

TABLE OF CONTENTS

Leach XPress Project and Rayne XPress Expansion Project Draft Environmental Impact Statement

TABLE OF CONTENTS	i
LIST OF APPENDICES	viii
LIST OF TABLES	ix
LIST OF FIGURES	xii
TECHNICAL ACRONYMS	xiii
EXECUTIVE SUMMARY	ES-1
PROPOSED ACTION	ES-1
PUBLIC INVOLVEMENT	ES-2
PROJECT IMPACTS AND MITIGATION	ES-3
Geology and Soils	ES-4
Groundwater, Waterbody Crossings, Water Use, and Wetlands	ES-5
Vegetation, Wildlife, Fisheries, and Federally Listed and State-Sensitive Species	ES-6
Land Use and Visual Resources	ES-7
Socioeconomics	ES-9
Cultural Resources	ES-9
Air Quality and Noise	ES-10
Reliability and Safety	ES-11
Cumulative Impacts	ES-12
ALTERNATIVES CONSIDERED	ES-12
MAJOR CONCLUSIONS	ES-13
1.0 INTRODUCTION	1-1
1.1 PROJECT PURPOSE AND NEED	1-2
1.2 PURPOSE AND SCOPE OF THE EIS	1-2
1.2.1 Federal Energy Regulatory Commission Purpose and Role	1-3
1.2.2 U.S. Environmental Protection Agency Purpose and Role	1-3
1.2.3 U.S. Army Corps of Engineers Purpose and Role	1-4
1.2.4 U.S. Fish and Wildlife Service Purpose and Role	1-5
1.2.5 Ohio Environmental Protection Agency Purpose and Role	1-5
1.2.6 West Virginia Department of Environmental Protection	1-5
1.2.7 West Virginia Department of Natural Resources Purpose and Role	1-5
1.2.8 Kentucky Department for Environmental Protection Purpose and Role	1-6
1.3 PUBLIC REVIEW AND COMMENT	1-6
1.4 NON-JURISDICTIONAL FACILITIES	1-11
1.5 PERMITS, APPROVALS, CONSULTATIONS, AND REGULATORY REVIEW ..	1-13
2.0 PROJECT DESCRIPTION	2-1
2.1 PROPOSED FACILITIES	2-1
2.1.1 Pipeline Facilities	2-1
2.1.2 Aboveground Facilities	2-5
2.1.2.1 New Aboveground Facilities	2-5
2.1.2.2 Existing Aboveground Facilities	2-10
2.2 LAND REQUIREMENTS	2-11

TABLE OF CONTENTS

	2.2.1 LX Project New Pipeline Facilities.....	2-14
	2.2.2 LX Project Aboveground New Facilities.....	2-17
	2.2.3 LX Project Aboveground Existing Facilities.....	2-18
	2.2.4 RXE Project Aboveground New Facilities.....	2-18
	2.2.5 RXE Project Aboveground Existing Facilities.....	2-19
2.3	CONSTRUCTION PROCEDURES.....	2-19
	2.3.1 General Pipeline Construction Procedures.....	2-19
	2.3.1.1 Surveying and Staking.....	2-20
	2.3.1.2 Clearing and Grading.....	2-20
	2.3.1.3 Trenching.....	2-21
	2.3.1.4 Stringing, Bending, Welding, and Coating.....	2-21
	2.3.1.5 Pipe Lowering.....	2-22
	2.3.1.6 Padding and Backfilling.....	2-22
	2.3.1.7 Hydrostatic Testing.....	2-22
	2.3.1.8 Foundations, Equipment, and Building Installations.....	2-23
	2.3.1.9 Piping Connections.....	2-23
	2.3.1.10 Clean-up and Restoration.....	2-23
	2.3.2 Special Construction Techniques.....	2-24
	2.3.2.1 Wetland Crossings.....	2-24
	2.3.2.2 Waterbody Crossings.....	2-25
	2.3.2.3 Horizontal Directional Drill Crossings.....	2-26
	2.3.2.4 Residential Areas.....	2-27
	2.3.2.5 Agricultural Areas.....	2-28
	2.3.2.6 Road Crossings.....	2-29
	2.3.2.7 Rugged Terrain.....	2-29
	2.3.2.8 Blasting.....	2-30
	2.3.2.9 Winter Construction.....	2-30
2.4	CONSTRUCTION SCHEDULE.....	2-31
2.5	ENVIRONMENTAL COMPLIANCE INSPECTION AND MITIGATION MONITORING.....	2-31
	2.5.1 Information Flow and Training.....	2-31
	2.5.2 Environmental Inspection.....	2-32
	2.5.3 FERC Third-Party Compliance Monitoring.....	2-33
	2.5.4 Post-Approval Variance Process.....	2-33
	2.5.5 Post-Construction Monitoring.....	2-34
2.6	OPERATION, MAINTENANCE, AND SAFETY CONTROLS.....	2-34
	2.6.1 Permanent Erosion Controls.....	2-34
	2.6.2 Pipeline Facilities.....	2-35
	2.6.3 Aboveground Facilities.....	2-35
3.0	ALTERNATIVES.....	3-1
	3.1 NO-ACTION ALTERNATIVE.....	3-2
	3.2 SYSTEM ALTERNATIVES.....	3-2
	3.2.1 Leach XPress.....	3-2
	3.2.1.1 Existing Transportation System Alternatives.....	3-2
	3.2.1.2 Expansion of Existing Pipeline Systems.....	3-3
	3.2.1.3 Modification of Existing Pipeline Systems.....	3-5
	3.2.2 Rayne XPress Expansion.....	3-6
3.3	MAJOR ROUTE ALTERNATIVES AND MINOR ROUTE ALTERNATIVES.....	3-6
	3.3.1 Major Route Alternatives.....	3-6
	3.3.1.1 Alternative 1.....	3-8

