

TABLE OF CONTENTS

Gulf Crossing Project Draft Environmental Impact Statement

| | |
|--|-------------|
| TABLE OF CONTENTS..... | i |
| LIST OF APPENDICES..... | vi |
| LIST OF TABLES..... | vii |
| LIST OF FIGURES..... | x |
| ACRONYMS AND ABBREVIATIONS | xi |
| | |
| 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-2 |
| 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 | 1-3 |
| 1.4 PUBLIC REVIEW AND COMMENT | 1-8 |
| | |
| 2.0 PROPOSED ACTION | 2-1 |
| 2.1 PROPOSED FACILITIES | 2-1 |
| 2.2 LAND REQUIREMENTS | 2-7 |
| 2.2.1 Pipeline Facilities..... | 2-9 |
| 2.2.2 Right-of-Way Considerations | 2-14 |
| 2.2.3 Aboveground Facilities..... | 2-15 |
| 2.2.4 Other Work Areas | 2-15 |
| 2.2.4.1 Additional Temporary Work Spaces | 2-15 |
| 2.2.4.2 Pipe Storage and Contractor Yards | 2-16 |
| 2.2.4.3 Access Roads | 2-16 |
| 2.2.3 CONSTRUCTION PROCEDURES | 2-16 |
| 2.3.1 General Pipeline Construction Procedures | 2-16 |
| 2.3.2 Specialized Pipeline Construction Procedures..... | 2-22 |
| 2.3.2.1 Waterbody Crossings | 2-22 |
| 2.3.2.2 Wetland Crossings..... | 2-27 |
| 2.3.2.3 Road, Highway, and Railroad Crossings..... | 2-28 |
| 2.3.2.4 Agricultural Areas | 2-29 |
| 2.3.2.5 Rugged Topography | 2-29 |
| 2.3.2.6 Residential Areas..... | 2-29 |
| 2.3.3 Aboveground Facilities Construction Procedures | 2-31 |
| 2.4 CONSTRUCTION SCHEDULE | 2-31 |
| 2.5 ENVIRONMENTAL TRAINING AND MONITORING..... | 2-31 |
| 2.6 OPERATION, MAINTENANCE, AND SAFETY CONTROLS | 2-32 |
| 2.7 FUTURE PLANS AND ABANDONMENT | 2-33 |
| 2.8 NONJURISDICTIONAL FACILITIES..... | 2-34 |

