

TABLE OF CONTENTS

East Texas to Mississippi Expansion Project Final Environmental Impact Statement

| | |
|---|-------------|
| TABLE OF CONTENTS | i |
| LIST OF APPENDICES | .vi |
| LIST OF TABLES | vii |
| LIST OF FIGURES | xi |
| ACRONYMS AND ABBREVIATIONS | xii |
| | |
| EXECUTIVE SUMMARY | ES-1 |
| INTRODUCTION | ES-1 |
| PROJECT BACKGROUND | ES-1 |
| PROPOSED ACTION | ES-1 |
| PUBLIC OUTREACH AND COMMENTS | ES-2 |
| ENVIRONMENTAL IMPACTS AND MITIGATION | ES-3 |
| ALTERNATIVES CONSIDERED | ES-4 |
| CONCLUSION | ES-4 |
| | |
| 1.0 INTRODUCTION | 1-1 |
| 1.1 PROJECT PURPOSE AND NEED | 1-1 |
| 1.2 PURPOSE AND SCOPE OF THIS EIS | 1-2 |
| 1.3 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS | 1-2 |
| 1.4 PUBLIC REVIEW AND COMMENT | 1-8 |
| | |
| 2.0 PROPOSED ACTION..... | 2-1 |
| 2.1 PROPOSED FACILITIES..... | 2-1 |
| 2.2 LAND REQUIREMENTS | 2-6 |
| 2.2.1 Pipeline Facilities | 2-6 |
| 2.2.2 Other Work Areas | 2-13 |
| 2.2.2.1 Additional Temporary Work Spaces..... | 2-14 |
| 2.2.2.2 Pipe Storage and Contractor Yards | 2-14 |
| 2.2.2.3 Access Roads | 2-14 |
| 2.2.3 CONSTRUCTION PROCEDURES..... | 2-14 |
| 2.3.1 General Pipeline Construction Procedures..... | 2-15 |
| 2.3.2 Specialized Pipeline Construction Procedures | 2-20 |
| 2.3.2.1 Waterbody Crossings | 2-20 |
| 2.3.2.2 Wetland Crossings | 2-25 |
| 2.3.2.3 Road, Highway, and Railroad Crossings | 2-26 |
| 2.3.2.4 Agricultural Areas..... | 2-26 |
| 2.3.2.5 Rugged Topography..... | 2-27 |
| 2.3.2.6 Residential Areas | 2-29 |
| 2.3.3 Aboveground Facilities Construction Procedures..... | 2-29 |
| 2.4 CONSTRUCTION SCHEDULE..... | 2-30 |
| 2.5 ENVIRONMENTAL TRAINING AND MONITORING | 2-30 |
| 2.6 OPERATION, MAINTENANCE, AND SAFETY CONTROLS | 2-31 |
| 2.7 FUTURE PLANS AND ABANDONMENT | 2-32 |
| 2.8 NONJURISDICTIONAL FACILITIES | 2-32 |

TABLE OF CONTENTS (CONTINUED)