TABLE OF CONTENTS

	3.3.1.2 Alternative 2	3-10
	3.3.2 Minor Route Alternatives	3-10
	3.3.3 Minor Route Variations	3-12
3.4	ABOVEGROUND FACILITY SITE ALTERNATIVES	3-17
	3.4.1 Leach XPress Project	3-17
	3.4.2 Rayne XPress Expansion Project.....	3-18
4.0	ENVIRONMENTAL IMPACT ANALYSIS.....	4-1
4.1	GEOLOGY	4-1
	4.1.1 Existing Resources.....	4-1
	4.1.1.1 Geologic Setting	4-1
	4.1.1.2 Mineral Resources	4-3
	4.1.1.3 Geologic Hazards	4-5
	4.1.1.4 Paleontological Resources.....	4-9
	4.1.2 General Impacts and Mitigation.....	4-9
	4.1.2.1 General Construction Activities	4-9
	4.1.2.2 Blasting and Rock Removal	4-11
	4.1.2.3 Encountered Oil and Gas Wells.....	4-12
	4.1.3 Conclusion	4-12
4.2	SOILS	4-13
	4.2.1 Existing Resources.....	4-13
	4.2.1.1 Erosion.....	4-13
	4.2.1.2 Hydric Soils and Compaction Potential.....	4-13
	4.2.1.3 Stony-Rocky Soils and Shallow Bedrock.....	4-13
	4.2.1.4 Poor Revegetation Potential	4-14
	4.2.1.5 Prime Farmland	4-14
	4.2.1.6 Contaminated Soils.....	4-15
	4.2.2 General Impacts and Mitigation.....	4-16
	4.2.2.1 Construction Activities.....	4-16
	4.2.2.2 Winter Construction	4-16
	4.2.2.3 Soil Handling.....	4-17
	4.2.2.4 Soil Restoration and Revegetation	4-18
	4.2.2.5 Installation of Erosion Controls and Stabilization.....	4-18
	4.2.2.6 Remobilization of Existing Contamination	4-19
	4.2.2.7 Fuel Handling and Storage	4-19
	4.2.3 Conclusion	4-20
4.3	WATER RESOURCES	4-20
	4.3.1 Groundwater Resources	4-20
	4.3.1.1 Existing Groundwater Resources	4-20
	4.3.1.2 Sole Source Aquifers	4-21
	4.3.1.3 Wellhead and Aquifer Protection Areas.....	4-22
	4.3.1.4 Water Supply Wells and Springs.....	4-22
	4.3.1.5 Contaminated Groundwater.....	4-26
	4.3.1.6 Groundwater General Impact and Mitigation.....	4-27
	4.3.1.7 Groundwater Conclusion.....	4-29
	4.3.2 Surface Water Resources	4-29
	4.3.2.1 Existing Surface Water Resources	4-29
	4.3.2.2 Public Watersheds	4-33
	4.3.2.3 Water Classifications.....	4-34
	4.3.2.4 Sensitive Waterbodies	4-36
	4.3.2.5 Waterbody Construction Procedures	4-39

