ALTERNATIVES

SECTION 3

3.0 ALTERNATIVES

We have evaluated a number of alternatives to the Elba III Project to determine whether any would be reasonable and environmentally preferable to the proposed action. Alternatives described in the following sections include the no-action or postponed-action alternatives, Terminal site and system alternatives, pipeline system and route alternatives, and compressor station site alternatives.

Southern LNG and EEC state that the Project would help to meet the growing demand for importation and delivery of LNG to domestic markets, specifically Georgia and South Carolina interstate natural gas markets, and other markets in the southeastern and eastern U.S. Southern LNG and EEC also state that the proposed project has the following specific objectives:

- to provide direct access to a very reliable source of LNG supply for the southeastern and eastern U.S. markets to supplement traditional domestic supplies;
- to provide a competitively-priced natural gas transportation infrastructure which would attract incremental global LNG supplies into the southeastern and eastern U.S. natural gas market to help meet the growing demand for clean energy;
- to provide new pipeline transportation services under long-term firm agreements with BG LNG Services LLC and Shell NA LNG LLC; and
- to provide firm interstate natural gas pipeline capacity that can move gas from the Elba Island import terminal to major pipeline interconnects with (1) the existing Southern pipeline system in its Zone 3 near the end of its South Main Line, (2) the existing Transco pipeline system at the end of its Zone 4, and (3) the existing Transco pipeline system at the beginning of its Zone 5.

Our evaluation of reasonable alternatives is based on whether these alternatives (1) meet the project objectives identified by Southern LNG and EEC; (2) would be environmentally preferable; and (3) are technically and economically feasible.

Overall, the FERC has three courses of action in processing an application. It may:

- deny the proposal;
- postpone action pending further study; or
- authorize the proposal, either with or without conditions.

The Coast Guard alternatives include:

- issue a negative LOR (an LOR finding the waterway unsuitable for an increase in LNG marine traffic);
- postpone issuance of an LOR; or
- issue an LOR with conditions.

3.1 NO ACTION OR POSTPONED ACTION

If the Commission denies the proposal (the no-action alternative), the short- and long-term environmental impacts identified in section 4.0 of this EIS would not occur. If the Commission

postpones action on the application, the environmental impacts identified in section 4.0 of this draft EIS would be delayed, or if the Applicants decided not to pursue the Project, would not occur.

If the Commission selects the No Action Alternative, the objectives of the proposed project would not be met, and Southern LNG and EEC would not be able to provide the proposed increased capacity of LNG import, storage, vaporization, and transportation services to its shippers. If action on the project is postponed, it could have the same result as the No Action Alternative, *i.e.*, the objective of providing direct access to imported LNG supplies for the southeastern and eastern U.S. market would be jeopardized and could result in these supplies being marketed at other destinations around the world.

Public comments were received regarding utilization of existing facilities and/or non-natural gas technologies to meet this Project's purpose and need in lieu of the proposed action, and all of these were evaluated. The demand for energy in the U.S. is predicted to increase and domestic natural gas supplies are declining, especially Gulf Coast sources on which both Transco and Southern rely. As a result, natural gas customers in the areas proposed to be served by the Elba III Project may have fewer and potentially more expensive options for obtaining natural gas supplies in the near future. It is possible that existing natural gas infrastructure supplying natural gas to the market area could be developed in other ways unforeseen at this point, including the further development of natural gas sources in North America and construction of associated pipeline projects. Alternatively, potential customers of natural gas could select other available energy alternatives to compensate for the reduced availability of natural gas. However, increased use of alternative fossil fuels, such as oil or coal, generally would result in higher emission rates of nitrogen oxide (NO_x) and sulfur dioxide (SO_2) than would be the case with natural gas.

To comply with current air emission regulations, emission control technologies could be required that could limit the economic viability of projects using alternative fuels. Another option – the development of renewable sources of energy, such as wind and solar – would result in lower emission rates for NO_x and SO_2 than would be the case with alternative hydrocarbon-based fuels. However, while development of renewable energy sources as well as energy conservation can play a critical role in the future of the U.S. energy sector, growth projections continue to indicate that the demand for energy, and specifically natural gas, will far exceed energy provided through renewable sources or savings resulting from energy conservation. Ultimately, it is purely speculative to predict the resulting actions that would be taken by the end users if the natural gas supplied by the Project were not available or the associated direct and indirect environmental impacts of these actions.

Coast Guard Alternatives

For the Elba III Project, the range of reasonable alternatives for the Coast Guard includes the issuing a negative LOR, postponing issuance of an LOR, and issuing an LOR with certain conditions.

The Coast Guard's preferred alternative for the Project is the issuance of an LOR finding the Savannah River/territorial seas waterway suitable for the increase in LNG marine traffic associated with the proposed expansion of the Elba Island import terminal facility, with conditions. Conditions on the existing LOR (for current LNG vessel transit) would remain in effect/be reiterated in the LOR for the expansion and the Coast Guard is proposing to modify or add to those conditions. The conditions on the current LOR are as follows:

- LNG operations in the port must follow the Coast Guard approved LNG Vessel Transit and Emergency Plan;
- all LNG operations must be in accordance with the Regulated Navigation Area outlined in 33 CFR 165.756; and
- the turning basing adjacent to the facility berth must be dredged.

In the Coast Guard's revised WSR, issued June 18, 2007, the COTP Savannah preliminarily determined (contingent on completed NEPA analyses) that the waterway is suitable for the increase in LNG marine traffic associated with the proposed project. Conditions proposed for addition to the Elba III LOR include:

- appropriate resources must be available to implement the required security measures outlined in the WSA or the most current Coast Guard policy on Ports, Waterways, and Coastal Security; and
- throughout the period of construction and until such time when the LNG facility goes into operation, the applicant must conduct an annual review of the WSA to identify changes that have occurred to the project scope and/or port community since submission of the initial WSA. The applicant must provide a written statement to the COTP annually coinciding with the date of the WSR attesting as to whether or not any changes have occurred. If this annual review identifies changes to the project and/or port that may invalidate portions of the WSA, the applicant must describe the changes in detail and describe any actions necessary to update the WSA. If updating the WSA is required, the applicant must include a timeline for actions to take place. Prior to the start of operations, the applicant must conduct a final review of the WSA and submit documentation to the COTP attesting that the most recent WSA on file with the COTP is current and up to date. Documentation of the final review must be submitted to the COTP between 30 and 60 days prior to the start of operations.

