

TABLE OF CONTENTS

Floridian Natural Gas Storage Project Final Environmental Impact Statement

EXECUTIVE SUMMARY	<i>ES-1</i>
PROPOSED ACTION	ES-1
PUBLIC OUTREACH AND COMMENTS	ES-2
ALTERNATIVES CONSIDERED	ES-3
PROJECT IMPACTS AND MITIGATION.....	ES-4
MAJOR CONCLUSION	ES-6
 1.0 INTRODUCTION	<i>I-1</i>
1.1 PROJECT PURPOSE AND NEED	1-1
1.2 PURPOSE AND SCOPE OF THIS EIS	1-3
1.3 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS.....	1-4
1.4 PUBLIC OUTREACH AND COMMENTS	1-6
 2.0 DESCRIPTION OF THE PROPOSED ACTION	<i>2-1</i>
2.1 PROPOSED FACILITIES.....	2-1
2.1.1 LNG Storage Facility Description	2-1
2.1.2 Pipelines and Aboveground Facilities	2-9
2.2 NONJURISDICTIONAL FACILITIES	2-10
2.3 LAND REQUIREMENTS.....	2-10
2.3.1 LNG Storage Facility	2-10
2.3.2 Pipelines and Aboveground Facilities	2-11
2.4 CONSTRUCTION PROCEDURES.....	2-16
2.4.1 LNG Storage Facility Construction Procedures	2-16
2.4.2 Pipeline and Aboveground Facilities	2-21
2.5 CONSTRUCTION SCHEDULE.....	2-25
2.6 ENVIRONMENTAL COMPLIANCE AND MONITORING	2-26
2.7 OPERATION AND MAINTENANCE.....	2-26
2.7.1 LNG Storage Facility	2-26
2.7.2 Pipelines and Associated Aboveground Facilities	2-27
2.8 SAFETY CONTROLS	2-27
2.8.1 LNG Storage Facility	2-27
2.8.2 Pipelines and Associated Aboveground Facilities	2-31
2.9 FUTURE PLANS AND ABANDONMENT	2-32

TABLE OF CONTENTS (cont.)

3.0	ALTERNATIVES	3-1
3.1	NO ACTION OR POSTPONED ACTION ALTERNATIVES	3-1
3.2	ALTERNATIVE ENERGY SOURCES.....	3-1
3.2.1	Other Non-Renewable Fuels.....	3-2
3.2.2	Renewable Energy Sources.....	3-3
3.2.1	Energy Conservation.....	3-4
3.2.2	Renewable Energy Combined with Energy Conservation....	3-4
3.2.1	Conclusions Regarding Alternative Energy Sources.....	3-5
3.3	STORAGE FACILITY ALTERNATIVES	3-5
3.3.1	System Alternatives	3-5
3.3.2	LNG Storage Facility Site Alternatives	3-8
3.4	PIPELINE AND ABOVEGROUND FACILITY ALTERNATIVES.....	3-12
3.4.1	Pipeline Route Alternatives	3-12
3.4.2	Aboveground Facility Alternatives.....	3-15
3.4.3	Hydrotest Water Pipeline Alternatives	3-15
4.0	ENVIRONMENTAL ANALYSIS	4-1
4.1	GEOLOGY	4-1
4.1.1	Geological Setting.....	4-1
4.1.2	Seismic Design Requirements	4-1
4.1.3	FERC Seismic Design Guidelines for LNG Facilities.....	4-2
4.1.4	Geological Hazards, Site-Specific Geotechnical Investigation and Seismic Hazard Analysis.....	4-3
4.1.5	Extractive Resources.....	4-7
4.1.6	Paleontological Resources	4-7
4.2	SOILS	4-8
4.2.1	Soil Composition and Limitations	4-8
4.2.2	Contaminated Soils	4-11
4.2.3	Mitigation.....	4-11
4.3	WATER RESOURCES	4-12
4.3.1	Groundwater	4-12
4.3.2	Surface Water Resources	4-14
4.4	VEGETATION	4-17
4.4.1	Wetlands	4-17
4.4.2	Upland Vegetation	4-22
4.5	WILDLIFE AND AQUATIC SPECIES	4-26
4.5.1	Wildlife	4-26
4.5.2	Aquatic Resources	4-30

TABLE OF CONTENTS (cont.)