| | | |
|------------|---|------------|
| 3.0 | ENVIRONMENTAL ANALYSIS | 3-1 |
| 3.1 | GEOLOGY | 3-1 |
| 3.1.1 | Geological Setting..... | 3-1 |
| 3.1.1.1 | Topography | 3-2 |
| 3.1.1.2 | Bedrock | 3-2 |
| 3.1.1.3 | Impacts to the Geologic Setting | 3-5 |
| 3.1.2 | Mineral Resources..... | 3-5 |
| 3.1.3 | Paleontological Resources | 3-6 |
| 3.1.4 | Geologic Hazards..... | 3-6 |
| 3.1.4.1 | Seismicity and Faults | 3-7 |
| 3.1.4.2 | Soil Liquefaction..... | 3-7 |
| 3.1.4.3 | Slope Failures/Landslides | 3-7 |
| 3.1.4.4 | Ground Subsidence | 3-8 |
| 3.1.5 | Conclusion Regarding Impacts to Geologic Resources | 3-9 |
| 3.2 | SOILS | 3-9 |
| 3.2.1 | Existing Soils | 3-9 |
| 3.2.2 | Major Soil Characteristics..... | 3-9 |
| 3.2.2.1 | Erosion Potential | 3-9 |
| 3.2.2.2 | Drainage Class | 3-9 |
| 3.2.2.3 | Presence of Hydric Soils | 3-10 |
| 3.2.2.4 | Compaction Potential..... | 3-10 |
| 3.2.2.5 | Revegetation Potential | 3-10 |
| 3.2.3 | Sensitive Soils | 3-11 |
| 3.2.3.1 | Loess Soils | 3-11 |
| 3.2.4 | General Impacts and Mitigation..... | 3-11 |
| 3.2.4.1 | Erosion | 3-12 |
| 3.2.4.2 | Compaction Potential..... | 3-13 |
| 3.2.4.3 | Revegetation Potential | 3-13 |
| 3.2.4.4 | Accidental Releases or Discovery of Contaminants | 3-14 |
| 3.2.4.5 | Drainage Systems and Drainage Patterns | 3-14 |
| 3.2.5 | Prime Farmland..... | 3-14 |
| 3.2.6 | Conclusion | 3-15 |
| 3.3 | WATER RESOURCES | 3-15 |
| 3.3.1 | Groundwater..... | 3-15 |
| 3.3.1.1 | Existing Groundwater Resources | 3-15 |
| 3.3.1.2 | General Impacts and Mitigation..... | 3-21 |
| 3.3.1.3 | Site-specific Impacts and Mitigation | 3-23 |
| 3.3.1.4 | Conclusion Regarding Groundwater Resources | 3-24 |
| 3.3.2 | Surface Water Resources | 3-24 |
| 3.3.2.1 | Existing Surface Water Resources | 3-24 |
| 3.3.2.2 | General Impacts and Mitigation..... | 3-27 |
| 3.3.2.3 | Site-specific Impacts and Mitigation | 3-29 |
| 3.3.3 | Conclusion Regarding Surface Water Resources..... | 3-34 |
| 3.4 | WETLANDS | 3-34 |
| 3.4.1 | Existing Wetland Resources | 3-35 |
| 3.4.1.1 | High-quality, Sensitive, or Special-status Wetlands | 3-37 |
| 3.4.2 | General Impacts and Mitigation..... | 3-38 |
| 3.4.2.1 | General Wetland Construction and Mitigation Procedures..... | 3-39 |
| 3.4.2.2 | Alternative Measures to Our Procedures | 3-40 |

TABLE OF CONTENTS (CONTINUED)

| | | |
|----------|--|------|
| 3.4.3 | Site-specific Wetland Impacts and Mitigation..... | 3-40 |
| 3.4.3.1 | High-quality, Sensitive, or Special-status Wetlands | 3-40 |
| 3.4.4 | Wetland Restoration and Compensatory Mitigation..... | 3-41 |
| 3.4.5 | Conclusion Regarding Impacts to Wetlands | 3-42 |
| 3.5 | VEGETATION | 3-42 |
| 3.5.1 | Existing Vegetation Resources | 3-42 |
| 3.5.1.1 | Vegetative Communities of Special Concern or Value | 3-44 |
| 3.5.1.2 | Extensive Forested Tracts | 3-45 |
| 3.5.2 | General Impacts and Mitigation..... | 3-46 |
| 3.5.2.1 | Impacts to Vegetation Communities of Special Concern or Value | 3-49 |
| 3.5.3 | Exotic or Invasive Plant Communities..... | 3-50 |
| 3.6 | WILDLIFE AND AQUATIC RESOURCES | 3-51 |
| 3.6.1 | Wildlife | 3-51 |
| 3.6.1.1 | Existing Wildlife Resources..... | 3-51 |
| 3.6.1.2 | Sensitive or Managed Wildlife Habitats | 3-53 |
| 3.6.1.3 | Unique and Sensitive Wildlife Species | 3-54 |
| 3.6.1.4 | General Impacts and Mitigation..... | 3-55 |
| 3.6.1.5 | Sensitive or Managed Wildlife Habitats and Species Effects and Mitigation | 3-57 |
| 3.6.1.6 | Conclusion Regarding Impacts to Wildlife Habitats and Species | 3-59 |
| 3.6.2 | Aquatic Resources..... | 3-59 |
| 3.6.2.1 | Existing Aquatic Resources | 3-59 |
| 3.6.2.2 | Conclusion Regarding Impacts to Aquatic Habitats and Species | 3-63 |
| 3.7 | THREATENED, ENDANGERED, AND SPECIAL-STATUS SPECIES | 3-63 |
| 3.7.1 | Federally Listed Threatened and Endangered Species..... | 3-63 |
| 3.7.1.1 | Bald Eagle | 3-65 |
| 3.7.1.2 | Interior Least Tern | 3-66 |
| 3.7.1.3 | Red-cockaded Woodpecker | 3-67 |
| 3.7.1.4 | Louisiana Black Bear | 3-67 |
| 3.7.1.5 | Ringed Map Turtle | 3-69 |
| 3.7.1.6 | Bayou Darter | 3-69 |
| 3.7.1.7 | Gulf Sturgeon | 3-70 |
| 3.7.1.8 | Pallid Sturgeon | 3-70 |
| 3.7.1.9 | Fat Pocketbook Mussel | 3-71 |
| 3.7.1.10 | Inflated Heelsplitter | 3-71 |
| 3.7.1.11 | Louisiana Pine Snake | 3-72 |
| 3.7.2 | Special-status Species | 3-72 |
| 3.7.2.1 | State-listed and Rare Species | 3-72 |
| 3.8 | LAND USE, RECREATION AND SPECIAL INTEREST AREAS, AND VISUAL RESOURCES | 3-76 |
| 3.8.1 | General Land Use Types..... | 3-76 |
| 3.8.1.1 | Land Types | 3-76 |
| 3.8.2 | Land Ownership and Easement Requirements | 3-80 |
| 3.8.3 | General Impacts and Mitigation..... | 3-80 |
| 3.8.3.1 | Land Use Type-Specific Impacts and Mitigation | 3-81 |
| 3.8.4 | Special Interest Areas Impacts and Mitigation | 3-84 |

