present, and reasonably foreseeable future actions occurring during the same timeframe and within the resource-specific CIAAs of the Project.

1.8.1 Methodology

The cumulative impact analysis follows the methodology set forth in relevant guidance (CEQ 1997, U.S. Environmental Protection Agency ["USEPA"] 1999). Under these guidelines, inclusion of other actions within the analysis is based on identifying commonalities of impacts from other actions to potential impacts that would result from the Project. An action must meet the following criteria to be included in the cumulative impacts analysis:

- Impact a resource area potentially affected by the Project;
- Cause this impact within the resource-specific CIAA where the Project will also have an impact; and
- Cause this impact within the time span for the potential impact of the Project (CEQ 1997, USEPA 1999).

In general, the CIAA will depend on the scope and size of the project (*e.g.*, larger projects will impact a larger area; smaller projects, a smaller area). In addition, the CIAA may also differ for each resource (*e.g.*, for waterbody and wetland impacts, the area of effect may be a particular watershed; for air emissions, the area of impact may be a particular air quality control region; for threatened and endangered species, habitat demarcations).

For the Project, the CIAA boundary for each resource, as well as regulatory guidance and published agency analyses used to determine the CIAA boundary for each resource, is presented in Table 1.8-1. The CIAA boundaries presented in Table 1.8-1 and used in the resource report analyses in this Certificate application are specific to the Project. The individual resource reports provide details regarding the resource-specific CIAA, as well as the supporting regulatory guidance and published agency analyses that were utilized to determine the resource-specific CIAA.

A basic assumption of the cumulative impacts analysis is that if there are no Project-related impacts for a particular resource, there would be no cumulative impacts for that resource. Similarly, if the Project activities are determined to have minimal impacts of short-duration they would not likely contribute significantly to cumulative impacts. For these resources, defining a CIAA is not applicable (USEPA 1999).

As discussed below, cumulative impacts are addressed as follows:

- Identification of other past, present, and reasonably foreseeable future actions (see Section 1.8.2), and
- Estimation of the cumulative impacts, which is the incremental impact of the Project when added to the impact from other past, present, and reasonably foreseeable future actions (see Section 1.8.3).

1.8.2 Cumulative Actions

Past, present, and reasonably foreseeable future actions within each of the resource-specific CIAAs were identified through federal, state, and local agency and municipal websites and direct communications; permit applications; paid and free-access database searches; and third-party communications. Data was collected for energy projects, transportation improvement projects, and industrial development activities.

Actions with the potential to contribute to cumulative impacts within the same geographic scope and timeframe as the Project are provided in Table 1.8-2. Specifically, Table 1.8-2 provides a brief description of these actions, identifies the locations and distances of the actions from the Project, and characterizes the timeframe for these actions (*e.g.*, past, present, and future). As shown in Table 1.8-2, a total of 23 actions were identified as past, present, and reasonably foreseeable future actions to be considered in the cumulative impact analysis for the Project. Figure 1-J (see Appendix 1-J) shows these past, present, and reasonably foreseeable future actions within with the resource-specific CIAAs (Note: TBD actions are identified on Figure 1-J; however, six of those actions [actions numbered 9-14] are pipe recoating that have been grouped together in Table 1.8-2 under the project entitled, "300-1 Cathodic Protection Modification Project")