4.6	THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES	4-31
4.6.1	Federally Listed Threatened and Endangered Species	4-31
4.6.2	State-listed Species	4-36
4.7	LAND USE, RECREATION, AND VISUAL RESOURCES	4-38
4.7.1	Land Use	4-38
4.7.2	Residences and Structures.....	4-43
4.7.3	Recreation and Special Interest Areas	4-43
4.7.4	Coastal Zone Management	4-43
4.7.5	Hazardous Waste Sites.....	4-43
4.7.6	Visual Resources.....	4-44
4.8	SOCIOECONOMICS	4-47
4.8.1	Population	4-47
4.8.2	Economy and Employment.....	4-49
4.8.3	Housing and Property Values	4-50
4.8.4	Government Revenues from the Project	4-50
4.8.5	Public Services.....	4-51
4.8.6	Environmental Justice.....	4-51
4.9	TRANSPORTATION.....	4-54
4.10	CULTURAL RESOURCES	4-56
4.10.1	Results of Cultural Resources Surveys.....	4-57
4.10.2	Native American Consultation.....	4-57
4.10.3	Compliance with NHPA	4-57
4.11	AIR QUALITY AND NOISE	4-58
4.11.1	Air Quality	4-58
4.11.2	Noise Quality	4-66
4.12	RELIABILITY AND SAFETY	4-71
4.12.1	LNG Hazards	4-72
4.12.2	Front-End Engineering Design Review	4-74
4.12.3	Siting Requirements – Thermal and Dispersion Exclusion Zones.....	4-83
4.12.4	LNG and NGL Truck Operations	4-97
4.12.5	Emergency Response and Evacuation Planning	4-98
4.12.6	Terrorism and Security Issues.....	4-99
4.12.7	Natural Gas Pipelines.....	4-101
4.13	CUMULATIVE IMPACTS.....	4-103
4.13.1	Potentially Cumulatively-Affected Resources.....	4-104
4.13.2	Geographic Scope and Temporal Scale	4-104
4.13.3	Other Actions Potentially Contributing to Cumulative Impacts.....	4-104
4.13.4	Resource-Specific Cumulative Impacts Analysis.....	4-106
4.13.5	Conclusions about Cumulative Impacts.....	4-111

TABLE OF CONTENTS (cont.)

5.0	CONCLUSIONS AND RECOMMENDATIONS	5-1
5.1	SUMMARY OF THE STAFF'S ENVIRONMENTAL ANALYSIS.....	5-1
5.1.1	Geology.....	5-1
5.1.2	Soils.....	5-1
5.1.3	Water Resources	5-2
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 Visual Resources	5-5
5.1.9	Socioeconomics	5-5
5.1.10	Transportation.....	5-6
5.1.11	Cultural Resources	5-6
5.1.12	Air Quality and Noise	5-7
5.1.13	Reliability and Safety.....	5-7
5.1.14	Alternatives	5-8
5.2	FERC STAFF'S RECOMMENDED MITIGATION.....	5-9

LIST OF APPENDICES

APPENDIX A	Final Environmental Impact Statement Environmental Mailing List
APPENDIX B	References
APPENDIX C	List of Preparers
APPENDIX D	Comments on the Draft Environmental Impact Statement and Responses

LIST OF TABLES

Table	Title	Page No.
1.3-1	Permits and Approvals	1-4
2.3-1	Locations and Land Requirements for the Proposed Pipeline Facilities	2-12
2.8-1	Federal Siting and Design Requirements for LNG Facilities	2-28
3.3-1	Comparison of Alternative LNG Storage Facility Sites	3-9
3.4-1	Comparison of Pipeline Route Alternatives	3-13
4.2-1	Soils at the FGS Project	4-9
4.4-1	Existing Project Vegetative Cover	4-17
4.4-2	Temporary Wetland Impacts from Pipeline Construction	4-21
4.4-3	Upland Vegetative Cover Types Occurring in the Project Area	4-23
4.4-4	Vegetation Communities Potentially Affected by the Project	4-24
4.6-1	Federally-Listed Species Potentially Occurring in the Project Area	4-32
4.6-2	State-Listed Species Potentially Occurring in the Project Area	4-36
4.7-1	Planned Development in the Project Area	4-39
4.7-2	Land Cover Potentially Affected by LNG Storage Facility Development	4-41
4.7-3	Land Cover Potentially Affected by Pipeline and Aboveground Facilities	4-42
4.8-1	Existing Population in the Project Area of Influence	4-47
4.8-2	Income and Unemployment Data for Area of Influence	4-49
4.8-3	Rental Units in Martin County	4-50
4.8-4	Existing Medical, Police, Education, and Fire Full-Time Equivalents in the Area of Influence	4-51
4.8-5	Racial/Ethnic Characteristics of the Area Surrounding the FGS Storage Project	4-52
4.11-1	National and State Ambient Air Quality Standards	4-59
4.11-2	Summary of Air Emissions from Project Construction	4-61
4.11-3	Summary of Air Emissions from Project Operations	4-62
4.11-4	Summary of Greenhouse Gas Emissions from Project Construction	4-65
4.11-5	Summary of Greenhouse Gas Emissions from Project Operations	4-66
4.11-6	Existing Sound Levels and Noise Limits	4-68
4.11-7	Predicted Construction Noise Impacts for the FGS Project	4-69
4.11-8	Project Operating Noise Impacts for the FGS Project	4-70
4.12-1	Impoundment Areas	4-87
4.12-2	Thermal Radiation Exclusion Zones	4-91
4.13-1	Summary of Potential Cumulative Effects of the Proposed Project	4-105
4.13-2	Potential Future Actions in the FGS Project Area	4-106
4.13-3	Cumulative Existing Criteria Air Pollutant Emissions in the Vicinity of the Proposed Project	4-110