TABLE OF CONTENTS

	4.3.2.6 Hydrostatic Testing	4-40
	4.3.2.7 General Impacts and Mitigation	4-42
	4.3.2.8 Surface Water Conclusions	4-45
4.4	WETLANDS	4-46
	4.4.1 Existing Wetland Resources	4-46
	4.4.1.1 Wetland Types.....	4-46
	4.4.2 Wetland Construction Procedures.....	4-47
	4.4.3 General Impacts and Mitigation.....	4-48
	4.4.4 Alternative Measures	4-52
	4.4.5 Compensatory Mitigation	4-53
	4.4.6 Conclusion	4-53
4.5	VEGETATION.....	4-54
	4.5.1 Existing Vegetation Conditions	4-54
	4.5.2 Project Facilities and Extra Workspaces.....	4-56
	4.5.3 Vegetation Communities of Special Concern or Value	4-56
	4.5.4 Interior Forest Habitat.....	4-57
	4.5.5 Noxious Weeds and Other Invasive Plant Species	4-59
	4.5.6 General Impacts and Mitigation.....	4-59
	4.5.6.1 Pipeline Facilities	4-59
	4.5.6.2 Contractor Yards	4-67
	4.5.6.3 Access Roads.....	4-67
	4.5.7 Conclusion	4-67
4.6	WILDLIFE AND AQUATIC RESOURCES	4-67
	4.6.1 Wildlife	4-67
	4.6.1.1 Existing Wildlife Resources	4-67
	4.6.1.2 Sensitive or Managed Wildlife Habitats.....	4-68
	4.6.1.3 Migratory Birds	4-70
	4.6.1.4 General Impacts and Mitigation	4-74
	4.6.1.5 Conclusions	4-77
	4.6.2 Aquatic Resources	4-77
	4.6.2.1 Existing Aquatic Resources.....	4-77
	4.6.2.2 Fisheries of Special Concern	4-79
	4.6.2.3 General Impacts and Mitigation	4-80
	4.6.2.4 Conventional Open Cut Method.....	4-81
	4.6.2.5 Dam and Pump Crossing Method.....	4-82
	4.6.2.6 Flume Crossing Method	4-82
	4.6.2.7 Horizontal Directional Drill Crossings.....	4-82
	4.6.2.8 Blasting.....	4-83
	4.6.2.9 Hydrostatic Test Water Withdrawal and Discharge	4-83
	4.6.2.10 Spill Prevention Control and Countermeasures.....	4-83
	4.6.2.11 Conclusion.....	4-84
4.7	SPECIAL STATUS SPECIES.....	4-84
	4.7.1 Species Identification.....	4-85
	4.7.2 Federally Listed Species and Species Proposed for Listing	4-86
	4.7.2.1 Mammals	4-88
	4.7.2.2 Reptiles	4-91
	4.7.2.3 Mussels.....	4-92
	4.7.2.1 Insects	4-96
	American Burying Beetle	4-97
	4.7.2.2 Plants	4-97
	4.7.3 State-Listed Species.....	4-99