Table 1.8-1. Resource-Specific Cumulative Impact Assessment Areas

Resource	CIAA Boundary	CIAA Rationale
RR 1: General Project Description	N/A	N/A
RR 2: Water Use and Quality	HUC 12 Watersheds (5): • 20401040504: Twin Lakes Creek-Delaware River • 20401030603: Lackawaxen River-Delaware River • 20401010605: Masthope Creek • 20401030601: Carley Brook-Lackawaxen River • 20401010606: Westcolang Creek-Delaware River	Watersheds are well-defined, published natural boundaries for surface water flow and are large enough to be deemed ecologically relevant to the impacts caused by the project (CEQ 1997). Cumulative effects have been most extensively studied at the watershed level. Furthermore, watersheds include the geographic area that sustains the resources of concern but are not too large as to be unwieldy (USEPA 1999).
RR 3: Fish, Wildlife, and Vegetation	Wildlife/Plant/migration corridors and home ranges for species within one-half mile of Project area	Wildlife/plant/migratory corridors and home ranges for species are published and well defined. This boundary was determined by doubling the standardized Pennsylvania Natural Diversity Inventory ("PNDI") one-quarter mile buffer utilized by PADCNR for all pipeline projects when examining potential impacts to any state and/or federal species or natural communities of concern. By extending the PNDI search boundaries to one-half mile on each side of the pipeline centerline and surrounding all aboveground facilities (*i.e.*, CS 323), potential impacts from adjacent projects will also be considered. The CIAA utilized to evaluate the cumulative impacts to vegetation and wildlife is consistent with regulatory guidance (see CEQ 1997 and USEPA 1999).
RR 4: Cultural Resources	General Project area and within view shed of Project up to one mile	The CIAA for Project-related direct impacts are confined to those areas potentially affected by the pipeline looping, access roads, staging areas, pipe/contractor yard, and ATWS. The CIAA for indirect effects encompasses historic structures, buildings, or districts within view of modifications at existing aboveground Project facilities (*i.e.*, CS 323 and the area encompassed by a one mile buffer around the construction work areas [USEPA 1999]). Because direct effects are highly localized and limited primarily to the period of construction, cumulative impacts to cultural resources would only occur if other projects are constructed at the same time and in the same geographic footprint as the Project.
RR 5: Socioeconomics	N/A	The FERC Guidance Manual for Preparing Environmental Documents (FERC 2002) specifies that the socioeconomic impact area generally comprises the municipalities or counties in which Project facilities will be located or may be affected by project activities. However, construction of the Project is expected to require less than 300 workers during the peak construction period. These workers will represent less than 0.5 percent of the population within Pike and Wayne counties, and will have a temporary and insignificant impact on socioeconomic resources within the counties. No additional permanent staff will be needed for continued operation of the Project facilities. Because the direct and indirect impacts of the Project will be negligible, the potential cumulative impacts associated with the Project would also be negligible. Consistent with CEQ and USEPA guidance on cumulative impacts (CEQ 1997 and USEPA 1999), the CIAA for socioeconomic impacts would not be applicable because the potential cumulative impacts associated with the Project would be negligible.
RR 6: Geological Resources	Area of disturbance of Project and "other actions" within one-half mile of Project area	The FERC Guidance Manual for Environmental Report Preparation (FERC 2002) recommends identifying surface and subsurface geologic resources up to one-quarter mile from proposed Project facilities. This report includes wells and mineral resources within one-half mile of the Project to provide an additional buffer.