The Coast Guard alternative of issuing a negative LOR by finding the waterway unsuitable for the proposed increase in LNG marine traffic would be similar to the No Action Alternative described above and the discussion regarding the potential for customers selecting other energy sources. A negative LOR would prevent the increase in the number and size of LNG vessels from transiting the waterway and the applicants would not be able to meet the project objective of providing increased LNG import and storage services. This alternative would avoid the impacts identified in section 4.0 of this EIS for the proposed action but the impacts associated with the current LNG marine traffic would continue.

If the Coast Guard postpones issuance of an LOR pending further analysis or study, the effect is expected to be similar to FERC postponing its action. That is, although it is speculative to

predict the resulting effects, postponing issuance of an LOR for the expansion could have the same result as the No Action Alternative because it could result in the LNG supplies going to other destinations around the world and customers would be required to seek other energy sources.

Coast Guard Alternatives Eliminated from Analysis

In some cases, a reasonable alternative for the Coast Guard is the issuance of an LOR without conditions. On this project, this alternative is deemed not reasonable and was eliminated from consideration because it did not meet the Coast Guard's purpose and need for issuance of an LOR – ensuring adequate safey of LNG vessel transit. See section 1.2.2 for a description of the Coast Guard's regulatory authority.

A possible additional alternative for the Coast Guard would be to find the waterway suitable for LNG marine traffic only if modifications were made to the applicant's proposal, such as evaluating different routes for the vessels to take to the facility or the imposition of seasonal restrictions and/or daylight only restrictions on vessel traffic. Different waterway routes were eliminated as alternatives from further analysis because the Elba terminal is an existing LNG import facility and all LNG marine traffic must use the existing marine transit route to reach the site of the Terminal Expansion. (See section 3.2 for a discussion of LNG Terminal Facility Alternatives.) Seasonal and/or daylight only restrictions were not deemed necessary for adequate security or protection of environmental resources because this facility is an existing operating import terminal. The proposed action is to increase the frequency and size of LNG vessels.

3.2 LNG TERMINAL FACILITY ALTERNATIVES

3.2.1 Existing LNG Import Terminal Systems

Our analysis of LNG facility alternatives includes the use of existing LNG import and storage facilities at other existing ports in the southeastern and eastern U.S. Although system alternatives could make it unnecessary to construct all or part of the Elba III Project, including the Terminal Expansion, significant modifications or additions to existing facilities may be required that would result in environmental impacts that are greater, equal to, or less than that of the proposed action.

Public concern was expressed as to the location of the proposed Terminal expansion facilities and the relative location to the market that the Project would serve. The identified markets include three existing gas-fired electric power plants (Effingham, McIntosh, and Rainey) in Georgia, and the Georgia and South Carolina interstate natural gas markets. Currently, two LNG import terminals exist that provide unloading, storage, and delivery within the southeastern U.S. in addition to Elba Island. These facilities are Dominion's terminal at Cove Point, Maryland, and Trunkline LNG's terminal on the Louisiana gulf coast (see figure 3.2-1). As discussed below, both Dominion and Trunkline LNG have recently expanded the terminals to help meet the nation's need for additional natural gas.

Dominion Cove Point

As a result of previous expansions, Cove Point presently has five LNG storage tanks totaling 2.35 million barrels (4 tanks at 375,000 bbl and 1 tank at 850,000 bbl) and a marine pier which can accommodate two LNG vessels unloading simultaneously. Dominion is presently constructing facilities to increase the Cove Point import terminal's daily output capacity by 0.8 Bcfd, from 1.0 to 1.8 Bcfd. Construction of two new 1-million-barrel LNG storage tanks will increase storage capacity by approximately 6.8 Bcf. Dominion will also construct downstream pipeline looping to facilitate transmission of additional natural gas supplies from the expanded terminal.

The Dominion Cove Point Project is not considered a viable alternative to the proposed expansion at Elba Island because:

- its storage and send-out capacity (including the expansion currently under construction) is allocated to existing customers; and
- when service associated with its current expansion commences, there will be no further room for additional tanks, infrastructure, or berthing facilities.

Trunkline LNG Lake Charles

The Trunkline LNG import terminal is located on the Gulf Coast, on the northeast side of Calcasieu Lake in Calcasieu Parish, Louisiana. The facility is owned by Southern Union and operated by Trunkline LNG Company LLC. The Commission has approved several expansions of this import terminal. The terminal currently has two marine LNG vessel berths and total LNG storage capacity of 2.68 million barrels.

With completion of its current expansion, the Trunkline LNG import terminal has almost tripled its send-out capacity and significantly increased its storage capability. The recent expansions have increased the sustained daily send-out capacity of the terminal from 630 MMcfd to 1.2 Bcfd and increased storage capacity to 9.3 Bcf. All the capacity at the Trunkline LNG import terminal is committed to firm contracts.

After the expansion work is completed, the Lake Charles Terminal would not have adequate space within its 125-acre fenced site to accommodate the storage tanks and send-out facilities associated with the delivery volumes for the proposed Terminal Expansion. Because the terminal is 100 percent committed, further expansion outside the existing fence line would be needed. Expansion potential at this site is limited by existing or planned industrial facilities, so the Lake Charles Terminal cannot be considered a practical alternative.

Existing Facility Alternative Conclusions

Southern LNG is proposing a facility that would have the ability to unload, store, and deliver imported LNG directly to the southeastern and eastern U.S. markets. No other existing LNG facility is in reasonable proximity to the southeast and eastern coasts of the U.S. to perform this

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Figure 3.2-1
Existing LNG System Terminal Alternatives

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service. Because the capacity of each of the existing facilities discussed above is fully committed, use of one of the existing LNG terminal facilities to meet the proposed Project objectives would not be possible without significant expansion and/or modification to their unloading, storage, and delivery systems. Because of their physical site constraints, significant expansion or modifications to one or more of these existing LNG import facilities is not a reasonable alternative to the proposed Terminal Expansion Project, and we have eliminated them from further consideration.