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 | 3-1 |
| 3.1.1.2 | Bedrock | 3-1 |
| 3.1.1.3 | Impacts to the Geologic Setting | 3-5 |
| 3.1.2 | Mineral Resources | 3-5 |
| 3.1.3 | Paleontological Resources | 3-7 |
| 3.1.4 | Geologic Hazards..... | 3-7 |
| 3.1.4.1 | Seismicity and Faults | 3-8 |
| 3.1.4.2 | Soil Liquefaction | 3-8 |
| 3.1.4.3 | Slope Failures/Landslides | 3-8 |
| 3.1.4.4 | Ground Subsidence | 3-9 |
| 3.1.5 | Conclusion Regarding Impacts to Geologic Resources..... | 3-9 |
| 3.2 | SOILS..... | 3-10 |
| 3.2.1 | Soil Limitations | 3-10 |
| 3.2.2 | Soil Characteristics | 3-10 |
| 3.2.2.1 | Erosion Potential | 3-10 |
| 3.2.2.2 | Drainage Class | 3-10 |
| 3.2.2.3 | Hydric Soils..... | 3-11 |
| 3.2.2.4 | Compaction Potential | 3-11 |
| 3.2.2.5 | Revegetation Potential..... | 3-11 |
| 3.2.3 | General Impacts and Mitigation | 3-12 |
| 3.2.3.1 | Erosion | 3-12 |
| 3.2.3.2 | Compaction Potential | 3-13 |
| 3.2.3.3 | Accidental Releases or Discovery of Contaminants | 3-13 |
| 3.2.3.4 | Introduction of Rocks to Surface Soil | 3-14 |
| 3.2.3.5 | Drainage Systems and Drainage Patterns..... | 3-14 |
| 3.2.4 | Prime Farmland..... | 3-15 |
| 3.2.5 | Conclusion Regarding Impacts to Soil Resources | 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..... | 3-22 |
| 3.3.1.3 | Site-specific Impacts and Mitigation..... | 3-24 |
| 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..... | 3-30 |
| 3.3.2.3 | Site-Specific Impacts and Mitigation | 3-33 |
| 3.3.3 | Conclusion Regarding Surface Water Resources | 3-37 |
| 3.4 | WETLANDS | 3-37 |
| 3.4.1 | Existing Wetland Resources | 3-37 |
| 3.4.1.1 | Alternative Measure to FERC's Procedures | 3-39 |
| 3.4.1.2 | Impacts and Mitigation..... | 3-41 |
| 3.4.1.3 | General Wetland Construction and Mitigation Procedures.... | 3-43 |
| 3.4.1.4 | Alternative Measures to the FERC's Procedures | 3-44 |
| 3.4.2 | Site-specific Wetland Impacts and Mitigation..... | 3-47 |
| 3.4.2.1 | High-quality, Sensitive, or Special-status Wetlands | 3-48 |
| 3.4.3 | Wetland Restoration and Compensatory Mitigation..... | 3-49 |
| 3.4.4 | Conclusion Regarding Impacts to Wetlands..... | 3-49 |

TABLE OF CONTENTS (CONTINUED)

| | | |
|----------|---|-------|
| 3.5 | VEGETATION | 3-50 |
| 3.5.1 | Existing Vegetation Resources | 3-50 |
| 3.5.1.1 | Vegetative Communities of Special Concern or Value..... | 3-54 |
| 3.5.1.2 | Extensive Forested Tracts | 3-55 |
| 3.5.2 | General Impacts and Mitigation | 3-55 |
| 3.5.2.1 | General Impacts | 3-55 |
| 3.5.2.2 | Impacts to Vegetation Communities of Special Concern or Value | 3-58 |
| 3.5.3 | Exotic or Invasive Plant Communities | 3-60 |
| 3.6 | WILDLIFE AND AQUATIC RESOURCES | 3-60 |
| 3.6.1 | Wildlife | 3-60 |
| 3.6.1.1 | Existing Wildlife Resources..... | 3-60 |
| 3.6.1.2 | Sensitive or Managed Wildlife Habitats | 3-63 |
| 3.6.1.3 | Unique and Sensitive Wildlife Species | 3-65 |
| 3.6.1.4 | General Impacts and Mitigation..... | 3-67 |
| 3.6.1.5 | Sensitive or Managed Wildlife Habitats and Species Effects and Mitigation..... | 3-69 |
| 3.6.1.6 | Conclusion Regarding Impacts to Wildlife Habitats and Species..... | 3-72 |
| 3.6.2 | Aquatic Resources | 3-73 |
| 3.6.2.1 | Existing Aquatic Resources | 3-73 |
| 3.6.2.2 | Conclusion Regarding Impacts to Aquatic Habitats and Species..... | 3-77 |
| 3.7 | THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES | 3-77 |
| 3.7.1 | Federally Listed Threatened and Endangered Species | 3-77 |
| 3.7.2 | Special-status Species | 3-88 |
| 3.7.2.1 | State-listed and Rare Species | 3-88 |
| 3.8 | LAND USE, RECREATION AND SPECIAL INTEREST AREAS, AND VISUAL RESOURCES | 3-92 |
| 3.8.1 | Land Use | 3-92 |
| 3.8.2 | Right-of-Way Easement | 3-97 |
| 3.8.3 | General Land Use Impacts and Mitigation | 3-98 |
| 3.8.3.1 | Impacts and Mitigation Specific to Existing Land Use..... | 3-99 |
| 3.8.4 | Recreation and Special Use Areas | 3-101 |
| 3.8.5 | Transportation..... | 3-105 |
| 3.8.6 | Visual Resources..... | 3-107 |
| 3.8.6.1 | Current Viewshed..... | 3-107 |
| 3.8.6.2 | General Impacts and Mitigation..... | 3-108 |
| 3.8.6.3 | Summary of Visual Impacts..... | 3-111 |
| 3.9 | SOCIOECONOMICS | 3-111 |
| 3.9.1 | Region of Influence | 3-111 |
| 3.9.2 | Population | 3-112 |
| 3.9.3 | Economy and Employment..... | 3-112 |
| 3.9.4 | Housing..... | 3-115 |
| 3.9.5 | Property Values..... | 3-117 |
| 3.9.6 | Government Revenue | 3-118 |
| 3.9.7 | Public Services..... | 3-119 |
| 3.9.8 | Impacts on Specific Economic Sectors..... | 3-121 |
| 3.10 | CULTURAL RESOURCES..... | 3-121 |
| 3.10.1 | Results of Cultural Resources Survey..... | 3-121 |
| 3.10.1.1 | Texas | 3-122 |