TABLE OF CONTENTS (CONTINUED)

| | | |
|----------|--|-------|
| 3.8.4.1 | Specially Managed Lands Impacts and Mitigation | 3-85 |
| 3.8.5 | Transportation | 3-92 |
| 3.8.6 | Visual Resources..... | 3-94 |
| 3.8.6.1 | Current Viewshed | 3-95 |
| 3.8.6.2 | General Impacts and Mitigation..... | 3-95 |
| 3.8.7 | Conclusion Regarding Impacts to Land Use, Recreation and Special Interest Areas, and Visual Resources | 3-98 |
| 3.9 | SOCIOECONOMICS | 3-98 |
| 3.9.1 | Region of Influence..... | 3-98 |
| 3.9.2 | Population | 3-98 |
| 3.9.3 | Economy and Employment..... | 3-100 |
| 3.9.4 | Housing | 3-101 |
| 3.9.5 | Property Values..... | 3-102 |
| 3.9.6 | Government Revenue..... | 3-102 |
| 3.9.7 | Public Services..... | 3-103 |
| 3.9.8 | Impacts on Specific Economic Sectors | 3-104 |
| 3.10 | CULTURAL RESOURCES | 3-105 |
| 3.10.1 | Results of Cultural Resources Survey | 3-105 |
| 3.10.1.1 | Texas | 3-105 |
| 3.10.1.2 | Louisiana..... | 3-105 |
| 3.10.1.3 | Mississippi | 3-106 |
| 3.10.1.4 | Natchez Trace Parkway | 3-107 |
| 3.10.2 | Unanticipated Discoveries Plan | 3-107 |
| 3.10.3 | Native American Consultation..... | 3-107 |
| 3.10.4 | General Impacts and Mitigation..... | 3-108 |
| 3.11 | AIR QUALITY AND NOISE | 3-108 |
| 3.11.1 | Air Quality | 3-108 |
| 3.11.1.1 | Existing Air Quality | 3-109 |
| 3.11.1.2 | Regulatory Requirements..... | 3-109 |
| 3.11.1.3 | General Impacts and Mitigation..... | 3-115 |
| 3.11.2 | Noise Quality | 3-116 |
| 3.11.2.1 | Regulatory Requirements..... | 3-116 |
| 3.11.2.2 | Existing Noise Levels | 3-117 |
| 3.11.2.3 | General Impacts and Mitigation..... | 3-117 |
| 3.12 | RELIABILITY AND SAFETY | 3-122 |
| 3.12.1 | Safety Standards..... | 3-123 |
| 3.12.2 | Pipeline Accident Data..... | 3-126 |
| 3.12.3 | Impact on Public Safety | 3-129 |
| 3.12.4 | Additional Security and Safety Issues..... | 3-130 |
| 3.12.4.1 | Terrorism..... | 3-130 |
| 3.12.4.2 | Electric Transmission Lines and Facilities | 3-131 |
| 3.13 | CUMULATIVE IMPACTS | 3-131 |
| 3.13.1 | Other Natural Gas Pipeline Projects | 3-134 |
| 3.13.2 | Unrelated Projects | 3-139 |
| 3.13.3 | Potential Cumulative Impacts of the Proposed Action | 3-141 |
| 3.13.3.1 | Wetlands and Waterbodies..... | 3-141 |
| 3.13.3.2 | Vegetation and Wildlife | 3-142 |
| 3.13.3.3 | Land Use | 3-143 |
| 3.13.3.4 | Air Quality | 3-144 |