Resource	CIAA Boundary	CIAA Rationale
		Similarly, to assess potential cumulative impacts, the CIAA is defined as the area encompassed by a one-half mile buffer around the construction work areas. Geologic resources and conditions occur within site-specific locales, and are generally not affected by activities occurring outside of the designated work area. Because direct effects are highly localized and limited primarily to the period of construction, cumulative impacts to geologic resources and conditions are more likely to occur if other projects are constructed at the same time and in the same geographic footprint as the Project.
RR 7: Soils	Area of disturbance of Project and "other actions"; wind erosion effects: one mile	Soil resources occur within site-specific locales and are generally not affected by activities occurring outside the designated work area. As such, the CIAA for Project-related impacts is defined as the area encompassed by a one mile buffer around the construction work areas (USEPA 1999). Because direct effects are highly localized and limited primarily to the period of construction, cumulative impacts to soils would only occur if other projects are constructed in the same geographic footprint as the Project.
RR 8: Land Use, Recreation, and Aesthetics	General Project area and within view shed of Project up to one mile	Impacts to land uses, recreation, and aesthetics generally occur within and adjacent to project areas. As such, CIAA for Project-related impacts to land use, recreation, and aesthetics is defined as a one mile buffer surrounding the Project facilities. This CIAA is appropriate for the assessment of land use impacts associated with the Project because the Project itself will not result in a noticeable change in the physical characteristics of the existing environment (DOT 1988).
RR 9: Air Quality	N/A	Air quality impacts will only be associated with construction activities because the Project includes no new facilities containing stationary emission sources and no new or modified emission sources. As a result, any air quality impacts from the pipeline looping and CS 323 activities will be temporary, localized, not occurring on a steady basis, spread out across the entire Project area, and below the *de minimis* emission threshold levels established for General Conformity. Consequently, the CIAA for the pipeline looping and CS 323 would not be applicable because the potential cumulative impacts associated with the Project would be negligible.
RR 9: Noise Quality	Up to two miles from Project area	Per the FERC Guidance Manual for Environmental Report Preparation (FERC 2002), this CIAA was selected because if other noise-generating actions are occurring within two miles of the Project it is expected that noise sensitive areas ("NSAs") could experience cumulative noise impacts due to the nature of sound propagation. Because noise impacts are highly localized and attenuate quickly as the distance from the noise source increases, noises beyond two miles away are not expected to contribute to noise-related impacts that would be experienced by the human ear and vibrations perceptible to the human body.
RR 10: Alternatives	N/A	N/A
RR 11: Reliability and Safety	N/A	N/A
RR 12: Polychlorinated biphenyl ("PCB") Contamination	Compressor Station & Pipeline area	The Project does not involve the replacement or abandonment of any existing pipeline known or expected to have PCBs in excess of 50 ppm, nor has CS 323 or the pipeline work area previously required PCB remediation activities. Cumulative impacts due to the exposure of PCB-containing materials will only occur if other projects are constructed at the same time and in the same geographic footprint as the Project. With proper compliance monitoring, the Project will not contribute to cumulative impacts.
RR 13: Engineering and Design Material	N/A	N/A
Note: N/A = not applicable		

Table 1.8-2. Projects Evaluated for Potential Cumulative Impacts

Project	Primary Elements	Location (County, State)	Closest Distance to Project (miles)	Status -Past -Present -Future
Section 7(c) Projects[a]				
300 Line Project, Tennessee, Docket No. CP09-444-000	Constructed eight 30-inch loops on Tennessee's 300 Line, constructed two new compressor stations, and modified seven existing compressor stations.	Potter, Tioga, Bradford, Susquehanna, Wayne, Pike, Venango, and McKean, PA and Sussex and Passaic, New Jersey	0.0[b]	Past In service – November 2011
Northeast Upgrade Project, Tennessee, Docket No. CP11-161-000	Constructed five 30-inch loops on Tennessee's 300 Line and modified four existing compressor stations.	Bradford, Susquehanna, Wayne, and Pike, PA, and Sussex, Passaic, and Bergen, New Jersey	0.0[b]	Past In-service – November 2013
Susquehanna West Project, Tennessee, Docket No. CP15-148-000	Approximately 8.1 miles of new 36-inch-diameter pipeline loop along Tennessee's existing 300 Line. Piping modifications and cooling system upgrades associated with the pipeline loop will be completed at CS 315. Increase compression capacity and modify piping and other equipment at existing CS 317 and CS 319.	Tioga and Bradford, PA	53.2	Future Anticipated November 2017 In-Service
Triad Expansion Project, Tennessee Docket No. CP15-520-000	Approximately 7.0 miles of new 36-inch-diameter pipeline loop along Tennessee's existing 300 Line and appurtenant and auxiliary facilities consisting of crossover and connecting facilities to the existing Tennessee 300-1 and 300-2 Lines, a new pig launcher, pig receiver and an additional odorant facility at CS 321.	Susquehanna, PA	23.2	Future Anticipated November 2017 In-Service