TABLE OF CONTENTS

	4.7.3.1 Mammals.....	4-102
	4.7.3.2 Reptiles.....	4-102
	4.7.3.3 Amphibians.....	4-102
	4.7.3.4 Mussels.....	4-103
	4.7.3.5 Fish.....	4-104
	4.7.3.6 Vascular Plants.....	4-104
	4.7.3.7 Birds.....	4-105
	4.7.3.8 Bald Eagle.....	4-106
	4.7.4 Conclusion.....	4-106
4.8	LAND USE, RECREATION, SPECIAL INTEREST AREAS, AND VISUAL RESOURCES.....	4-107
	4.8.1 Land Use.....	4-107
	4.8.1.1 Environmental Setting.....	4-113
	4.8.1.2 Pipeline Facilities.....	4-113
	4.8.1.3 Aboveground Facilities.....	4-115
	4.8.1.4 Project Contractor Yards.....	4-118
	4.8.1.5 Access Roads.....	4-120
	4.8.2 Landownership and Easement Requirements.....	4-122
	4.8.3 Existing Residences, Commercial and Industrial Facilities, and Planned Developments.....	4-122
	4.8.3.1 Existing Residences and Commercial and Industrial Facilities.....	4-123
	4.8.3.2 Planned Developments.....	4-128
	4.8.4 Recreation and Special Interest Areas.....	4-128
	4.8.4.1 State Forests.....	4-130
	4.8.4.2 Organic Farm Lands and Specialty Crops.....	4-130
	4.8.4.3 Conservation and Other Special Land Uses.....	4-131
	4.8.5 Hazardous Waste Sites.....	4-131
	4.8.6 Visual Resources.....	4-131
	4.8.6.1 Pipelines.....	4-131
	4.8.6.2 Aboveground Facilities.....	4-132
	4.8.6.3 Contractor Yards.....	4-132
	4.8.6.4 Access Roads.....	4-132
	4.8.6.5 Scenic Byways.....	4-133
	4.8.6.6 Agricultural Lands and Open Lands.....	4-133
	4.8.6.7 Forested Land.....	4-133
	4.8.7 Conclusion.....	4-133
4.9	SOCIOECONOMICS.....	4-134
	4.9.1 Population and Employment.....	4-134
	4.9.2 Housing.....	4-137
	4.9.3 Public Services.....	4-138
	4.9.4 Transportation and Traffic.....	4-139
	4.9.4.1 Construction Across and Within Roadways and Railroads.....	4-140
	4.9.5 Property Values.....	4-141
	4.9.6 Economy and Tax.....	4-141
	4.9.7 Environmental Justice.....	4-143
4.10	CULTURAL RESOURCES.....	4-146
	4.10.1 Ohio (LX Project).....	4-147
	4.10.1.1 Results of Cultural Resource Investigations in Ohio.....	4-147
	4.10.1.2 Ohio SHPO Consultation.....	4-147
	4.10.2 West Virginia (LX Project).....	4-148
	4.10.2.1 Results of Cultural Resource Investigations in West Virginia.....	4-148

TABLE OF CONTENTS

4.10.2.2	West Virginia SHPO Consultation	4-148
4.10.3	Pennsylvania (LX Project).....	4-149
4.10.3.1	Results of Cultural Resource Investigations in Pennsylvania	4-149
4.10.3.2	Pennsylvania SHPO Consultation	4-149
4.10.4	Kentucky (RXE Project).....	4-149
4.10.4.1	Results of Cultural Resource Investigations in Kentucky	4-149
4.10.4.2	Kentucky SHPO Consultation.....	4-150
4.10.5	Tribal Consultation	4-150
4.10.6	Unanticipated Discovery Plans.....	4-151
4.10.7	General Impacts and Mitigation.....	4-151
4.11	AIR QUALITY AND NOISE	4-152
4.11.1	Air Quality	4-152
4.11.1.1	Existing Air Quality	4-152
4.11.1.2	Air Regulatory Requirements.....	4-154
4.11.1.3	Construction Emissions, Mitigations, and Impacts	4-161
4.11.1.4	Operation Emissions, Mitigation, and Impacts	4-163
4.11.2	Noise.....	4-167
4.11.2.1	Noise Regulatory Requirements.....	4-167
4.11.2.2	Construction Noise Impacts and Mitigation.....	4-167
4.11.2.3	Operational Noise Impacts and Mitigation.....	4-170
4.12	RELIABILITY AND SAFETY	4-176
4.12.1	Safety Standards	4-176
4.12.2	Pipeline Accident Data	4-181
4.12.3	Impact on Public Safety	4-183
4.13	CUMULATIVE IMPACTS.....	4-184
4.13.1	Columbia Gas and Columbia Gulf Projects.....	4-190
4.13.2	Other FERC-Jurisdictional Projects.....	4-191
4.13.3	Shale Formation Development	4-191
4.13.4	Natural Gas Production.....	4-192
4.13.5	Potential Cumulative Impacts of the Proposed Action	4-193
4.13.5.1	Geology and Soils.....	4-193
4.13.5.2	Water Resources.....	4-194
4.13.5.3	Vegetation.....	4-196
4.13.5.4	Wildlife.....	4-198
4.13.5.5	Fisheries and Aquatic Resources.....	4-199
4.13.5.6	Special Status Species	4-199
4.13.5.7	Land Use, Recreation, Special Interest Areas, and Visual Resources	4-200
4.13.5.8	Socioeconomics.....	4-201
4.13.5.9	Cultural Resources.....	4-203
4.13.5.10	Air Quality and Noise.....	4-203
4.13.5.11	Climate Change	4-206
4.13.5.12	Reliability and Safety	4-208
5.0	CONCLUSIONS AND RECOMMENDATIONS.....	5-1
	Water Resources	5-3
	Groundwater	5-3
	Surface Water	5-3
	Surface Water Uses during Construction.....	5-4
	Wetlands	5-4
	Vegetation.....	5-5