TABLE OF CONTENTS (CONTINUED)

| | | |
|------------|---|------------|
| 3.10.1.2 | Oklahoma | 3-122 |
| 3.10.1.3 | Louisiana | 3-123 |
| 3.10.1.4 | Mississippi..... | 3-123 |
| 3.10.2 | Unanticipated Discoveries Plan | 3-123 |
| 3.10.3 | Native American Consultation..... | 3-124 |
| 3.10.4 | General Impacts and Mitigation | 3-124 |
| 3.11 | AIR QUALITY AND NOISE | 3-125 |
| 3.11.1 | Air Quality | 3-125 |
| 3.11.1.1 | Existing Air Quality | 3-126 |
| 3.11.1.2 | Regulatory Requirements | 3-127 |
| 3.11.1.3 | General Impacts and Mitigation | 3-134 |
| 3.11.2 | Noise Quality | 3-139 |
| 3.11.2.1 | Regulatory Requirements | 3-139 |
| 3.11.2.2 | Existing Noise Levels..... | 3-139 |
| 3.11.2.3 | General Impacts and Mitigation | 3-140 |
| 3.12 | RELIABILITY AND SAFETY | 3-147 |
| 3.12.1 | Safety Standards | 3-147 |
| 3.12.2 | Pipeline Accident Data | 3-151 |
| 3.12.3 | Impact on Public Safety | 3-153 |
| 3.12.4 | Additional Security and Safety Issues | 3-155 |
| 3.12.4.1 | Terrorism..... | 3-155 |
| 3.13 | CUMULATIVE IMPACTS | 3-155 |
| 3.13.1 | Other Natural Gas Pipeline Projects | 3-158 |
| 3.13.2 | Natural Gas Pipeline Projects Not Subject to FERC Jurisdiction..... | 3-163 |
| 3.13.3 | Unrelated Projects..... | 3-163 |
| 3.13.3.1 | Wetlands and Waterbodies | 3-165 |
| 3.13.3.2 | Vegetation and Wildlife | 3-166 |
| 3.13.3.3 | Land Use | 3-167 |
| 3.13.3.4 | Air Quality | 3-168 |
| 3.13.3.5 | Noise | 3-169 |
| 3.13.4 | Conclusions..... | 3-169 |
| 4.0 | ALTERNATIVES | 4-1 |
| 4.1 | NO ACTION AND POSTPONED ACTION ALTERNATIVE..... | 4-1 |
| 4.2 | SYSTEM ALTERNATIVES | 4-4 |
| 4.2.1 | Existing Pipeline System Alternatives..... | 4-4 |
| 4.2.1.1 | Gulf South System Alternative | 4-4 |
| 4.2.1.2 | CEGT Pipeline System Alternative..... | 4-9 |
| 4.2.1.3 | NGPL System Alternative..... | 4-9 |
| 4.2.2 | New Pipeline System Alternatives..... | 4-10 |
| 4.2.2.1 | MEP System Alternative..... | 4-10 |
| 4.2.2.2 | Single Pipeline System Alternative | 4-12 |
| 4.3 | ROUTE ALTERNATIVES..... | 4-13 |
| 4.3.1 | Southern Route Alternative | 4-13 |
| 4.3.2 | Sherman to Texarkana Route Alternative..... | 4-16 |
| 4.4 | ROUTE VARIATIONS | 4-18 |
| 4.4.1 | Wilkerson Route Variations..... | 4-23 |
| 4.4.2 | Doyle Route Variation | 4-27 |
| 4.4.3 | Everhart Route Variation | 4-29 |
| 4.4.4 | Foster Route Variation..... | 4-31 |
| 4.4.5 | Johnson Route Variation..... | 4-33 |