LIST OF FIGURES

Figure	Title	Page No.
1.0-1	General Location Map	1-2
2.1-1	Project Facility Location Map	2-2
2.1-2	Project Location Map.....	2-3
2.1-3	LNG Storage Facility Plot Plan	2-5
2.1-4	Typical Full Containment Storage Tank.....	2-6
2.3-1	Proposed Pipeline Right-of-Way Section	2-14
2.3-2	Proposed Wetland Crossing Pipeline Right-of-Way Section	2-15
2.4-1	Hydrotest Pipeline Route Location Map.....	2-19
3.3-1	Alternative LNG Storage Facility Sites Location Map.....	3-10
3.4-1	Alternative Pipeline Routes	3-14
4.4-1	Location of Project Wetlands.....	4-19
4.7-1	Planned Future Project Area Land Use Map	4-40
4.7-2	LNG Storage Facility Visual Simulation.....	4-46
4.8-1	US Census Track Boundaries	4-48
4.12-1	Thermal Radiation Exclusion Zones.....	4-90
4.12-2	Vapor Dispersion Exclusion Zones	4-93
4.13-1	Current and Potential Future Actions in the Project Area	4-107

ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
µg/m ³	Micrograms per cubic meters
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effect
AQCR	Air Quality Control Region
ASME	American Society of Mechanical Engineers
BACT	Best Available Control Technology
Bcf	Billion cubic feet
BOG	Boil-off gas
Btu	British thermal units
Btu/ft ² -hr	British thermal units per square foot per hour
CAA	Clean Air Act
CCD	Census County Division
CDP	Census Designated Place
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFA	Core foraging area
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO ₂	carbon dioxide
CO _{2-e}	carbon dioxide equivalents
COE	U.S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CZMA	Coastal Zone Management Act
dBA	Decibels on the A-weighted scale
DCS	Distributed Control System
DE	Design Earthquake
DEGADIS	Dense gas dispersion model
DSM	Demand-Side Management
DOT	U.S. Department of Transportation
DOT-OPS	U.S. Department of Transportation Office of Pipeline Safety
E	Endangered species
EI	Environmental Inspector
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERP	Environmental Review Permit
ESA	Endangered Species Act of 1973
ESD	Emergency Shutdown
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FDS	Fire Dynamics Simulation
FEED	Front-end Engineering Design
FERC	Federal Energy Regulatory Commission
FFWCC	Florida Fish and Wildlife Conservation Commission

FGS	Floridian Natural Gas Storage Company, LLC
FGT	Florida Gas Transmission
FLUCFCS	Florida Land Use, Cover, and Farms Classification System
FPL	Florida Power & Light Company
fps	feet per second
FWS	U.S. Fish and Wildlife Service
GHG	Greenhouse gas
gpm	gallons per minute
HAPs	Hazardous air pollutants
HCA	High Consequence Area
hp	horsepower
L _{Aeq}	Average equivalent sound level (hourly)
L _d	Day sound level
L _{dn}	Day-night sound level
L _{eq(24)}	24-hour equivalent sound level
L _n	Night sound level
LNG	Liquefied natural gas
M&R	Metering and regulation
m ³	Cubic meters
MCE	Maximum Considered Earthquake
MMBtu/hr	Million British thermal units per hour
MMscfd	Million standard cubic feet per day
MP	Milepost
mph	miles per hour
MR	mixed refrigerant
MW	Megawatt
n/a	Not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NGL	Natural gas liquids
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Places Act of 1966
NO ₂	Nitrogen dioxide
NOI	Notice of Intent
NO _x	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSA	Noise Sensitive Area
NSPS	New Source Performance Standards
O ₃	Ozone
OBE	Operating Basis Earthquake
OEP	Office of Energy Projects
PAMP	Preserve Area Management Plan
PCBs	Polychlorinated biphenyls

PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	Upland Erosion Control, Revegetation, and Maintenance Plan
PM	Particulate matter
PM ₁₀	Particulate matter less than 10 microns in diameter
PM _{2.5}	Particulate matter less than 2.5 microns in diameter
ppm	Parts per million
Procedures	Wetland and Waterbody Construction and Mitigation Procedures
PSC	Public Service Commission
PSD	Prevention of Significant Deterioration
psig	Pounds per square inch gauge
PVC	Polyvinyl Chloride
ROW	Right-of-way
RPT	Rapid phase transition
S/A	Similarity of Appearance
SC	Species of Concern
SFWMD	South Florida Water Management District
SHPO	State Historic Preservation Office or Officer
SIS	Safe Instrument System
SO ₂	Sulfur dioxide
SPCC	Spill Prevention, Control and Countermeasure
SR	State Route
SSE	Safe Shutdown Earthquake
SVA	Security Vulnerability Assessment
SWPP	Stormwater Pollution Prevention
THPO	Tribal Historic Preservation Officer
TNT	trinitrotoluene
tpy	Tons per year
USC	United States Code
USCG	U.S. Coast Guard
USGS	U.S. Geological Survey
VOCs	Volatile organic compounds
WEG	Water ethylene glycol