TABLE OF CONTENTS

Wildlife and Aquatic Resources	5-6
Special Status Species	5-7
Land Use, Recreation, Special Interest Areas, and Visual Resources	5-8
Socioeconomics	5-9
Cultural Resources	5-9
Air Quality and Noise	5-10
Air Quality	5-10
Noise	5-11
Reliability and Safety.....	5-12
Cumulative Impacts	5-12
Alternatives.....	5-13
5.2 FERC STAFF'S RECOMMENDED MITIGATION.....	5-14

LIST OF APPENDICES

APPENDIX A	Distribution List
APPENDIX B	Project Overview Maps
APPENDIX C	Typical Construction Standards
APPENDIX D	Access Roads Associated with the Leach XPress Project
APPENDIX E	Site-Specific Deviations from the FERC Plan and Procedures
APPENDIX F	Geological Formations Crossed by the Leach XPress Project
APPENDIX G	Areas of Shallow Depth to Bedrock Crossed by the Leach XPress Project
APPENDIX H	Oil and Gas Wells Within 0.25 Mile of the Leach XPress Project
APPENDIX I	Active and Abandoned Mines Within 0.25 Mile of the Leach XPress Project
APPENDIX J	Longwall Mining Plan
APPENDIX K	Waterbodies Crossed or Impacted by the Projects
APPENDIX K-1	Waterbodies Crossed or Impacted by the Leach XPress Project
APPENDIX K-2	303(d) Listed Impaired Waterbodies Crossed by the Leach XPress Project
APPENDIX L	Wetlands Affected by the Leach XPress Project
APPENDIX M	Interagency Endangered Species Act Consultation Documentation
APPENDIX M-1	Federally Listed Species Potentially Affected by the Leach XPress Project and Rayne XPress Expansion Project
APPENDIX M-2	Interagency Endangered Species Act Consultation Checklist for the Leach XPress Project
APPENDIX M-3	MSHCP Coverage Overview Map for the Leach XPress Project
APPENDIX M-4	Interagency Endangered Species Act Consultation Checklist for the Rayne XPress Expansion Project
APPENDIX N	Extra Workspaces Associated with Construction of the Leach XPress Project
APPENDIX O	Site-Specific Plans for Residences Within Construction of the Leach XPress Project
APPENDIX P	Tribal Correspondence
APPENDIX Q	Noise Sensitive Areas Associated with the Projects
APPENDIX R	References
APPENDIX S	List of Preparers