TABLE OF CONTENTS (CONTINUED)

| | | |
|------------|--|------------|
| 4.4.6 | Water Oak-Willow Oak Route Variation | 4-35 |
| 4.4.7 | The Nature Conservancy Route Variation | 4-37 |
| 4.4.8 | Trip Trust Route Variation | 4-39 |
| 4.4.9 | Alexander Route Variation | 4-41 |
| 4.5 | ABOVEGROUND FACILITY ALTERNATIVES | 4-43 |
| 4.5.1 | Sherman Compressor Station Site Alternatives | 4-44 |
| 4.5.2 | Paris Compressor Station Site Alternatives | 4-44 |
| 4.5.3 | Mira Compressor Station Site Alternatives | 4-49 |
| 4.5.4 | Sterlington Compressor Station Site Alternatives | 4-51 |
| 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 | 5-5 |
| 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 | LITERATURE CITED |
| APPENDIX I | LIST OF PREPARERS |

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 Gulf Crossing Project | 1-3 |
| 1.4-1 | Issues Identified and Comments Received During the Public Scoping Process for the Proposed Gulf Crossing Project | 1-10 |
| 2.1-1 | Pipeline Facilities for the Proposed Gulf Crossing Project | 2-3 |
| 2.1-2 | Aboveground Facilities for the Proposed Gulf Crossing Project | 2-4 |
| 2.2-1 | Locations and Land Requirements for the Proposed Gulf Crossing Project | 2-7 |
| 3.1.1-1 | Geologic Units Underlying the Proposed Gulf Crossing Project | 3-2 |
| 3.3.1-2 | Wells Located within 150 Feet of the Proposed Gulf Crossing Project | 3-21 |
| 3.3.1-3 | Potentially Contaminated Groundwater Sites Located within 1.0 Mile of the Proposed Gulf Crossing Project Centerline | 3-22 |
| 3.3.2-1 | Major and Navigable Waterbodies that would be Crossed by the Proposed Gulf Crossing Project | 3-26 |
| 3.3.2-2 | Impaired Waterbodies Crossed by the Proposed Gulf Crossing Project | 3-28 |
| 3.3.2-3 | Proposed Hydrostatic Test Water Source and Discharge Locations | 3-35 |
| 3.4.1-1 | Summary of Wetlands Affected by the Proposed Gulf Crossing Project | 3-39 |
| 3.4.1-2 | High Quality Forested Wetlands Occurring Along the Proposed Gulf Crossing Project | 3-40 |
| 3.4.1-3 | WRP Lands Crossed by the Proposed Gulf Crossing Project | 3-41 |
| 3.4.2-1 | Summary of Alternative Measures to FERC's Procedures for the Proposed Gulf Crossing Project | 3-44 |
| 3.5.1-1 | Vegetation Cover Types Occurring along the Proposed Gulf Crossing Project | 3-50 |
| 3.5.1-2 | Extensive Forested Tracts Crossed by the Proposed Gulf Crossing Project | 3-52 |
| 3.5.2-1 | Vegetative Communities Affected by the Proposed Gulf Crossing Project | 3-57 |
| 3.6.1-1 | Common Wildlife Species That Occur along the Proposed Pipeline..... | 3-62 |
| 3.6.1-2 | Migratory Bird Species that Potentially Occur in the Project Area | 3-66 |
| 3.6.2-1 | Fish and Mussel Species Commonly Occurring in the Proposed Project Area..... | 3-73 |
| 3.7.1-1 | Federally Listed Species Potentially Occurring in the Proposed Gulf Crossing Project Area | 3-78 |
| 3.7.2-1 | State-Listed and Rare Species Potentially Occurring in the Proposed Gulf Crossing Project Area | 3-89 |
| 3.8.1-1 | Acres Potentially Affected by the Proposed Project Land Uses Affected by the Proposed Project (Acres) | 3-94 |
| 3.8.1-2 | Existing Rights-of-Way Paralleled by the Pipeline..... | 3-96 |
| 3.8.3-1 | Residences Within 50 feet of Construction Work Area and Proposed Mitigation | 3-100 |