Project	Primary Elements	Location (County, State)	Closest Distance to Project (miles)	Status -Past -Present -Future
Northeast Energy Direct Project, Tennessee Docket No PF14-22-000	Approximately 420 miles of pipeline (new, loops, laterals), 9 new compressor stations and modifications to existing CS 319, new and modified meter stations, and appurtenant facilities.	Bradford and Susquehanna PA; Broome, Chenango, Delaware, Schoharie, Albany, Rensselaer, Otsego, New York; Berkshire, Hampshire, Franklin, Worcester, Middlesex, Essex, Hampden, Massachusetts; Cheshire, Hillsborough, and Rockingham, New Hampshire; and Fairfield and Hartford, Connecticut.	35.1	Future Anticipated November 2018 In-Service
Tennessee Minor Pipeline-Related Projects				
Replace Unit 1A VFD Chiller Unit at CS 323	Replacing existing obsolete chiller unit for CS 323.	Pike, PA	0.0	Present Start April 2015
300 System Class Change 32	A class change (Class 1 to 3) for Line 300-1 within valve section 322-1, resulting in replacement of approximately 220 feet of 24-inch pipe, and installation of a new mainline block valve.	Wayne, PA	0.0	Future In Review
300-1 Cathodic Protection Modification Project	Recoat pipe, and install new rectifier, linear anode, and new cathodic protection system at multiple sites along Line 300-1.	Pike, PA	1.8	Future In Review
Commercial/Industrial/Residential/Municipal Development				
Strasser Quarry, Lackawaxen-Honesdale Shippers Association	Quarry operations in Palmyra Township, Wayne County affecting 15.3 acres on property owned by Lackawaxen-Honesdale Shippers Association.	Wayne, PA	1.8	Present
Trails End Camp Blasting	Construction blasting for Trails End Camp in Berlin Township, Wayne County.	Wayne, PA	2.9	Past March 2014

Project	Primary Elements	Location (County, State)	Closest Distance to Project (miles)	Status -Past -Present -Future
Wayne D. Holbert Quarry Expansion	Commencement, operation, and restoration of a quarry in Lackawaxen Township.	Pike, PA	1.5	Past Permit issued June 2013
PennDOT Infrastructure				
PennDOT Project No. 9329: Pond Eddy Crossing	Replacement of existing Pond Eddy Bridge	Pike, PA	9.4	Future 2016
PennDOT Project No. 96726: SR 1007 over Twin Lakes Creek	Bridge replacement on State Route 1007 (Woodtown Road) over Twin Lakes Creek, in Shohola Township, Pike County.	Pike, PA	6.4	Future 2015
PennDOT Project No. 57769: SR 590 Pipes Bridge Replacement	Replacing existing pipes with culverts on State Route 590 east and west of the intersection with State Route 4003 (Welcome Lake Road) in Lackawaxen Township, Pike County.	Pike, PA	1.1	Present February 2013 to November 2015
PennDOT Project No. 89014: SR 1003 over Lackawaxen River	Replacement/rehabilitation of State Route 1003 bridge (Rowland Road) over Lackawaxen River in Lackawaxen Township, Pike County.	Pike, PA	0.8	Future 2016-2019
PennDOT Project No. 9833: Carley Brooks Bridge 2	Bridge replacement/ rehabilitation on State Route 2008 over Carley Brook, in Honesdale Borough, Wayne County	Wayne, PA	2.6	Future 2018
PennDOT Project No. 96808: SR 1014 Slide Restoration	Slope repair on State Route 1014 (Masthope Road) in Lackawaxen Township, Pike County	Pike, PA	0.9	Future 2016

Project	Primary Elements	Location (County, State)	Closest Distance to Project (miles)	Status -Past -Present -Future
Unrelated Project (Energy & Utility)				
Northeast-Pocono Reliability Project, PPL Electric Utilities	Part of this project will be rebuilding an existing 69-kilovolt electric utility line that runs from the Peckville area in Lackawanna County to Honesdale, Wayne County. The line is about 20 miles long. It is 85 years old and no longer adequate to serve customer needs. The existing wooden poles for this line, which are about 70 feet tall, will be replaced with new steel poles that are about 95 feet tall. The right of way for this line will be 100 feet wide.	Wayne, PA	1.7	Present/Future 2014 to 2017
131 - Bohemia Tap 69KV, 845 BIL Modernization Project, PPL Electric Utilities	Approximate 1.75 miles of modifications to existing overhead electrical power line.	Pike, PA	0.0	Present
Oil and Gas Exploration and Production[c]				
Natural Gas Production Wells, Wayne County, PA	There is one existing natural gas well (ROBSON 6275281, permit #127-20008 owned by Chesapeake Appalachia, LLC - 2009) within the HUC-12 watershed CIAA. No additional natural gas production wells are reasonably foreseeable.[d]	Wayne, PA	4.4	Past
Natural Gas Production Wells, Pike County, PA	There is one existing natural gas well (PA DEPT OF FORESTS 7 WATERS, permit # C-1103-20003) owned by Texaco, Inc.) within the HUC-12 watershed CIAA. Plugged well in 1971 – listed as dry hole. No additional natural gas production wells are reasonably foreseeable.[d]	Pike, PA	6.7	Past