3.2.2 LNG Terminal Site Alternatives

We examined three options for siting the proposed LNG import terminal at alternative locations. Our process considered environmental, engineering, economic, safety and regulatory factors, keeping in mind the stated objectives of the Project. Within the southeastern region of the U.S., alternative sites could be existing vessel unloading sites suitable for conversion to an LNG terminal, new land sites, or new offshore sites.

Offsite Storage Tank Locations

Public comments were received requesting the evaluation of locating the proposed storage tanks inland at an existing industrial site on Interstate 16 just northwest of Interstate 95 instead of at the existing terminal. The Terminal is located on the south side of the shipping channel that leads to the Port of Savannah, and the alternative inland site is approximately 5 miles west of the Terminal. Siting the proposed LNG storage tanks off-site from the existing Terminal would require cryogenic pipeline(s) from the receiving facilities at the Terminal to the off-site location. Construction and operation of off-site cryogenic pipeline(s) and LNG storage tanks would result in additional impacts to the environment, urban centers, numerous additional landowners, and increased operational considerations for cryogenic pipelines in an urban setting. The technology required for a multi-mile cryogenic pipeline has not been demonstrated at this scale. As such, its routine operation would be speculative and extremely expensive. Additionally, the alternative site would require storage of large quantities of LNG at more than one location within/near the City of Savannah, resulting in additional concerns regarding operation and security. As a result, we believe that locating the proposed LNG storage tanks at a distant off-terminal site is not a reasonable or feasible alternative, and would result in greater potential environmental impacts.

Port of Savannah

Potential alternative sites within the Port of Savannah could include existing industrial sites suitable for conversion to an LNG terminal, such as an idle refinery, a liquids-handling terminal site, or a new land site. However, use of any such site would have to comply with the Coast Guard's requirement to maintain a safe distance between unloading LNG vessels and other vessel traffic in the Savannah River channel. Currently there are no existing refinery- or liquids-handling terminal sites along the Savannah River that would be suitable for conversion to an LNG import and delivery terminal that would comply with the Coast Guard's requirement.

Even if an alternative site were available within the Port of Savannah, we anticipate it would have comparatively increased adverse environmental effects associated with development of a

new terminal site and the construction and operation of a natural gas send-out pipeline than would the proposed Elba III Project.

Southeastern Region of the U.S.

Potential alternative sites within the southeastern region of the U.S. would require on-shore land suitable for construction and operation of a new LNG import facility and direct ocean access. Such sites would ideally be located in relative proximity to interstate natural gas pipeline transmission systems to support development of the new terminal. Depending on the location of the new terminal site, some amount of new pipeline would have to be constructed to meet the objectives of the Project. Both of these factors would have a direct bearing on the associated environmental impacts.

The only potential alternative on-shore site that has been identified for an LNG import terminal on the southeastern coast of the U.S. is located on Radio Island, North Carolina. To partially meet one of the project objectives, construction of a new LNG facility at this site would require about 200 miles of new, large-diameter, greenfield natural gas pipeline in North Carolina to an interconnect with the Transco Pipeline System in Transco Zone 5. If the Project customers would accept gas deliveries at a point other than "the beginning of Zone 5" (where the Transco system crosses the Savannah River from Georgia into South Carolina), deliveries to Zone 4 could probably be made by a "backhaul" arrangement[1]. However, the incremental transportation charge associated with such an arrangement would be inconsistent with the Project objectives. Further, such an arrangement would not satisfy the Project objectives of providing deliveries to Southern near the end of its South Main Line in Zone 3 or to the Effingham and McIntosh Power Plants.

Construction and operation of an entirely new LNG facility (even without the new pipeline and the tariff issue) would result in substantially more environmental impact than that associated with the proposed Terminal Expansion. As a result, and in view of the new pipeline and incremental transportation charge issues, this alternative was eliminated from further consideration.

Conclusions of LNG Site Alternatives

The proper location of a terminal would be required to ensure flexibility in the delivery of the natural gas to a variety of markets. The Elba III Project would interconnect with existing pipeline facilities (Southern's Zone 3) and require a relatively direct route for new greenfield facilities to interconnect with Transco's Zones 4 and 5. Construction and operation of an alternative terminal site would require new disturbance of on-shore and marine resources and a substantial length of new, large-diameter pipeline, with associated environmental impacts.

[1] A backhaul arrangement is only possible when gas destined for upstream customers is introduced at a downstream point on the system. For example, gas traveling on Transco's system from Alabama and destined for customers in North Carolina could be delivered instead to customers in Georgia (Transco Zone 4), while gas introduced from Radio Island is substituted for downstream deliveries to North Carolina (Transco Zone 5).

While other potential LNG terminal sites (both onshore and offshore) likely exist in the southeastern U.S. (including the Gulf Coast region of Florida), Southern LNG would not be able to acquire or develop such sites in time to meet its contractual obligations. Further, development of an entirely new import terminal when the Elba Island facility is already established, operational, and easily expandable, would be a questionable economic decision. We conclude that development of a new alternative site in proximity to Elba Island or in the southeastern U.S. region, and associated pipeline facilities that would be required, is not an advantageous alternative to the proposed action, and therefore have eliminated alternative onshore terminal sites from further consideration.

3.2.3 Offshore Terminal Alternatives

Public comments were received that raised concern about the safety of LNG vessels navigating the Savannah River, and requested analysis of offshore LNG facility alternatives. In response to this comment, we examined the available offshore alternatives.

There are four existing onshore and one existing offshore LNG import terminals in the U.S. The onshore terminals are located at shoreline marine transfer terminals with onshore LNG storage and vaporization facilities. Numerous companies are either proposing or evaluating methods of importing LNG into the U.S. through the use of deepwater ports that would, potentially, avoid many of the perceived environmental and safety issues associated with onshore LNG facilities. Terminals sited in federal waters fall under the Deepwater Port Act of 1974, and as amended by the Maritime Transportation Security Act of 2002 (which provided jurisdiction for natural gas). Deepwater ports with either a fixed or floating structure (other than a vessel) or a group of structures that are located off the coast of the U.S. and are used as a port or terminal for the transportation, storage, and further handling of oil or natural gas. This legislation requires that the DOT (Maritime Administration) and the Coast Guard regulate the licensing, siting, construction, and operation of deepwater ports for natural gas. The FERC would cooperate with the Coast Guard on environmental review for any land-based pipelines associated with these offshore facilities.