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
Table 1.3-1	Minor Route Alternatives Adopted into the Proposed Pipeline Route for the LX Project	1-8
Table 1.3-2	Environmental Issues Identified and Comments Received During the Scoping Process for the LX and RXE Projects	1-10
Table 1.4-1	Non-Jurisdictional Project Facilities for the LX Project	1-12
Table 1.5-1	Applicable Major Permits, Licenses, Authorizations, and Clearances for the LX Project	1-14
Table 1.5-2	Applicable Major Permits, Licenses, Authorizations, and Clearances for the RXE Project.....	1-17
Table 2.1.1-1	Locations of Adjacent Corridors for the LX Project	2-3
Table 2.1.2-1	Aboveground Facilities for the LX Project	2-7
Table 2.1.2-2	Aboveground Facilities for the RXE Project.....	2-9
Table 2.2-1	Summary of Land Requirements Associated with the LX Project Pipeline Facilities	2-12
Table 2.2-2	Summary of Land Requirements Associated with LX Project Aboveground Facilities	2-13
Table 2.2-3	Summary of Land Requirements Associated with RXE Project.....	2-14
Table 2.2.1-1	Pipe Yards Along the LX Project Route	2-16
Table 2.3.2-1	Proposed Horizontal Directional Drill Crossings Associated with the LX Project.....	2-26
Table 3.3.1-1	Pipeline Route Alternative 1 Comparison for the LX Project.....	3-9
Table 3.3.1-2	Pipeline Route Alternative 2 Comparison for the LX Project.....	3-11
Table 3.3.2-1	Minor Route Deviation H Comparison for the LX Project	3-12
Table 3.3.3-1	Minor Route Variation Analysis of Residences	3-14
Table 3.3.3-2	Minor Route Deviation P Comparison for the LX Project.....	3-15
Table 3.3.3-3	Minor Route Deviation B-2 Comparison for the LX Project	3-16
Table 3.3.3-4	Minor Route Deviation D-2 Comparison for the LX Project.....	3-17
Table 4.1.1-1	Geological Formations in the LX and RXE Project Areas.....	4-2
Table 4.1.1-2	Subsidence Events Recorded Within 1 mile of the LX Project.....	4-8
Table 4.2.1-1	Farmland Crossed by the LX and RXE Projects	4-15
Table 4.3.1-1	Principal Aquifers Crossed by the Leach XPress Project.....	4-21
Table 4.3.1-2	Water Wells Within 150 Feet of the LX Project	4-23
Table 4.3.1-3	Springs Along the LX Project Area	4-26
Table 4.3.2-1	Watersheds Crossed by the LX Project.....	4-30
Table 4.3.2-2	Waterbodies Affected by the RXE Project.....	4-32
Table 4.3.2-3	Surface Water Intakes for Public Water Supplies Within 3 Miles Downstream of the LX Project.....	4-34
Table 4.3.2-4	Sensitive Surface Waters Crossed by the LX Project	4-37
Table 4.3.2-5	Areas Within the 100-year Floodplain Crossed by the LX Project.....	4-39
Table 4.3.2-6	Proposed Hydrostatic Test Water Source and Discharge Locations for Pipeline Facilities	4-41
Table 4.3.2-7	Proposed Hydrostatic Test Water Source and Discharge Locations for Aboveground Facilities	4-42
Table 4.4.3-1	Summary of Wetlands Resources Impacted by the LX Project Pipeline Facilities	4-49
Table 4.4.3-2	Summary of Wetlands Resources Impacted by the LX Project Aboveground Facilities, Access Roads, and Contractor Yards.....	4-50
Table 4.4.4-1	Areas Where Columbia Gas Requested Additional Extra Workspace in Relation to Wetlands for the LX Project	4-52

LIST OF TABLES

Table 4.5.1-1	Land Cover Types and Representative Species Occurring in the LX Project Area.....	4-55
Table 4.5.4-1	Interior Forest Impacts by County.....	4-58
Table 4.5.6-1	Summary of LX Pipeline Facility Habitat Impacts (acres)	4-60
Table 4.5.6-2	Summary of LX Aboveground Facility Habitat Impacts (acres)	4-64
Table 4.5.6-3	Summary of RXE Aboveground Facility Habitat Impacts (acres).....	4-66
Table 4.6.1-1	Wildlife Species Potentially Occurring in the LX Project Area.....	4-68
Table 4.6.1-2	Birds of Conservation Concern Potentially Occurring in the LX Project Area	4-71
Table 4.6.1-3	Birds of Conservation Concern Potentially Occurring in the RXE Project Area	4-72
Table 4.6.2-1	Number of Water Crossings Occurring in the LX and RXE Project Area.....	4-77
Table 4.7.2-1	Federally Listed Species Potentially Occurring in the LX and RXE Project Areas.....	4-87
Table 4.7.3-1	State Listed Species Potentially Occurring in the LX and RXE Project Areas	4-100
Table 4.8.1-1	Acreage Affected by Construction and Operation of the LX Project.....	4-108
Table 4.8.1-2	Acreage Affected by Construction and Operation of the RXE Project.....	4-112
Table 4.8.1-3	Acreage Affected by Construction and Operation of the Proposed LX Aboveground Facilities	4-116
Table 4.8.1-4	Acreage Affected by Construction and Operation of the Proposed RXE Aboveground Facilities	4-119
Table 4.8.1-5	Acreage Affected by Proposed Contractor Yards (Construction Phase Only) for the LX Project	4-120
Table 4.8.1-6	Acreage Affected by Construction and Operation of Proposed LX Project Access Roads.....	4-121
Table 4.8.3-1	Structures Within 50 Feet of the Construction Workspace for the LX Project.....	4-124
Table 4.8.4-1	Federal, State, Recreation, and Conservation Lands Located Within 0.25 Mile of the LX Project.....	4-129
Table 4.9.1-1	Existing Socioeconomic Conditions in the LX and RXE Project Areas.....	4-134
Table 4.9.1-2	Anticipated Construction Schedule and Workforce Requirements	4-136
Table 4.9.2-1	Housing by County in the LX and RXE Project Areas	4-137
Table 4.9.3-1	Existing Public Services and Facilities by County in the LX and RXE Project Areas	4-138
Table 4.9.4-1	Major Roads by County in the LX and RXE Project Areas.....	4-140
Table 4.9.6-1	Socioeconomic Impact from Construction and Operation of the LX and RXE Projects	4-142
Table 4.9.7-1	Minority Populations in the LX and RXE Project Areas	4-144
Table 4.9.7-2	Income Statistics for the LX and RXE Project Areas	4-145
Table 4.11.1-1	Potential Emission Rates Associated with the Lone Oak Compressor Station (tpy).....	4-155
Table 4.11.1-2	Potential Emission Rates Associated with the Summerfield Compressor Station (tpy).....	4-155
Table 4.11.1-3	Potential Emission Rates Associated with the Oak Hill Compressor Station (tpy).....	4-156
Table 4.11.1-4	Potential Emission Rates Associated with the Grayson Compressor Station (tpy).....	4-156
Table 4.11.1-5	Potential Emission Rates Associated with the Means Compressor Station (tpy)	4-157
Table 4.11.1-6	Comparison of Construction Emissions to General Conformity <i>De Minimis</i> Thresholds	4-159