TABLE OF CONTENTS (CONTINUED)

| | | |
|------------|--|------------|
| 3.13.3.5 | Noise | 3-144 |
| 3.13.4 | Conclusions..... | 3-145 |
| 4.0 | ALTERNATIVES | 4-1 |
| 4.1 | NO ACTION AND POSTPONED ACTION ALTERNATIVE | 4-1 |
| 4.2 | SYSTEM ALTERNATIVES..... | 4-3 |
| 4.2.1 | Existing Pipeline System Alternatives | 4-3 |
| 4.2.1.1 | Gulf South System Alternative | 4-3 |
| 4.2.1.2 | CEGT Pipeline System Alternative | 4-7 |
| 4.2.2 | New Pipeline System Alternatives..... | 4-7 |
| 4.2.2.1 | Carthage to Perryville System Alternative..... | 4-8 |
| 4.2.2.2 | SESH Project System Alternative | 4-8 |
| 4.2.2.3 | Gulf Crossing System Alternative | 4-8 |
| 4.2.2.4 | Midcontinent Express System Alternative..... | 4-11 |
| 4.3 | ROUTE ALTERNATIVES | 4-11 |
| 4.3.1 | Northern Route Alternative..... | 4-11 |
| 4.3.2 | Tallulah to Florence Route Alternatives | 4-12 |
| 4.4 | ROUTE VARIATIONS..... | 4-14 |
| 4.4.1 | Garner Route Variations | 4-18 |
| 4.4.2 | Hoychick Route Variation..... | 4-21 |
| 4.4.3 | Shelton Route Variation..... | 4-23 |
| 4.4.4 | Withrow/Broadbent Route Variation | 4-25 |
| 4.4.5 | Barton Route Variation | 4-27 |
| 4.4.6 | Pearl River Route Variation | 4-29 |
| 4.4.7 | Pitre Route Variation | 4-31 |
| 4.5 | ABOVEGROUND FACILITY ALTERNATIVES..... | 4-33 |
| 4.5.1 | Vixen Compressor Station Site Alternatives..... | 4-33 |
| 4.5.2 | Tallulah Compressor Station Site Alternatives | 4-34 |
| 5.0 | CONCLUSIONS AND RECOMMENDATIONS..... | 5-1 |
| 5.1 | SUMMARY OF THE STAFF'S ENVIRONMENTAL ANALYSIS OF THE PROPOSED ACTION AND ALTERNATIVES | 5-1 |
| 5.1.1 | Geology | 5-1 |
| 5.1.2 | Soils..... | 5-1 |
| 5.1.3 | Water Resources | 5-1 |
| 5.1.4 | Wetlands..... | 5-2 |
| 5.1.5 | Vegetation | 5-3 |
| 5.1.6 | Wildlife and Aquatic Resources..... | 5-3 |
| 5.1.7 | Threatened, Endangered, and Special Status Species | 5-4 |
| 5.1.8 | Land Use, Recreation and Special Interest Areas, and Visual Resources. | 5-4 |
| 5.1.9 | Socioeconomics | 5-5 |
| 5.1.10 | Cultural Resources | 5-6 |
| 5.1.11 | Air Quality and Noise | 5-6 |
| 5.1.12 | Reliability and Safety | 5-7 |
| 5.1.13 | Cumulative Impacts | 5-7 |
| 5.1.14 | Alternatives | 5-7 |
| 5.2 | STAFF'S RECOMMENDATIONS | 5-8 |

LIST OF APPENDICES

| | |
|------------|--|
| APPENDIX A | DISTRIBUTION LIST |
| APPENDIX B | FACILITY LOCATION MAPS |
| APPENDIX C | SOILS FOUND ALONG THE PROPOSED PROJECT |
| APPENDIX D | WATERBODY CROSSINGS |
| APPENDIX E | AFFECTED WETLANDS |
| APPENDIX F | EXTRA WORKSPACES, ACCESS ROADS, AND PIPE STORAGE AND CONTRACTOR YARDS |
| APPENDIX G | MINOR ROUTE VARIATION MAPS |
| APPENDIX H | NATCHEZ TRACE PARKWAY |
| APPENDIX I | LITERATURE CITED |
| APPENDIX J | LIST OF PREPARERS |
| APPENDIX K | RESPONSE TO COMMENTS |
| APPENDIX L | SUBJECT INDEX |