Only one offshore LNG import facility has been completed in the U.S. (the Energy Bridge Project). Currently, additional offshore LNG terminals have been proposed and are under review in the U.S., Australia, West Africa, Taiwan, and Italy. The four main offshore technologies under development include:

- regasification vessels where vaporization equipment is installed on LNG vessels and the LNG vessels are offloaded to a pipeline via a floating buoy and riser system;
- gravity based structures (GBS) where LNG storage tanks, offloading, and vaporization facilities are placed on platforms with foundations that are anchored directly to the seafloor;
- reuse of existing platforms for storage and vaporization facilities; and
- floating storage and regasification units (FSRU) where storage tanks, offloading, and vaporization facilities are placed on a floating structure (or vessel) that is moored to the seafloor.

Calypso LNG LLC has announced the development of a deepwater port project near Fort Lauderdale, Florida that would include both a floating buoy and riser system terminal and a semi-permanently moored FSRU-like vessel. This project would serve Florida markets and if approved and constructed would not serve the market proposed for the Project.

Typical floating buoy and riser system terminals do not have the capacity to store LNG. The lack of storage severely limits this technology for providing base load natural gas supply to the region. To ensure that a continuous supply of gas would be provided to the region, use of a floating buoy and riser system LNG terminal would require two or three unloading buoys to allow for the departure/arrival of a regasification vessel while another regasification vessel is unloading. During severe weather, particularly in the Atlantic Ocean, the potential for periodic interruptions of service when the regasification vessels are unable to berth and unload natural gas into the riser significantly reduces the reliability of this alternative. Given these limitations, we have eliminated this alternative from further consideration.

To accommodate LNG vessels, a GBS-based LNG terminal would need to be installed where water depth is at least 50 feet. Because the GBS must extend above the water, the maximum practicable water depth for a facility of this type would be approximately 100 feet. As water depth increases beyond 100 feet, factors such as structure size and geotechnical constraints generally limit the practicability of a GBS-based terminal.

GBSs would be constructed at a specialized onshore construction facility called a graving dock. Graving docks generally are established adjacent to a channel of sufficient depth to float the GBS once the construction is complete. In most cases, sheet piling or a similar type of barrier is installed to block water from the channel, and an area is excavated to accommodate the concrete forms required to construct the structure. In some cases, more than one graving dock is constructed to allow concurrent construction of all structures associated with the terminal. After the GBS is constructed in the graving dock, the barrier would be removed and the GBS floated and towed to the terminal location. Here, the GBS would be allowed to sink to the sea bottom. For most potential sites for graving docks in the region, the impacts associated with construction of a GBS would be substantially greater than those associated with the modest modifications proposed by the Terminal Expansion. Based on anticipated impacts, we eliminated the GBS technology from further consideration.

This analysis addresses the two remaining offshore technologies for unloading LNG to meet the needs of the Project:

- an offshore unloading terminal with connecting cryogenic pipeline; and
- an offshore unloading and regasification terminal with connecting natural gas pipeline.

We requested that Southern LNG provide input regarding the design of facilities that would be required to interconnect an offshore facility with the existing facilities at Elba Island, and associated cost estimates for construction of offshore alternatives. Such offshore terminal facilities would be required to be sited in areas away from shipping fairways and operating oil

and gas platforms, and include a safety buffer zone to preclude commercial or recreational fishing.

For both offshore alternatives, the analysis assumed that the offshore terminal would be located a sufficient distance at sea (about 20 miles from the existing terminal) such that the platform would be only minimally visible, if visible at all, from the shores of Hilton Head Island, South Carolina, and Tybee Island, Georgia. We further assumed that the associated interconnect pipeline(s) would extend westward from the offshore unloading terminal, through federal and state waters, across the onshore lands of South Carolina's Jasper County, under the Savannah River channel, to the existing Elba Island Terminal. Both offshore alternatives would be located as depicted in figure 3.2-2.

Southern LNG provided estimated costs and mileage of offshore alternative facilities compared to the equivalent portion of the proposed Terminal Expansion facilities. Southern LNG provided an analysis of the modifications at the existing Elba Island onshore berthing facility that are summarized in table 3.2-1, as well as a comparison of the estimated environmental impacts of the offshore alternatives and the proposed modifications at the berthing facility provided in table 3.2-2.

Offshore Unloading Terminal Alternative

An alternative to the proposed modifications to existing berthing facilities is an offshore unloading platform with twin cryogenic pipelines connecting to the existing Elba Island facility where the proposed Elba III storage and vaporization facilities would be located. The unloading platform would be capable of offloading two LNG vessels simultaneously to consistently meet the need for 900 MMcfd of baseload deliverability. The estimated cost for an Offshore Offloading Terminal would be approximately $426,000,000.

The cost estimates in table 3.2-1 exclude expenses related to drilling, boring and/or tunneling the entire length of the approximately 20-mile cryogenic pipeline. Utilizing HDD techniques for some onshore segments would mitigate some of these impacts; however the extended length of onshore construction through Jasper County, South Carolina, would presumably involve earth disturbance through trenching and pipe laying construction techniques, which would impose other environmental impacts related to vegetation removal, turbidity, and sedimentation. The estimate installed cost of the twin 20-mile-long connecting pipelines would be $680,000,000. Also, the cryogenic pipeline would require a vacuum jacket or special insulted wrapping which is unproven for this application.

Modifying the existing berths at Elba Island as proposed would confine construction and operation to a limited area already dedicated to LNG operations, while constructing an unloading platform and cryogenic pipeline for the Offshore Unloading Terminal Alternative would impact approximately 20 miles of navigable rivers, open water, coastal marshlands, and sea beds. Total temporary and permanent impacts to resources for this alternative are nearly eight times and two and a half times that of the proposed action, respectively. Additionally, the total estimated cost for this alternative is more than two and a half times that of the proposed action.