LIST OF TABLES (CONTINUED)

| <u>Number</u> | <u>Title</u> | <u>Page</u> |
|---------------|--|-------------|
| 3.8.4-1 | WRP Lands Crossed by the Project | 3-104 |
| 3.8.5-1 | Major Highway Road Crossings | 3-106 |
| 3.9.2-1 | Existing Population and Demographics Conditions in the Region of Influence for the Proposed Gulf Crossing Project..... | 3-113 |
| 3.9.3-1 | Existing Income and Employment Conditions within the Region of Influence for the Proposed Gulf Crossing Project..... | 3-114 |
| 33.9.4-1 | Temporary Housing Units Available within the Region of Influence for the Proposed Gulf Crossing Project..... | 3-116 |
| 3.9.6-1 | County Revenue and Estimated Annual Taxes for the Proposed Gulf Crossing Project | 3-118 |
| 3. 3.9.7-1 | Existing Educational, Medical, Police, and Fire Full-time Equivalents within the Region of Influence for the Proposed Gulf Crossing Project..... | 3-120 |
| 3.11.1-1 | National Ambient Air Quality Standards | 3-127 |
| 3.11.1-2 | Existing and Proposed Emissions for the Harrisville Compressor Station | 3-129 |
| 3.11.1-3 | Proposed Emissions for the Mira Compressor Station..... | 3-130 |
| 3.11.1-4 | Proposed Emissions for the Paris Compressor Station..... | 3-130 |
| 3.11.1-5 | Proposed Emissions for the Sherman Compressor Station | 3-131 |
| 3.11.1-6 | Proposed Emissions for the Sterlington Compressor Station..... | 3-131 |
| 3.11.1-7 | SCREEN3 Modeling Results | 3-136 |
| 3.11.1-8 | Harrisville Compressor Station NAAQS Analysis..... | 3-137 |
| 3.11.1-9 | Paris Compressor Station NAAQS Analysis..... | 3-138 |
| 3.11.2-1 | Locations with Predicted HDD Operation Noise Impacts Greater Than 55 dBA | 3-141 |
| 3.11.2-2 | Predicted Noise Level Contribution of the Harrisville Compressor Station at NSAs..... | 3-143 |
| 3.11.2-3 | Predicted Noise Level Contribution of the Mira Compressor Station at Nearby NSAs | 3-144 |
| 3.11.2-4 | Predicted Noise Level Contribution of the Paris Compressor Station at Nearby NSAs | 3-144 |
| 3.11.2-5 | Predicted Noise Level Contribution of the Sherman Compressor Station at Nearby NSAs | 3-145 |
| 3.11.2-6 | Predicted Noise Level Contribution of the Sterlington Compressor Station at Nearby NSAs | 3-146 |
| 3.12.2-1 | Natural Gas Service Incidents by Cause ^a | 3-152 |
| 3.12.2-2 | Outside Forces Incidents by Cause (1970 through 1984) ^a | 3-152 |
| 3.12.2-3 | External Corrosion by Level of Control (1970 through June 1984) | 3-153 |
| 3.12.3-1 | Annual Average Fatalities for Natural Gas Transmission and Gathering Systems..... | 3-154 |
| 3.12.3-2 | Nationwide Accidental Deaths..... | 3-154 |
| 3.13-1 | Existing or Proposed Projects That Would Cumulatively Impact Resources in the Gulf Crossing Project Area..... | 3-156 |
| 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 Gulf Crossing Project | 3-160 |