Project	Primary Elements	Location (County, State)	Closest Distance to Project (miles)	Status -Past -Present -Future
Natural Gas Production Gathering Systems[d]				
Natural Gas Production Gathering Lines, Wayne County, PA	Development of gathering lines for natural gas production in county. No additional natural gas gathering systems are reasonably foreseeable.[d]	Wayne, PA	4.4 (estimated)	Past
Natural Gas Production Gathering Lines, Pike County, PA	Development of gathering lines for natural gas production in county. No natural gas gathering systems are reasonably foreseeable.[d]	Pike, PA	N/A	Past

Note:
N/A = not applicable

a Projects recently completed, under construction, or expected to be under construction in the same timeframe as, and located within the CIAA of the Orion Project, with the exception of Tennessee's Northeast Energy Direct, Susquehanna West and Triad Expansion Projects.

b Portions of the Orion Project parallel or cross 300 Line Project and Northeast Upgrade Project areas.

c Well drilling activity within the same counties (Wayne and Pike counties) as the Orion Project.

d No projection for future buildout of wells was conducted for this analysis due to a *de facto* moratorium on natural gas production within the Delaware River Basin, of which Pike and Wayne counties are a part. The Delaware River Basin Commission ("DRBC") is a federal-interstate compact government agency formed in 1961 by the United States and the four basin states (Pennsylvania, New York, New Jersey, and Delaware), with Division Engineer, North Atlantic Division, U.S. Army Corps of Engineers serving as the federal representative. In May 2010, the DRBC postponed their consideration of natural gas well pad dockets until regulations were adopted. In December 2010 the DRBC published their proposed Draft Natural Gas Development Regulations. Following an extensive public comment period and plans for a November 21, 2011 meeting to revise the draft regulations, the DRBC postponed the meeting to allow for sufficient review time. The most recent action regarding the draft regulations was in a public statement by DRBC chair Michele Siekerka on July 10, 2013, in which she stated that the DRBC continues to review the draft regulations along with new scientific studies, water quality monitoring, new regulations and best management practices. (Source: DRBC 2013 available at http://www.nj.gov/drbc/programs/natural/)

1.8.3 Estimation of Cumulative Impacts

Cumulative impacts are estimated by aggregating the impacts of the Project with the impacts of past, present, and reasonably foreseeable future actions. Cumulative impacts are presented for each resource, with impacts aggregated for the applicable resource-specific CIAA. For example, cumulative cultural resource impacts are presented for the Project and the past, present, and reasonably foreseeable future actions within the general Project area and within view shed of the Project up to one mile (*e.g.,* the cultural resource CIAA).

A basic assumption of the cumulative impacts analysis is that if there are no Project-related impacts for a particular resource, there would be no cumulative impacts for that resource. Similarly, if the Project activities are determined to have a negligible impact on a particular resource, the cumulative impacts resulting from the Project would also be negligible on that particular resource (USEPA 1999).

Table 1-J (see Appendix 1-J) presents a summary compilation of the potential impacts associated with the Project and the past, present, and reasonably foreseeable future actions considered in this cumulative impact analysis. The table is arranged in a resource-by-resource format. For example, for vegetation and wildlife resources, the table identifies the applicable CIAA ("Wildlife/Plant/migration corridors and home ranges for species within one-half mile of the Project area"); identifies the size of that CIAA ("8,710 acres"); summarizes the impacts of the Project on vegetation/wildlife within the CIAA; summarizes the impacts of past, present, and reasonably foreseeable future actions on vegetation/wildlife within the CIAA; and, presents the "total" (*e.g.,* cumulative) impacts on vegetation/wildlife within the CIAA. Any past, present, and reasonably foreseeable future actions that would not produce impacts on vegetation/wildlife within the CIAA are noted as "Outside CIAA." This approach is repeated for each resource of concern. A detailed analysis of the potential cumulative impacts for each resource is presented in the applicable resource report in the ER.