LIST OF TABLES

| <u>Number</u> | <u>Title</u> | <u>Page</u> |
|---------------|---|-------------|
| 1.3-1 | Summary of Major Permits, Approvals, and Consultations for the Proposed East Texas to Mississippi Expansion Project | 1-3 |
| 1.4-1 | Issues Identified and Comments Received During the Public Scoping Process for the Proposed East Texas to Mississippi Expansion Project | 1-9 |
| 2.1-1 | Pipeline Facilities for the Proposed East Texas to Mississippi Expansion Project | 2-3 |
| 2.1-2 | Aboveground Facilities for the Proposed East Texas to Mississippi Expansion Project | 2-4 |
| 2.2-1 | Locations and Land Requirements for the Proposed East Texas to Mississippi Expansion Project | 2-7 |
| 2.2-2 | Existing Utility Rights-of-Way That Would Parallel the Proposed East Texas to Mississippi Expansion Project..... | 2-13 |
| 2.3.2-1 | Proposed Horizontal Directional Drill Locations for the Proposed East Texas to Mississippi Expansion Project..... | 2-24 |
| 2.3.2-2 | Areas That Would Be Affected by Two-Tone Construction Techniques for the Proposed East Texas to Mississippi Expansion Project | 2-27 |
| 3.1.1-1 | Geologic Units Underlying the Proposed East Texas to Mississippi Expansion Project | 3-3 |
| 3.1.2-1 | Mineral Resources within 0.25 Mile of the Proposed East Texas to Mississippi Expansion Project | 3-5 |
| 3.3.1-1 | Drinking Water Wellhead Protection Areas Crossed by the Proposed East Texas to Mississippi Expansion Project..... | 3-18 |
| 3.3.1-2 | Wells Located within 150 Feet of the Proposed East Texas to Mississippi Expansion Project..... | 3-18 |
| 3.3.1-3 | Potentially Contaminated Groundwater Sites Located within 0.25 Mile of the Proposed East Texas to Mississippi Expansion Project Centerline..... | 3-20 |
| 3.3.2-1 | Major and Navigable Waterbodies That Would Be Crossed by the Proposed East Texas to Mississippi Expansion Project..... | 3-26 |
| 3.3.2-2 | Impaired Waterbodies ¹ Crossed by the Proposed East Texas to Mississippi Expansion Project | 3-27 |
| 3.3.2-3 | Summary of Hydrostatic Test Water Requirements for the Proposed East Texas to Mississippi Expansion Project..... | 3-32 |
| 3.4.1-1 | Summary of Wetlands Affected by the Proposed East Texas to Mississippi Expansion Project | 3-36 |
| 3.4.1-2 | Forested Wetlands with Mature Tupelo or Cypress Stands Occurring Along the Proposed East Texas to Mississippi Expansion Project..... | 3-37 |

LIST OF TABLES (CONTINUED)

| <u>Number</u> | <u>Title</u> | <u>Page</u> |
|---------------|--|-------------|
| 3.5-1 | Upland Vegetation Communities Occurring along the Proposed East Texas to Mississippi Expansion Project..... | 3-43 |
| 3.5.1-2 | Extensive Forested Tracts Crossed by the Proposed East Texas to Mississippi Expansion Project..... | 3-45 |
| 3.5.2-1 | Vegetative Communities Affected by the Proposed East Texas to Mississippi Expansion Project | 3-47 |
| 3.6.1-1 | Common Wildlife Species That Occur along the Proposed East Texas to Mississippi Expansion Project..... | 3-52 |
| 3.6.2-1 | Fish and Mussel Species Occurring in the Proposed East Texas to Mississippi Expansion Project Area..... | 3-60 |
| 3.7.1-1 | Federally Listed Species Potentially Occurring in the Proposed East Texas to Mississippi Expansion Project Area | 3-64 |
| 3.7.2-1 | State-listed and Rare Species Potentially Occurring in the Proposed East Texas to Mississippi Expansion Project Area ^a | 3-73 |
| 3.8.1-1 | Acres Potentially Affected by the Proposed Project..... | 3-78 |
| 3.8.4-1 | Sixteenth Section Lands Crossed by the Proposed East Texas to Mississippi Expansion Project | 3-86 |
| 3.8.4-2 | Conservation Reserve Program Lands Crossed by the Proposed East Texas to Mississippi Expansion Project..... | 3-89 |
| 3.8.4-3 | Wetland Reserve Program Lands Crossed by the Proposed East Texas to Mississippi Expansion Project..... | 3-90 |
| 3.8.5-1 | Major Highway Road Crossings for the Proposed East Texas to Mississippi Expansion Project | 3-93 |
| 3.9.2-1 | Existing Population and Demographics Conditions within the Region of Influence for the Proposed East Texas to Mississippi Expansion Project | 3-99 |
| 3.9.3-1 | Existing Income and Employment Conditions within the Region of Influence for the Proposed East Texas to Mississippi Expansion Project | 3-100 |
| 3.9.4-1 | Temporary Housing Units Available within the Region of Influence for the Proposed East Texas to Mississippi Expansion Project | 3-101 |
| 3.9.6-1 | County Revenue and Estimated Annual Taxes for the Proposed East Texas to Mississippi Expansion Project..... | 3-103 |
| 3.9.7-1 | Existing Educational, Medical, Police, and Fire Full-time Equivalents within the Region of Influence for the Proposed East Texas to Mississippi Expansion Project ^a | 3-104 |
| 3.11.1-1 | National Ambient Air Quality Standards..... | 3-110 |