LIST OF TABLES (CONTINUED)

| <u>Number</u> | <u>Title</u> | <u>Page</u> |
|---------------|---|-------------|
| 4.3.1-1 | Comparison of Southern Route Alternative and the Proposed Route | 4-15 |
| 4.3.2-1 | Comparison of Sherman to Texarkana Route Alternative and the Proposed Route..... | 4-18 |
| 4.4-1 | Minor Route Variations Incorporated into the Proposed Gulf Crossing Project | 4-19 |
| 4.4-2 | Summary of Route Variations Identified in Response to Public Comments Received for the Proposed Gulf Crossing Project | 4-22 |
| 4.4.1-1 | Comparison of Wilkerson Route Variations and the Original Route | 4-27 |
| 4.4.2-1 | Comparison of Doyle Route Variation and the Original Route | 4-29 |
| 4.4.3-1 | Comparison of Everhart Route Variation and the Original Route | 4-31 |
| 4.4.4-1 | Comparison of Foster Route Variation and the Original Route | 4-33 |
| 4.4.5-1 | Comparison of Johnson Route Variation and the Original Route | 4-35 |
| 4.4.6-1 | Comparison of Water Oak-Willow Oak Route Variation and the Original Route | 4-37 |
| 4.4.7-1 | Comparison of TNC Route Variation and the Original Route | 4-39 |
| 4.4.8-1 | Comparison of Trip Trust Route Variation and the Original Route | 4-39 |
| 4.4.9-1 | Comparison of Alexander Route Variation and the Original Route | 4-41 |
| 4.5.1-1 | Comparison of Sherman Compressor Station Site Alternatives | 4-46 |
| 4.5.2-1 | Comparison of Paris Compressor Station Site Alternatives..... | 4-48 |
| 4.5.3-1 | Comparison of Mira Compressor Station Site Alternatives | 4-49 |