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Figure 3.2-2
Offshore LNG Terminal Alternative Site

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TABLE 3.2-1

Engineering and Economic Comparison of the Proposed Terminal Expansion Project to Offshore Terminal Alternatives

	Offshore Unloading Terminal Alternative (Cryogenic Pipe and Unloading Platform)	**Offshore Regasification Terminal Alternative (Natural Gas Pipe and Unloading Vessel)**	**Terminal Expansion Project (Berth Modification)**
Facilities Required			
Offshore Structure Type	Fixed Platform	Floating	No offshore structure (Land-Based)
Pipeline Type	Two - Cryogenic (42-inch Outside Diameter)	Natural Gas (42-inch Outside Diameter)	No Pipeline
Pipeline Length (miles)	20	20	0
Terminal facilities	Unloading terminal offshore, LNG storage tanks, regasification, and auxiliary facilities onshore at Elba Island.	Floating LNG unloading, storage, and regasification unit offshore. Measuring and receiving facilities onshore at Elba Island.	LNG unloading, storage tanks, regasification, measuring, and auxiliary facilities onshore at Elba Island Terminal.
Pipeline Cost			
Pipeline cost/mile:	$34,000,000	$4,000,000	$0.00
Material cost/mile	$16,800,000	$1,200,000	$0.00
Installation cost/mile	$17,200,000	$2,800,000	$0.00
Total pipeline cost	$680,000,000	$80,000,000	$0.00
Terminal Facilities Cost			
Material	$146,000,000	$315,000,000	$160,000,000
Installation	$280,000,000	$385,000,000	$270,000,000
Total Terminal Facilities Cost	$426,000,000	$700,000,000	$430,000,000
Total Project Cost	$1,106,000,000	$780,000,000	$430,000,000
Comments	Because the feasibility of the concept remains unproven, particularly with respect to cryogenic pipe insulation, and because the specifics of suitable materials are unknown, the above cost estimates should be interpreted as “at least” figures, with the actual costs increasing with time until commercial availability and more testing yields more stringent design specifications.	The technology for offshore storage and regasification at this scale would require a significant amount of engineering, design, and permitting activities that would extend the schedule significantly and likely would not be accomplished to meet the proposed Project schedule.	These cost estimates remain in development but represent existing technology, materials, construction techniques and ROW. More definitive costs are included in Exhibit K to Southern LNG’s FERC application.

TABLE 3.2-2

Comparison Of Environmental Impacts Among The Terminal Expansion Project And The Two Berthing Alternatives

Impacts	Offshore Unloading Terminal Alternative	Offshore Regasification Terminal Alternative	Terminal Expansion Project
Temporary Impacts by Facility (acres)			
Offshore Terminal Facilities	10.00	5.00	0.00
Elba Island Facilities	124.08	2.50	178.82
Pipeline	353.69 a/	355.94 b/	0.00
Total	**487.77**	**363.44**	**178.82**
Permanent Impacts by Facility (acres)			
Offshore Terminal Facilities	20.00	10.00	0.00
Elba Island Facilities	34.26	5.00	34.26
Pipeline	217.57 c/	199.45 d/	0.00
Total	**271.83**	**214.45**	**34.26**
Total Impacts by Facility (acres)			
Offshore Terminal Facilities	30.00	15.00	0.00
Elba Island Facilities	158.34	7.50	213.08
Pipeline	571.27 e/	555.39	0.00
Total	**759.61**	**577.89**	**213.08**
Temporary Impacts by Resource (acres)			
Wetlands	28.67	28.67	0.00
Uplands	3.33	3.33	0.00
Developed Industrial Land f/	124.08	4.75	145.51
Open Water	327.09 g/	322.09 g/	33.31
Government Lands h/	4.60	4.60	0.00
Total	**487.77**	**363.44**	**178.82**
Permanent Impacts by Resource (acres)			
Wetlands	43.00	28.67	0.00
Uplands	5.00	3.33	0.00
Developed Industrial Land f/	34.26	7.24	34.26
Open Water	182.66 g/	170.61 g/	0.00
Government Lands h/	6.91	4.60	0.00
Total	**271.83**	**214.45**	**34.26**
Total Impacts by Resource (acres)			
Wetlands	71.67	57.33	0.00
Uplands	8.33	6.67	0.00
Developed Industrial Land f/	158.34	11.99	179.77
Open Water	509.75 g/	492.70 g/	33.31
Government Lands h/	11.51	9.20	0.00
Total	**759.60**	**562.89**	**213.08**
Other Impacts			
Channel/Stream Crossings	3	3	0
Marine and Coastal Resources	Potential for direct impacts (*e.g.*, sea turtles, whales, hard bottom outcrops, oyster reefs)	Potential for direct impacts (*e.g.*, sea turtles, whales, hard bottom outcrops, oyster reefs)	Potential for direct impacts low and limited to slip modification work
Essential Fish Habitat (SAFMC 1998)	Potential for impacts more likely during offshore and	Potential for impacts more likely during offshore and	Potential for impacts less likely; expect only minor

TABLE 3.2-2

Comparison Of Environmental Impacts Among The Terminal Expansion Project And The Two Berthing Alternatives

Impacts	Offshore Unloading Terminal Alternative	Offshore Regasification Terminal Alternative	Terminal Expansion Project
	wetland/marsh construction	wetland/marsh construction	indirect impacts, if any, from turbidity generated during slip modification work
Additional Engineering and Constructability Factors			
Marine and Wetland Construction	Approximately 92 percent marine and wetland construction, requiring floating equipment subject to weather, current and tidal effects; complicated material and supply logistics; relative safety concerns related to construction offshore and in unstable marsh substrates	Approximately 92 percent marine and wetland construction, requiring floating equipment subject to weather, current and tidal effects; complicated material and supply logistics; relative safety concerns related to construction offshore and in unstable marsh substrates	Minimal; only for modification of the slip
Horizontal Directional Drilling Required	At least 5 HDDs required	At least 5 HDDs required	None

a/ Assumes a cryogenic LNG pipeline and a return pipeline; value is calculated from an assumed 200-foot temporary construction impact zone offshore (in addition to, but excluding, the 100-foot permanent ROW) and 50 feet of extra workspace equivalent (in addition to, but excluding, the 75-foot permanent ROW) onshore; 2.24 acres for the pipeline are included with the Elba Island Facilities acres.