LIST OF TABLES

Table 4.11.1-7	Summary of Potential Construction Emissions from the Proposed LX and RXE Projects (tons).....	4-163
Table 4.11.1-8	Comparison of the Projects’ GHG Emissions to State-Wide GHG Emissions	4-164
Table 4.11.1-9	Air Dispersion Modeling Results for LX and RXE Compressor Stations in Comparison to the NAAQS.....	4-166
Table 4.11.2-1	Calculated HDD Noise Levels at the Nearest NSAs for the LX Project.....	4-169
Table 4.11.2-2	Estimated Peak Construction Noise Levels at Proposed and Existing Aboveground Facilities for the LX Project	4-170
Table 4.11.2-3	Calculated Operational Noise Levels for New and Existing Compressor Stations	4-171
Table 4.11.2-4	Calculated Operation Noise Levels for New and Existing Regulator Stations	4-174
Table 4.11.2-5	Calculated Operation Noise Levels for New Odorization Stations.....	4-176
Table 4.12.1-1	Class Locations Crossed by the LX Project	4-179
Table 4.12.1-2	High Consequence Areas Crossed by the LX Project.....	4-180
Table 4.12.3-1	Natural Gas Transmission Pipeline Significant Incidents by Cause (1996-2015).....	4-182
Table 4.12.3-2	Natural Gas Transmission Pipeline Significant Incidents by State (1996-2015).....	4-182
Table 4.12.3-3	Excavation, Natural Forces, and Outside Force Incidents by Cause (1996-2015).....	4-183
Table 4.12.4-1	Injuries and Fatalities – Natural Gas Transmission Pipelines	4-183
Table 4.12.4-1	Nationwide Accidental Fatalities by Cause.....	4-184
Table 4.13-1	Existing or Proposed Projects Evaluated for Potential Cumulative Impacts for the LX and RXE Projects.....	4-187
Table 4.13-2	Forested and Scrub-Shrub Wetland Impacts in Monroe County, Ohio.....	4-196
Table 4.13.2-1	Potential Emission Rates Associated with Operation of the LX Project and Other Projects Potentially Contributing to Cumulative Impacts	4-205

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
Figure 2.1-1	Leach XPress Project – Project Overview Map for the LX Project.....	2-2
Figure 2.1.2-1	Rayne XPress Expansion Project – Project Overview Map.....	2-6
Figure 3.2.1-1	Leach Xpress Project – Systems Alternatives Map	3-4
Figure 3.3.1-1	Leach XPress Project – Pipeline Alternative Map.....	3-7