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 Upland Right-of-Way Cross Section Parallel to Existing Pipelines..... | 2-10 |
| 2.2.1-2 | Typical Upland Right-of-Way Cross Section in Greenfield Area | 2-11 |
| 2.2.1-3 | Typical Wetland Right-of-Way Cross Section Adjacent to Existing Pipelines | 2-12 |
| 2.2.1-4 | Typical Wetland Right-of-Way Cross Section in Greenfield Areas | 2-13 |
| 2.3.1-1 | Typical Pipeline Construction Sequence..... | 2-17 |
| 2.3.1-2 | Typical Trench and Spoil Area Topsoil Stripping | 2-19 |
| 2.3.2-1 | Typical HDD Pipeline Installation | 2-24 |
| 2.3.2-2 | Typical Side-Slope Construction Right-of-Way Cross Section | 2-30 |
| 3.13-1 | Approximate Location of Interstate Natural Gas Pipeline Projects in Counties/Parishes Affected by the Proposed Gulf Crossing Project | 3-159 |
| 4.2.1-1 | Gulf South System Alternative..... | 4-5 |
| 4.2.1-2 | CEGT Pipeline System Alternative..... | 4-6 |
| 4.2.1-3 | NGPL System Alternative | 4-7 |
| 4.2.2-1 | Midcontinent Express Pipeline System Alternatives | 4-11 |
| 4.3.1-1 | Southern Route Alternative | 4-14 |
| 4.3.2-1 | Sherman to Texarkana Route Alternative | 4-17 |
| 4.4.1-1 | Wilkerson Route Variation I | 4-24 |
| 4.4.1-2 | Wilkerson Route Variation II | 4-25 |
| 4.4.1-3 | Wilkerson Route Variation III..... | 4-26 |
| 4.4.2-1 | Doyle Route Variation | 4-28 |
| 4.4.3-1 | Everhart Route Variation | 4-30 |
| 4.4.4-1 | Foster Route Variation | 4-32 |
| 4.4.5-1 | Johnson Route Variation | 4-34 |
| 4.4.6-1 | Water Oak-Willow Oak Route Variation..... | 4-36 |
| 4.4.7-1 | TNC Route Variation | 4-38 |
| 4.4.8-1 | Trip Trust Route Variation | 4-40 |
| 4.4.9-1 | Alexander Route Variation..... | 4-42 |
| 4.5.1-1 | Sherman Compressor Station Site Alternative | 4-45 |
| 4.5.2-1 | Paris Compressor Station Site Alternative | 4-47 |
| 4.5.3-1 | Mira Compressor Station Site Alternative | 4-50 |

ACRONYMS AND ABBREVIATIONS

| | |
|--------------------|---|
| ABB | American burying beetle |
| ACHP | Advisory Council on Historic Preservation |
| AHTD | Arkansas Highway Transportation Department |
| AMSL | above main sea level |
| AQCRs | Air Quality Control Regions |
| ATWS | additional temporary work space |
| BA | Biological Assessment |
| BACT | best available control technology |
| Bcf/d | billion cubic feet per day |
| BOD | biochemical oxygen demand |
| CAA | Clean Air Act |
| CAAA | Clean Air Act Amendments |
| 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 |
| CRP | Conservation Reserve Program |
| CSC | Connecticut Siting District |
| CWA | Clean Water Act |
| dBA | decibels on the A-weighted scale |
| dbh | diameter at breast height |
| DEGT | Duke Energy Gas Transmission |
| DEIS | Draft Environmental Impact Statement |
| DO | dissolved oxygen |
| DOT | U. S. Department of Transportation |
| ECMR Program | Environmental Compliance Monitoring and Reporting Program |
| EI | Environmental Inspector |
| EIA | Energy Information Administration |
| EIS | Environmental Impact Statement |
| Enterprise | Enterprise Texas Pipeline, L. P. |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| ESD | emergency shut down |
| °F | degrees Fahrenheit |
| FERC or Commission | Federal Energy Regulatory Commission |
| FHWA | Federal Highway Administration |
| FINDS | Facility Index System/Facility Registry System |

ACRONYMS AND ABBREVIATIONS (CONTINUED)

| | |
|-----------------|---|
| FR | Federal Register |
| FSA | Farm Service Agency |
| FWS | U. S. Fish and Wildlife Service |
| gpm | gallons per minute |
| HAP | hazardous air pollutant |
| HCA | high consequence area |
| HDD | horizontal directional drill |
| hp | horsepower |
| HR 3609 | The Pipeline Safety Improvement Act of 2002 |
| kPa | kilopascals |
| LAC | Louisiana Administrative Code |
| LCS | land capability subclass |
| 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} | equivalent sound level |
| LNG | liquefied natural gas |
| LNHP | Louisiana Natural Heritage Program |
| LQG | large quantity generator |
| M/R | Meter/Regulator |
| MACT | Maximum Achievable Control Technology |
| MAOP | maximum allowable operating pressure |
| MATRAS | Mississippi, Arkansas, and Tennessee Regional Aquifer Study |
| MDEQ | Mississippi Department of Environmental Quality |
| MDOT | Mississippi Department of Transportation |
| MEP | Midcontinent Express Pipeline Project |
| MLV | mainline valves |
| MMNS | Mississippi Museum of Natural Science |
| MP | milepost |
| MW | megawatt |
| NAAQS | National Ambient Air Quality Standards |
| NDD | Natural Diversity Database |
| NEPA | National Environmental Policy Act |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NGA | Natural Gas Act |
| NGPL | Natural Gas Pipeline Company of America |
| NGPSA | Natural Gas Pipeline Safety Act |
| NHI | National Heritage Inventory |
| NHP | National Heritage Program |