LIST OF TABLES (CONTINUED)

| <u>Number</u> | <u>Title</u> | <u>Page</u> |
|---------------|---|-------------|
| 3.11.1-2 | Existing and Proposed Emissions for the Carthage Junction Compressor Station..... | 3-112 |
| 3.11.1-3 | Proposed Emissions for the Vixen Compressor Station | 3-113 |
| 3.11.1-4 | Proposed Emissions for the Tallulah Compressor Station..... | 3-113 |
| 3.11.2-1 | Locations with Predicted HDD Operation Noise Impacts Greater Than 55 dBA..... | 3-119 |
| 3.11.2-2 | Predicted Noise Level Contribution of the Carthage Junction Compressor Station at NSAs | 3-120 |
| 3.11.2-3 | Predicted Noise Level Contribution of the Vixen Compressor Station at Nearby NSAs..... | 3-121 |
| 3.11.2-4 | Predicted Noise Level Contribution of the Tallulah Compressor Station at Nearby NSAs..... | 3-122 |
| 3.12.2-1 | Natural Gas Service Incidents by Cause ^a | 3-127 |
| 3.12.2-2 | Outside Forces Incidents by Cause (1970 through 1984) ^a | 3-128 |
| 3.12.2-3 | External Corrosion by Level of Control (1970 through June 1984) | 3-128 |
| 3.12.3-1 | Annual Average Fatalities for Natural Gas Transmission and Gathering Systems | 3-129 |
| 3.12.3-2 | Nationwide Accidental Deaths | 3-130 |
| 3.13-1 | Existing or Proposed Projects That Would Cumulatively Impact Resources in the East Texas to Mississippi Expansion Project Area..... | 3-132 |
| 3.13-2 | Environmental Resources That Would Be Affected During Construction and Operation of Recent and Proposed Interstate Natural Gas Pipeline Projects in the Vicinity of the Proposed East Texas to Mississippi Expansion Project..... | 3-136 |
| 4.2-1 | Comparison of the Gulf South System Alternative to the Proposed East Texas to Mississippi Expansion Project Route | 4-6 |
| 4.3.2-1 | Comparison of Tallulah to Florence Route Variations and the Proposed Route | 4-12 |
| 4.4-1 | Minor Route Variations Incorporated into the Proposed East Texas to Mississippi Expansion Project..... | 4-15 |
| 4.4-2 | Summary of Route Variations Identified in Response to Public Comments Received for the Proposed East Texas to Mississippi Expansion Project | 4-18 |
| 4.4.1-1 | Comparison of Garner Route Variations and the Original Route | 4-21 |
| 4.4.2-1 | Comparison of the Hoychick Route Variation and the Original Route | 4-23 |
| 4.4.3-1 | Comparison of the Shelton Route Variation and the Original Route..... | 4-25 |

LIST OF TABLES (CONTINUED)

| <u>Number</u> | <u>Title</u> | <u>Page</u> |
|---------------|---|-------------|
| 4.4.4-1 | Comparison of the Withrow/Broadbent Route Variation and the Original Route..... | 4-27 |
| 4.4.5-1 | Comparison of the Barton East Route Variation and the Original Route..... | 4-29 |
| 4.4.6-1 | Comparison of the Pearl River Route Variation and the Original Route..... | 4-31 |
| 4.4.7-1 | Comparison of the Pitre Route Variation and the Original Route..... | 4-31 |