1.8.4 Recent and Proposed Modifications to Tennessee's 300 Line

Tennessee's existing pipeline infrastructure consists of approximately 11,900 miles of pipeline designated as the 100, 200, 300, 400, 500, 700, and 800 Lines based on the region each serves. The proposed Project focuses on the existing 300 Line, which starts at the discharge of CS 219 in Mercer County, Pennsylvania, travels east through Pennsylvania, New Jersey, New York, and Connecticut, and ends as a 16-inch OD pipeline at the discharge of CS 261 in Hampden County, Massachusetts. The 24-inch OD pipeline, which was constructed in the mid-1950s, has been previously looped with 30-inch OD pipeline by separate, independent projects based on separate customer delivery needs and in-service dates needed to supply specific contracted firm transportation capacity to specific customers.

1.8.4.1 *Past/Recent Projects*

Modifications to Tennessee's 300 Line in the vicinity of the Project area, including CS 323, have occurred as part of various separate past and recent Tennessee expansion projects, and impacts of these projects are discussed in the cumulative impact sections of each resource report, as applicable:

- As part of Tennessee's 300 Line Project, for which the Commission issued a Certificate in Docket No. CP09-444-000 on May 14, 2010, 131 FERC ¶ 61,140 (2010), Tennessee installed approximately 127 miles of pipeline, consisting of seven separate pipeline loops in northern Pennsylvania, totaling approximately 111 miles, and one pipeline loop in northwestern New Jersey, totaling approximately 16.5 miles. Additionally, as part of the Project, Tennessee constructed two new compressor stations near its existing 300 Line ROW in northwestern Pennsylvania, as well as modifications and system upgrades at seven existing compressor station facilities in Pennsylvania and New Jersey, including CS 323. The 300 Line Project was placed in-service on November 1, 2011. Because the 300 Line Project has been in service for more than three years, associated impacts are included in the environmental baseline for this Project, with the exception of ongoing wetland mitigation and permanent revegetation processes along the 300 Line Project ROW.

- As part of Tennessee's Northeast Upgrade Project, for which the Commission issued a Certificate in Docket No. CP11-161-000 on May 29, 2012, 139 FERC ¶ 61,161 (2012); Order on Rehearing, Clarification, and Stay, 142 FERC ¶ 61,025 (2013), Tennessee made certain modifications to existing CS 321. The Northeast Upgrade Project also included the construction and installation of approximately 40 miles of pipeline in five separate loops in Bradford, Wayne, and Pike counties in Pennsylvania and Sussex, Passaic, and Bergen counties in New Jersey and modifications at three other existing compressor stations in Pennsylvania and New Jersey. The Northeast Upgrade Project was placed in-service on November 1, 2013.

Modifications to other portions of Tennessee's existing 300 Line within the northeastern region of Pennsylvania, but outside of the vicinity of the Project area, have occurred as part of various past or recent Tennessee expansion projects:

- Tennessee filed a prior notice request with the Commission for the Uniondale Project on July 24, 2013 in Docket No. CP13-526-000. The Uniondale Project included modifications at existing CS 321 located in West Clifford, Susquehanna County, Pennsylvania, and modifications to the Uniondale Meter Station located in Uniondale, Susquehanna County, Pennsylvania. The Uniondale Project was constructed and placed in-service on September 23, 2014.

- As part of Tennessee's Rose Lake Expansion Project, for which the Commission issued a Certificate in Docket No. CP13-3-000 on September 19, 2013, 144 FERC ¶ 61,219 (2013), Tennessee installed certain improvements and modifications to three existing compressor stations in Pennsylvania: (1) CS 315 in Tioga County, (2) CS 317 in Bradford County, and (3) CS 319 in Bradford County. The Rose Lake Expansion Project was placed in-service on November 1, 2014.