TECHNICAL ACRONYMS

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
ACHP	Advisory Council of Historic Preservation
AMM	avoidance and minimization measures
API	American Petroleum Institute
AQCR	Air Quality Control Regions
ATWS	additional temporary workspace
BCC	Birds of Conservation Concern
BGEPA	bald and golden eagle protection act
BMP	best management practices
Btu	british thermal unit
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERI	Center for Earthquake Research and Information
Certificate	Certificates of Public Convenience and Necessity
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
COE	U. S. Army Corps of Engineers
Columbia Gas	Columbia Gas Transmission, LLC
Columbia Gulf	Columbia Gulf Transmission, LLC
Commission	Federal Energy Regulatory Commission
CS	Compressor Station
CSR	Code of State Rules
CWA	Clean Water Act
dB	decibels
dBA	A-weighted sound level
DOT	U.S. Department of Transportation
Dth/d	dekatherms per day
DWSPA	Drinking Water Source Protection Areas
ECDs	erosion control devices
ECS	Environmental Construction Standards
EI	environmental inspector
EIA	U. S. Energy Administration
EIS	Environmental Impact Statement
EPA	U. S. Environmental Protection Agency
ESA	Endangered Species Act
ESCP	erosion and sedimentation control plans
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FSA	Farm Services Administration
FWS	U. S. Fish and Wildlife Service
GHG	greenhouse gases
GP	General Permit

TECHNICAL ACRONYMS

GWP	global warming potential
HAP	hazardous air pollutant
HCA	high consequence area
HDD	horizontal directional drill
hp	horsepower
IBA	important bird area
IPCC	Intergovernmental Panel on Climate Change
ISO	Internal Organization for Standardization
KDFWR	Kentucky Department of Fish and Wildlife Resources
KDOW	Kentucky Division of Water
KGS	Kentucky Geological Survey
KPDES	Kentucky Pollutant Discharge System
KSNPC	Kentucky State Nature Preserves Commission
KYDEP	Kentucky Department for Environmental Protection
L_{dn}	day-night sound level
L_{eq}	24-hour equivalent sound level
LX Project	Leach XPress Project
MACT	maximum achievable control technology
M&R	Measuring and Regulator Station
MAOP	Maximum Allowable Operating Pressure
MBTA	Migratory Bird Treaty Act
mg/L	milligram per liter
mgd	million gallons per day
MLV	mainline valve
MOU	Memorandum of Understanding
MP	milepost
MSHCP	Multiple Species Habitat Conservation Plan
MSL	Mean Sea Level
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEC	National Electric Code
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection ACT
NGA	Natural Gas Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NNSR	Non-Attainment New Source Review
NO_2	nitrogen dioxide
NOI	Notice of Intent
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Parks Service

TECHNICAL ACRONYMS

NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive areas
NSPS	new source performance standards
NSR	New Source Review
NWI	national wetlands inventory
NWP	nationwide general permit
O ₃	ozone
OAC	Open Air Campaigners
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OS	odorization station
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PASDA	Pennsylvania Spatial Data Clearinghouse
PCB	polychlorinated biphenyl
PCN	pre-construction notification
PEM	palustrine emergent
PFBC	Pennsylvania Fish and Boat Commission
PFO	palustrine forested
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	Upland Erosion Control, Revegetation, and Maintenance Plan
PM	particulate matter
PM ₁₀	particulate matter with a diameter of 10 microns or less
PM _{2.5}	particulate matter with a diameter of 2.5 microns or less
Procedures	Wetland and Waterbody Construction and Mitigation Procedures
PSD	Prevention of Significant Deterioration
psig	pounds per square inch
PSS	palustrine scrub-shrub
PTE	potential to emit
RHA	Rivers and Harbors Act
RS	regulator station
RXE Project	Rayne XPress Expansion Project
SAA	sole source aquifer
SCADA	supervisory control and data acquisition
SCS	Soil Conservation Survey
SHPO	State Historic Preservation Office
SILs	significant impact levels
SO ₂	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SWPPP	stormwater pollution prevention plan
TMDL	total maximum daily load
tpy	tons per year

TECHNICAL ACRONYMS

TSCA	Toxic Substances Control Act
TSP	total suspended particulate
USC	United States Code
USDA	United States Department of Agriculture
USGS	U. S. Geological Survey
USGCRP	U. S. Global Change Research Program
VOC	volatile organic compounds
WHPA	Wellhead Protection Areas
WMA	Wildlife Management Area
WVDEP	West Virginia Department of Environmental Protection
WVDHHR	West Virginia Division of Health and Human Resources
WVDNR	West Virginia Department of Natural Resources
WVGES	West Virginia Geological and Economic Survey