LIST OF FIGURES

| <u>Number</u> | <u>Title</u> | <u>Page</u> |
|---------------|--|-------------|
| 2.1-1 | General Location Map | 2-2 |
| 2.2.1-1 | Typical Right-of-Way Cross Sections Parallel to Existing Gulf South Pipelines | 2-9 |
| 2.2.1-2 | Typical Right-of-Way Cross Sections Parallel to the proposed CenterPoint Pipeline | 2-10 |
| 2.2.1-3 | Typical Right-of-Way Cross Sections in Greenfield Areas..... | 2-11 |
| 2.3.1-1 | Typical Pipeline Construction Sequence | 2-16 |
| 2.3.1-2 | Typical Trench and Spoil Area Topsoil Stripping | 2-17 |
| 2.3.2-2 | Typical Two-Tone Construction Right-of-Way Cross Section | 2-28 |
| 3.13.-1 | Approximate Location of Interstate Natural Gas Pipeline Projects in Counties/Parishes Affected by the Proposed East Texas to Mississippi Expansion Project | 3-135 |
| 4.2.1-1 | Gulf South System Alternative | 4-4 |
| 4.2.1-2 | CenterPoint Pipeline System Alternative..... | 4-5 |
| 4.2.2-1 | Carthage to Perryville Project System Alternative | 4-9 |
| 4.2.2-2 | Recently Proposed Project System Alternatives | 4-10 |
| 4.3.2-1 | Tallulah to Florence Route Alternatives | 4-13 |
| 4.4.1-1a | Garner Route Variation 1 | 4-19 |
| 4.4.1-1b | Garner Route Variation 2..... | 4-20 |
| 4.4.2-1 | Hoychick Route Variation | 4-22 |
| 4.4.3-1 | Shelton Route Variation..... | 4-24 |
| 4.4.4-1 | Withrow/Broadbent Route Variation | 4-26 |
| 4.4.5-1 | Barton Route Variation | 4-28 |
| 4.4.6-1 | Pearl River Route Variation..... | 4-30 |
| 4.4.7-1 | Pitre Route Variation | 4-32 |
| 4.5.1-1 | Vixen Compressor Station Site Alternative | 4-35 |
| 4.5.2-1 | Tallulah Compressor Station Site Alternative | 4-36 |

ACRONYMS AND ABBREVIATIONS

| | |
|-------------------------|--|
| ACHP | Advisory Council on Historic Preservation |
| AMSL | above mean sea level |
| ANR | ANR Pipeline Company |
| APE | area of potential effect |
| AQCRs | Air Quality Control Regions |
| BA | Biological Assessment |
| BACT | best available control technology |
| Bcf/d | billion cubic feet per day |
| BMSL | below mean sea level |
| BOD | biochemical oxygen demand |
| BTU | British thermal units |
| CAA | Clean Air Act |
| CEGT | CenterPoint Energy Gas Transmission Company |
| CEQ | Council on Environmental Quality |
| Certificate | Certificate of Public Convenience and Necessity |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| COE | U.S. Army Corps of Engineers |
| Columbia Gulf | Columbia Gulf Transmission Company |
| Contaminated Media Plan | Plan for the Unanticipated Discovery of Contaminated Environmental Media |
| CRP | Conservation Reserve Program |
| CWA | Clean Water Act |
| dBA | decibels on the A-weighted scale |
| DOT | U.S. Department of Transportation |
| Duke | Duke Energy Gas Transmission |
| ECMR Program | Environmental Compliance Monitoring and Reporting Program |
| EFH | essential fish habitat |
| EI | Environmental Inspector |
| EIA | U.S. Department of Energy, Energy Information Administration |
| EIS | Environmental Impact Statement |
| Enbridge | Enbridge Energy Partners, LP |