b/ Assumes a single natural gas pipeline; value is calculated from an assumed 200-foot temporary construction impact zone offshore (in addition to, but excluding, the 100-foot permanent ROW) and 50 feet of extra workspace equivalent (in addition to, but excluding, the 50-foot permanent ROW) onshore.

c/ Assumes a 75-foot permanent ROW onshore and a 100-foot permanent ROW offshore (assumed easement from MMS); 3.36 acres for the pipeline are included with the Elba Island Facilities acres.

d/ Assumes a 50-foot permanent ROW onshore and a 100-foot permanent ROW offshore.

e/ 5.61 acres are included in the Elba Island Facilities acres.

f/ Elba Island.

g/ Includes pipeline and offshore terminal facility acres.

h/ COE Confined Disposal Facility

Offshore Regasification Terminal Alternative

An offshore regasification terminal including receiving, storage, and vaporization components with a standard 42-inch-diameter pipeline connecting to the existing Elba Island facility was evaluated as an alternative to the proposed berthing and onshore terminal facilities modifications. The estimated installed cost of the 20-mile-long pipeline would be $80,000,000.

Estimated costs for the unloading facilities associated with the Offshore Regasification Terminal Alternative assume use of a FSRU. Using public information available for the Broadwater Energy project under review by the Commission in Docket No. CP05-64-000, the estimated cost for an Offshore Regasification Terminal Alternative based on the FSRU concept would be at least $700,000,000.

Expanding terminal facilities at Elba Island as proposed would confine construction and operations to very limited areas that are previously disturbed, currently maintained, and already dedicated to LNG operation. Construction of the natural gas pipeline and unloading vessel for the Offshore Regasification Terminal Alternative would impact 20 miles of navigable rivers, coastal marshlands, sea beds, and open water. Total temporary and permanent impacts to resources for this alternative are greater than six times and two times that of the proposed action, respectively. Additionally, the total estimated cost for this alternative is $780,000,000, which is nearly twice that of the proposed action.

3.2.4 Conclusions of Offshore Berth Alternatives

The offshore terminal alternatives would require installation of offshore facilities and approximately 20 miles of pipeline (figure 3.2-2), most of which would traverse marine and wetland environments before making landfall at the Elba Island Terminal. Table 3.2-2 summarizes the environmental impacts that would be associated with the proposed Terminal Expansion and each of the two offshore berthing alternatives. All construction and operation of the proposed Terminal Expansion would occur on an existing, previously disturbed industrial site situated on dredged material. Compared to the proposed Terminal Expansion, both offshore alternatives would disturb more wetlands, open water habitat, and government lands, as well as have a greater potential to adversely impact marine and estuarine resources, including EFH (SAFMC 1998; Van Dolah, et al. 1983; UGA 2006a).

The two offshore terminal alternatives also would require significant additional engineering and design efforts to address and mitigate safety and environmental issues associated with construction and operation due to the variability of offshore weather and marine conditions and unstable wetland soils that would be traversed by the pipeline(s). The offshore unloading terminal would require 20 miles of cryogenic pipeline, which is not technically feasible. Finally, the offshore alternatives would be substantially more expensive to construct and operate than the proposed onshore Terminal Expansion facilities. Therefore, we concluded that an offshore LNG terminal and pipeline facility would not provide an environmental advantage over the proposed action. In this instance, it would also be economically infeasible and therefore not a reasonable alternative to the proposed terminal expansion.

3.3 ELBA EXPRESS PIPELINE ALTERNATIVES

A number of public comments were received requesting analysis of pipeline system alternatives, route alternatives, and minor route variations to avoid specific localized resource impact concerns along each proposed segment. The results of these analyses are presented in this section.

3.3.1 Pipeline System Alternatives

Because there are no known pipeline systems proposed for construction in the project area (other than Elba Express), our analysis of pipeline system alternatives focused on the use of existing project-area pipeline systems to meet the objectives of the Elba III Project.

There are only two existing pipeline systems in the project area that potentially could be used to transport the vaporized LNG from the proposed Terminal Expansion to Transco Zones 4 and 5. These systems belong to Southern and to South Carolina Pipeline Company (SCPC).[2] However, neither system is currently capable of transporting the additional volume of natural gas without construction of major new looping and other facilities similar to those proposed by EEC. Further, to meet the project objective of delivery to Transco Zones 4 and 5, it would be necessary to use (and upgrade) both systems.

The system alternative evaluated consists of three legs. The first leg would use Southern's existing system between the Port Wentworth Meter Station (MP 0.0) and the Wrens Compressor Station (MP 104.8). From Wrens, the system alternative would have an eastern leg (a combination of Southern and SCPC's systems) and a western leg (entirely Southern's system). This system alternative is shown as Alternative A in figure 3.3-1.

The western leg would use Southern's pipeline system from Wrens to an area west of Macon near Thomaston, and then north to a new interconnection with Transco in its Zone 4 near Jonesboro, Georgia. The eastern leg would use Southern's system eastward from Wrens, across the Savannah River, to an intersection with SCPC's system near Aiken, South Carolina, and then use SCPC's system northward to a new interconnection with Transco in its Zone 5 near Spartanburg.[3]

The facilities required for this alternative would include:

- looping Southern's system from Port Wentworth to Wrens (about 105 miles of 42-inch-diameter pipeline and about 10,000 horsepower of compression, similar to the proposed Southern Segment);
- looping Southern's system eastward from Wrens to Aiken, South Carolina, and then looping SCPC's system between Aiken and Spartanburg (overall, about 175 miles of 36- and 42-inch-diameter pipeline, and 8,000 horsepower of additional compression at the Wrens Compressor Station); and
- adding three segments of loop to Southern's system between Wrens and Thomaston (about 50.5 miles of 30- and 36-inch-diameter pipeline loop), and looping Southern's system between Thomaston and Jonesboro (about 56.2 miles of 42-inch-diameter loop).[4] This leg would also require the addition of about 8,500 horsepower of compression at two existing compressor stations and reconfiguring piping at these stations to accommodate bi-directional gas flows.

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[2] In 2006, SCPC merged with SCG Pipeline, Inc. to form Carolina Gas Transmission Corporation.