- As part of Tennessee's MPP Project, for which the Commission issued a Certificate in Docket No. CP12-28-000 on August 9, 2012, 140 FERC ¶ 61,120 (2013), Tennessee installed certain improvements and modifications at the following compressor stations in Pennsylvania: (1) CS 219 in Mercer County; (2) CS 303 in Venango County; (3) CS 310 in McKean County; and (4) CS 313 in Potter County. This project also included

construction and installation of approximately 7.9 miles of pipeline looping in in Potter County, Pennsylvania. The MPP Project was placed in-service on November 1, 2013.

- As part of Tennessee's Northeast Supply Diversification Project, for which the Commission issued a Certificate order in Docket No. CP11-30-000 on September 15, 2011, 136 FERC ¶ 61,173 (2011), Tennessee constructed and installed certain facilities in northern Pennsylvania, including the construction and installation of approximately 6.77 miles of pipeline looping between CS 315 and CS 317 and a pig receiver facility at CS 317. The Northeast Supply Diversification Project was placed in-service on November 1, 2012.

Because the impacts of these four projects are not within the CIAAs that were identified for any of the resources impacted by this Project, these projects are not further addressed in this cumulative impact analysis.

1.8.4.2 *Pending/Current Projects*

Other portions of Tennessee's existing 300 Line within the northeastern region of Pennsylvania are currently proposed for modifications as part of separate projects, are as discussed below.

- Tennessee is currently within the pre-filing process for its proposed NED Project. Tennessee filed a request to utilize the Commission's pre-filing procedures on September 15, 2014 for its proposed NED Project. The Commission issued a notice granting Tennessee's request on October 2, 2014 (in Docket No. PF14-22-000). The proposed NED Project includes the construction and installation of pipeline, compression, and meter facilities in Pennsylvania, New York, Massachusetts, New Hampshire, and Connecticut. Proposed pipeline facilities to be located in Pennsylvania consist of approximately 32 miles of pipeline looping on Tennessee's 300 Line in Bradford and Susquehanna counties and approximately 40 miles of new pipeline proposed to be generally co-located with the Constitution Pipeline Project, approved by the Commission in a Certificate issued December 2, 2014 in Docket No. CP13-499-000, 149 FERC ¶ 61,199 (2014). Tennessee also proposes to modify existing CS 319 and to add one new natural gas-powered compressor station in Susquehanna County, Pennsylvania. Tennessee anticipates submitting a Certificate application to the Commission for the proposed NED Project in the fourth quarter 2015. None of the facilities required for the NED Project require any modifications to the pipeline looping, compressor station modifications or appurtenant facility work that is part of this Project.

- On April 2, 2015, Tennessee filed a Certificate application with the Commission for the Susquehanna West Project in Docket No. CP15-148-000. The Susquehanna West Project involves the construction of approximately 8.1 miles of pipeline looping and modifications to three existing compressor stations on Tennessee's 300 Line in Tioga and Bradford counties, Pennsylvania. All of the capacity to be created by the Susquehanna West Project has been subscribed by one shipper under a long-term, binding precedent agreement. The anticipated in-service date for the Susquehanna West Project is November 2017. The facilities that are proposed for the Orion Project will not require modifications to the pipeline loops, compressor station modifications and appurtenant facilities proposed as part of the proposed Susquehanna West Project.

- On June 19, 2015, Tennessee filed a Certificate application with the Commission for the Triad Expansion Project in Docket No. CP15-520-000. The Triad Expansion Project will allow Tennessee to transport approximately 180,000 Dth/d of additional firm natural gas transportation capacity on Tennessee's pipeline system. The Project involves construction of approximately 7.0 miles of new 36-inch OD pipeline looping along Tennessee's existing 300 Line ROW in Lennox and Clifford Townships, Susquehanna County, Pennsylvania. All of the capacity to be created by the Triad Expansion Project is anticipated to be subscribed by one shipper under a long-term, binding precedent agreement. The anticipated in-service date for the Triad Expansion Project is November 1, 2017. None of the facilities required for the Triad Expansion Project require any modifications to the pipeline looping, compressor station modifications or appurtenant facility work that is part of this Project.