ACRONYMS AND ABBREVIATIONS (CONTINUED)

| | |
|-------------------------|---|
| Entergy | Entergy Louisiana, Inc. |
| Enterprise | Enterprise Products Partners |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| ESD | emergency shut down |
| FAA | Federal Aviation Administration |
| FERC or Commission | Federal Energy Regulatory Commission |
| FHWA | Federal Highway Administration |
| FR | Federal Register |
| FWS | U. S. Fish And Wildlife Service |
| GIS | Geographic Information System |
| Gulf South or Applicant | Gulf South Pipeline Company, LP |
| HAP | hazardous air pollutant |
| HCA | high consequence area |
| HDD | horizontal directional drill |
| HDD Contingency Plan | Plan for Containment of Inadvertent Release of Drilling Mud during Horizontal Directional Drilled Wetland and Waterbody Crossings |
| HDD Noise Plan | Comprehensive Plan for HDD Operations That Could Exceed 55 dBA |
| hp | horsepower |
| ka | kilo annum |
| kPa | kilopascals |
| LAC | Louisiana Administrative Code |
| L _d | daytime sound level |
| LDEQ | Louisiana Department of Environmental Quality |
| L _{dn} | day-night sound level |
| LDOT | Louisiana Department of Transportation |
| LDWF | Louisiana Department of Wildlife and Fisheries |
| L _{eq(24)} | 24-hour equivalent sound level |
| L _n | nighttime sound level |
| LNG | liquefied natural gas |
| LSMP | Loess Soil Management Plan |
| M/R station | meter/regulator station |

ACRONYMS AND ABBREVIATIONS (CONTINUED)

| | |
|------------------|--|
| m ³ | cubic meter |
| Ma | mega annum |
| MACT | maximum achievable control technology |
| MAOP | maximum allowable operating pressure |
| MDEQ | Mississippi Department of Environmental Quality |
| MDOT | Mississippi Department of Transportation |
| MDWFP | Mississippi Department of Wildlife, Fisheries, and Parks |
| mgd | million gallons per day |
| Mississippi SHPO | Mississippi Department of Archives and History |
| MLRA | Major Land Resource Areas |
| MLV | mainline valve |
| MP | milepost |
| MW | megawatt |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act of 1969 |
| NGA | Natural Gas Act |
| NGPSA | Natural Gas Pipeline Safety Act |
| NHPA | National Historic Preservation Act |
| NNSR | Non-attainment New Source Review |
| NO ₂ | nitrogen dioxide |
| NOI | <i>Notice of Intent to Prepare an Environmental Impact Statement, Request for Comments on Environmental Issues</i> |
| NO _x | nitrogen oxides |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NRI | Nationwide Rivers Inventory |
| NSA | noise-sensitive area |
| NSPS | New Source Performance Standards |
| NSR | New Source Review |
| NWI | National Wetlands Inventory |
| O ₃ | ozone |

ACRONYMS AND ABBREVIATIONS (CONTINUED)

| | |
|-------------------|--|
| OEP | FERC Office of Energy Projects |
| °F | degrees Farenheit |
| OPS | Office of Pipeline Safety |
| PEM | palustrine emergent |
| PFO | palustrine forested |
| PHMSA | Pipeline and Hazardous Materials Safety Administration |
| Plan | FERC's Upland Erosion Control, Revegetation, and Maintenance Plan |
| PM ₁₀ | particulate matter with an aerodynamic diameter of 10 microns or less |
| PM _{2.5} | particulate matter with an aerodynamic diameter of 2.5 microns or less |
| Procedures | FERC's Wetland and Waterbody Construction and Mitigation Procedures |
| Project | East Texas to Mississippi Expansion Project |
| PSD | Prevention of Significant Deterioration |
| psig | pounds per square in gauge |
| PSS | palustrine scrub-shrub |
| RCRA | Resource Conservation and Recovery Act |
| RCW | red-cockaded woodpecker |
| Regency | Regency Intrastate Gas, LLC |
| Secretary | Secretary of the Commission |
| SESH | Southeast Supply Header Project |
| SHPO | State Historic Preservation Office |
| SO ₂ | sulfur dioxide |
| SPCC | Spill Prevention, Containment, and Countermeasure (Plan) |
| SWPPP | Stormwater Pollution Prevention Plan |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| Tcf | trillion cubic feet |
| Texas Eastern | Texas Eastern Transmission, LLC |
| Texas Gas | Texas Gas Transmission, LLC |
| TIMED | Transportation Infrastructure Model for Economic Development |

ACRONYMS AND ABBREVIATIONS (CONTINUED)

| | |
|-------|-------------------------------------|
| TPWD | Texas Parks and Wildlife Department |
| tpy | tons per year |
| TTC | Trans-Texas Corridor |
| TxDOT | Texas Department of Transportation |
| USC | United States Code |
| USDA | U.S. Department of Agriculture |
| USGS | U.S. Geological Survey |
| VOCs | volatile organic compounds |
| WMA | Wildlife Management Area |
| WRP | Wetland Reserve Program |
| µg | Microgram |