[3] While this alternative does not precisely meet the project objective of interconnecting with Transco's system at the end of Zone 4 and the beginning of Zone 5, it connects within the identified zones and responds to comments received during scoping.

[4] In response to comments on the draft EIS, a hydraulic simulation was conducted of Southern's system between Wrens and the Jonesboro delivery point to Transco Zone 4. As a result, the western leg requirements presented in the final EIS are more precise than previously reported.

A comparison of the facilities needed for the system alternative versus the proposed project is presented in table 3.3-1.

The first leg of the alternative (Port Wentworth to Wrens) would be identical to EEC's proposed Southern Segment, so impacts would be identical to those associated with the proposed route. The eastern and western legs would be constructed across areas of the southeast (along the fall line separating the coastal plain from the piedmont and into the southern piedmont) that are similar to those crossed by the proposed Northern Segment.

As shown in table 3.3-1, this alternative would be more than twice the length of pipeline proposed by EEC and require more than twice the horsepower of compression. The impact of this alternative on many resources, particularly land use, vegetation, and air quality, would be much greater than the proposed project due simply to the increase in affected acreage and compression. Because we identified no significant impacts associated with construction of the Northern Segment (see section 4) that this alternative would avoid, the proposed pipeline would be environmentally preferable to the alternative. For this reason, we eliminated the system alternative from further consideration.

TABLE 3.3-1

Comparison of System Alternative to the Proposed Elba Express Pipeline

Evaluation Factor	Proposed Pipeline	Alternative A (System Alternative)
Total Length (miles)	187.9	386.7
New ROW, greenfield (miles)	81.8	0
Adjacent to existing pipeline ROW (miles)	106.1	386.7
Total ROW (acres)	2,748 **a/**	4,876 **b/**
Temporary Construction ROW (acres)	1,787	3,258
Incremental Permanent ROW (acres)	961	1,618
Compression (horsepower)	10,000	26,500

a/ Acreage impact calculations are based on the proposed Elba Express Pipeline ROW configurations depicted in figures 2.2-1 and 2.2-2, and reported for construction (temporary) and operation (permanent) in table 4.8-1

b/ Acreage impact calculations are based on temporary/incremental permanent ROW configurations of 95-/30-foot-wide for the 105-mile-long southern leg, 60-/40-foot-wide for the 175-mile-long eastern leg, and 60-/30-foot-wide for the 106.7-mile-long western leg

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Figure 3.3-1
Alternative A (System Alternative)

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3.3.2 Pipeline Route Alternatives

3.3.2.1 Southern Segment

The proposed Southern Segment (MP 0.0 to MP 104.8) is entirely collocated with Southern's existing pipeline system and provides a direct route from the Terminal to the southernmost intended interconnect zone at Wrens Compressor Station. Because alternative routes which would follow other existing corridors (utility, road, rail, *etc.*) between Port Wentworth and Wrens would be far less direct, they would significantly increase the pipeline length and associated environmental impacts. For instance, public comments were received requesting evaluation of a route alternative from Port Wentworth west along Interstate 16 to Laurens County where it would interconnect with other existing corridors (pipeline and roadway) to reach the Wrens Compressor Station. This route would require a minimum of 20 miles of additional pipeline along a less direct route. The proposed route yields the least amount of environmental impact by minimizing the length of the required pipeline and maximizing the use of previously disturbed areas for construction. Further, because the Southern Segment would be sited on Southern's existing ROW, the need for new permanently maintained ROW is very limited. For these reasons, no further analysis of route alternatives is necessary for this segment.

3.3.2.2 Northern Segment

Because the proposed 83.1-mile-long Northern Segment would primarily involve greenfield construction, commenters requested that we consider alternative routes that would follow existing utility ROWs. As a result, we evaluated two major route ("full collocation") alternatives and three additional ("partial collocation") alternatives that would place the Northern Segment adjacent to existing corridors for all or a portion of its length.

Full Collocation Route Alternatives

In response to public comments, we evaluated two major route alternatives that would meet the project objectives by entirely following existing pipeline corridors between the Wrens Compressor Station (MP 104.8) in Jefferson County, Georgia, and the Transco system in Hart County, Georgia (Transco Zone 4) and Anderson County, South Carolina (Transco Zone 5).[5] These alternatives are identified as Major Route Alternatives B and C in figure 3.3-2. Table 3.3-2 provides a comparison of the facilities required by these two alternatives and the proposed Northern Segment.

Route Alternative B

Route Alternative B consists of the eastleg portion of Alternative A (the system alternative discussed above), but with an entirely new pipeline constructed by EEC. However, to meet the project objective of interconnections in both Transco Zone 5 and Zone 4, EEC would need to

[5] It is important to emphasize that interconnections with both Transco Zones 4 and 5 were specified by the project shippers, not Southern LNG, EEC, or Southern. EEC's proposal is based upon meeting the requirements of the project shippers and their customers.

extend the east leg for about 57.3 miles along Transco's system to the southwest (to the Georgia side of the Savannah River). Overall, this alternative would require about 232.3 miles of new pipeline constructed parallel to the systems of Southern, SCPC, and Transco, and additional compression (about 8,000 horsepower).

Alternative B would cross areas similar to that crossed by the proposed Northern Segment. Although this alternative would follow existing pipeline corridors, it would be constructed by EEC on a new ROW along existing ROWs (not overlapping SCPC's system ROW as was the

TABLE 3.3-2

Comparison of Route Alternatives B and C to the Proposed Northern Segment

Evaluation Factor	Northern Segment	Alternative B	Alternative C
Total Length of New Pipeline (miles)	83.1	232.3	271.5
New ROW, greenfield (miles)	81.8	0	0
Adjacent to existing pipeline ROW (miles)	1.3	232.3	271.5
Total ROW (acres)	1,126 **a/**	4,224 **b/**	4,936 **c/**
Temporary Construction ROW (acres)	627	2,816	3,291
Incremental Permanent ROW (acres)	499	1,408	1,645
Additional Compression (horsepower)	0	8,000	13,500

a/ Acreage impact calculations are based on the proposed Elba Express Pipeline ROW configurations for MPs 104.8 to 187.9 depicted in figures 2.2-1 and 2.2-2

b/ Acreage impact calculations are based on temporary/incremental permanent ROW configuration of 100-/50-foot-wide for the 175-mile-long eastern leg and 57.3-mile-long extension

c/ Acreage impact calculations are based on temporary/incremental permanent ROW configuration of 100-/50-foot-wide for 170.2-mile-long western leg and 101.3-mile-long extension

case in the system alternative), construction would simply shift impacts from one group (those crossed by the proposed route) to another. We have not identified any significant impacts associated with the Northern Segment that the alternative would avoid, so construction of substantially more pipeline and compression facilities would provide no environmental benefit over the proposed route. Therefore, Major Alternative B would not be environmentally preferable to the proposed pipeline and was eliminated from further consideration.