- In June 2015, Tennessee began construction on the rebuild of the Milford Delivery Station under its existing blanket authorization. The rebuild of the Milford Delivery Station will allow Tennessee to transport up to 349 million standard cubic feet per day ("MMSCFD"). The project involves the installation of a new meter building and ancillary equipment such as filter separators, tanks, and new piping to tie into existing systems. The new facilities will also result in a new segment of access road coming off of an existing access road, and a new area to be used for access/parking at Tennessee's existing Milford Delivery Station in Milford Township, Pike County, Pennsylvania. The Milford Delivery Station is anticipated to be placed in-service in September 2015 to service the Columbia Gas Transmission, LLC ("Columbia") East Side Expansion Project.

- Columbia filed a Certificate application with the Commission for the East Side Expansion Project in Docket No. CP14-17-000 and received a Certificate from the Commission on December 18, 2014. The purpose of the project is to provide 312,000 Dth/d of additional firm transportation service to growing mid-Atlantic markets. The project involves two natural gas looping pipeline segments, compressor facilities and other aboveground facility modifications in Gloucester County, New Jersey; Bucks, Chester, Northampton and Pike counties, Pennsylvania; Harford County, Maryland; and Orange County, New York.

- Tennessee is also reviewing three locations associated with the 300-1 Cathodic Protection Modification Project which are located outside of the CIAA, but within Pike County. The Project involves recoating of pipe, and installation of a new rectifier, linear anode, and new cathodic protection systems at multiple sites along Line 300-1.

Although the four Tennessee Projects and three locations of the 300-1 Cathodic Protection Modification Project are proposed projects on the 300 Line, these projects are not located within the CIAAs identified for any of the resources impacted by this Project; therefore, they are not further addressed in this cumulative impact analysis. Similarly, the Columbia project is not located within the CIAAs identified for any of the resources impacted by this Project and therefore is not further addressed in this cumulative impact analysis.

1.9 REFERENCES

Council on Environmental Quality (CEQ). 1997. Considering Cumulative Effects Under the National Environmental Policy Act. Council on Environmental Quality, Executive Office of the President, Washington D.C. 122 pp.

Federal Energy Regulatory Commission (FERC). 2002. Guidance Manual for Environmental Report Preparation. Office of Energy Projects. August 2002.

FERC. 2008. Preparing Environmental Documents: Guidelines for Applicants, Contractors, and Staff. Office of Energy Projects. September 2008.

FERC. 2013a. Upland Erosion Control, Revegetation, and Maintenance Plan. Office of Energy Projects. May 2013.

FERC. 2013b. Wetland and Waterbody Construction and Mitigation Procedures. Office of Energy Projects. May 2013.

National Energy Board. 2013. Canada's Energy Future 2013: Energy Supply and Demand Projections to 2035. Available at: https://www.neb-one.gc.ca/nrg/ntgrtd/ftr/2013/2013nrgftr-eng.pdf. Accessed September 2015.

New York State Department of Environmental Conservation (NYSDEC). 2011. Revised Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program: Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs. Available at: http://www.dec.ny.gov/energy/75370.html. Accessed February 7, 2015.

U.S. Department of Transportation (DOT). 1988. Visual Impact Assessment for Highway Projects (Publication No. FHWA-HI-88-054). Available at http://www.dot.ca.gov/ser/downloads/visual/FHWAVisualImpactAssmt.pdf. Accessed January 7, 2015

U.S. Energy Information Administration (EIA). 2015. Annual Energy Outlook 2015 with projections to 2040. April 2015. Available at: http://www.eia.gov/forecasts/aeo/pdf/0383(2015).pdf. Accessed September 2015.

U.S. Environmental Protection Agency (USEPA). 1999. Consideration of Cumulative Impacts in EPA Review of NEPA Documents. U.S. Environmental Protection Agency, Office of Federal Activities. 1999.