ACRONYMS AND ABBREVIATIONS (CONTINUED)

| | |
|-------------------|--|
| NHPA | National Historic Preservation Act |
| NNSR | Non-attainment New Source Review |
| NO ₂ | nitrogen dioxide |
| NOA | Notice of Availability |
| NOI | <i>Notice of Intent to Prepare an Environmental Impact Statement, Request for Comments on Environmental Issues</i> |
| NO _x | nitrogen oxide |
| NPAT | Native Prairie Association of Texas |
| 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 |
| NWR | National Wildlife Refuge |
| NYSERDA | New York State Energy Research and Development Authority |
| O ₃ | ozone |
| OAC | Oklahoma Administrative Code |
| OBS | Oklahoma Biological Survey |
| OD | outside diameter |
| ODEQ | Oklahoma Department of Environmental Quality |
| OEP | FERC Office of Energy Projects |
| OMB | Office of Management and Budget |
| ONHI | Oklahoma Natural Heritage Inventory |
| OPS | Office of Pipeline Safety |
| PCB | Polychlorinated biphenyl |
| PCN | Pre-Construction Notification |
| PEM | palustrine emergent |
| PFO | palustrine forested |
| PHMSA | The Pipeline and Hazardous Materials Safety Administration |
| PM ₁₀ | 10 microns particulate matter |
| PM _{2.5} | 2.5 microns particulate matter |
| POW | palustrine open water |
| PSD | Prevention of Significant Deterioration |
| psig | pounds per square inch |
| PSS | palustrine scrub shrub |
| RCRA | Resource Conservation and Recovery Act |

ACRONYMS AND ABBREVIATIONS (CONTINUED)

| | |
|-----------------|---|
| RICE | reciprocating internal combustion engines |
| Secretary | Secretary of the Commission |
| SESH | Southeast Supply Header Project |
| SH | State Highway |
| SI ICE | spark ignition internal combustion engines |
| SIL | significant impact level |
| SIU | Section of Independent Utility |
| SO ₂ | sulfur dioxide |
| SPCC | Spill Prevention, Containment, and Countermeasure |
| SQG | small quantity generator |
| SSA | Sole Source Aquifer |
| SURRG02 | Soil Survey Geographic Information System |
| SWPPP | Stormwater Pollution Preservation Plan |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| Tcf | trillion cubic feet |
| The Companies | Gulf Crossing and Gulf South |
| TNC | The Nature Conservancy |
| TOES | Texas Organization of Endangered Species |
| TPWD | Texas Parks and Wildlife Department |
| tpy | tons per year |
| TREIA | Texas Renewable Energy Industries Association |
| TTC | Trans-Texas Corridor Project |
| TWDB | Texas Water Development Board |
| TWS | temporary work space |
| TxDOT | Texas Department of Transportation |
| USC | United States Code |
| USDA | U. S. Department of Agriculture |
| USDOE | U. S. Department of Energy |
| USFS | U. S. Department of Agriculture Forest Service |
| USFWS | U. S. Fish and Wildlife Service |
| USGS | U. S. Geological Survey |
| UST | underground storage tanks |
| VOCs | volatile organic compounds |
| WMA | Wildlife Management Area |
| WMD | Wetlands Management District |
| WRP | Wetland Reserve Program |
| WWF | World Wildlife Federation |