Route Alternative C

Comments on the draft EIS noted that we evaluated an Alternative B based on the eastleg portion of Alternative A, but failed to evaluate an alternative route based on the westleg portion of Alternative A. As a result, we examined a third major route alternative which:

- is based on the western leg of Alternative A;
- could function as a stand-alone alternative (similar to Alternative B); and
- is designed to follow existing ROWs while meeting the project objectives of deliveries to both Transco Zones 4 and 5 (similar to Alternative B).

Alternative C (figure 3.3-2) uses the route of the westleg portion of Alternative A, but because it would be constructed by EEC parallel to and independent of Southern's system, it would require about 114 miles of pipeline between Wrens and Thomaston, Georgia. To meet the project objective of interconnecting with Transco Zone 5, EEC would also need to extend the westleg portion of Alternative A by constructing about 101.3 miles of 36- and 42-inch-diameter pipeline parallel to Transco's system between Jonesboro, Georgia and the South Carolina side of the Savannah River. Overall, this alternative would require about 271.5 miles of new pipeline and about 13,500 horsepower of compression at various locations (see table 3.3-2).

As with Alternative B, Alternative C would cross areas similar to that crossed by the proposed Northern Segment and require construction of more than three times the length of pipeline and additional compression. The notable difference is that the Northern Segment follows no established utility corridor while Alternative C would be constructed parallel and adjacent to the systems of Southern and Transco. However (as previously stated), we identified no significant impacts associated with the proposed Northern Segment that this alternative would avoid, so the additional disturbance and air emissions associated with constructing substantially more pipeline and compression facilities would provide no environmental benefit. Therefore, Major Alternative C would not be environmentally preferable to the proposed pipeline and was eliminated from further consideration.

Partial Collocation Alternatives

In an effort to respond to public comments which sought the use of existing corridors for routing the Northern Segment, we also investigated existing pipeline, railroad, and utility line corridors in the vicinity of the proposed route. This proved challenging because:

- there are a limited number of existing corridors in the project vicinity;
- those that exist tend to trend east-west (the Southern and Transco systems, and the Hartwell Railroad [HRT-RR]) rather than north-south (the Atlanta Gas and Light [AGL] system); and
- railroad corridors frequently weave across the proposed route in an indirect manner (Norfolk Southern Railroad [NS-RR] and Georgia Woodlands Railroad [GWRC-RR]).

Ultimately, we evaluated three route alternatives which began at the Wrens Compressor Station (MP 104.8) and would be partially collocated with other existing corridors. These alternatives are presented in figure 3.3-3. A comparison of environmental factors associated with each route alternative is provided in table 3.3-2.

West Route Alternative

As shown in figure 3.3-3, the West Route Alternative would follow Southern's ROW west from the Wrens Compressor Station for about 8.9 miles to an intersection with the AGL system. The alternative would then follow AGL's system north for a total of about 26.6 miles. Midway in

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Figure 3.3-2
Route Alternatives B and C

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this interval, the alternative would make a 7.1-mile-long deviation from the AGL ROW to route around the east side of Warrenton, Georgia. After following AGL, the alternative would continue cross-country in a northerly direction for about 29 miles before rejoining the proposed route near MP 166.8 Overall, the West Route Alternative would be collocated with existing pipeline ROWs for about 37.2 miles (40 percent) of its entire 92.8-mile length.

While the West Route Alternative would be parallel to or within existing ROWs for 40 percent of its length, it would be 9.7 miles longer than EEC's proposed route. This additional mileage translates into almost 140 acres of additional impact on soils, waterbodies, and wetlands (see table 3.3-2). The alternative would also encounter some of the roughest terrain of any Northern Segment route along a 7.5-mile-long portion of the AGL ROW north of Warrenton (further increasing the overall disturbance acreage). Additionally, in order to meet delivery pressure requirements without construction of an additional compressor station, use of this alternative would also require about 17 miles of the proposed 36-inch-diameter pipeline to be replaced with 42-inch-diameter pipeline.

This would have both an environmental impact (need for a wider construction ROW and more disturbance acreage) and an economic impact (greater pipe costs). While the use of existing utility corridors is generally preferable, the trade-off in this case would be to substantially increase the length of the pipeline (and attendant environmental impact) without providing a significant environmental advantage over the proposed route. As a result, we eliminated the West Route Alternative from further consideration.

Midwest Route Alternative

The Midwest Route Alternative would follow Southern's ROW for about 3 miles westward to an intersection with the NS-RR corridor. It would then follow the railroad corridor for about 13 miles to an intersection with the AGL ROW. From here, it would follow an identical path as the West Route Alternative until intersecting with the GWRC-RR corridor in southern Wilkes County, Georgia. The alternative would follow this railroad corridor to just south of Washington, circle around the west and north sides of Washington, and then continue cross-country on a northeast heading to intersect with the proposed route near MP 153.

The Midwest Route Alternative would be parallel to or within existing pipeline or railroad ROWs for about 44 percent of its 90.3-mile-long length. Although the increased length (about 7.2 miles) would reduce the number of perennial stream crossings, it would again significantly increase the overall acreage disturbed by construction and involve more wetland acreage. As with the West Route Alternative, use of this alternative would trade difficult construction terrain along the AGL corridor and more than 100 acres of additional construction disturbance for following existing corridors. We also note that following a railroad ROW is different than following a pipeline or road ROW because the track area and subgrade cannot be used. For these reasons, the alternative would not provide a significant environmental advantage over the proposed route. As a result, we eliminated the Midwest Route Alternative from further consideration.

East Route Alternative

The East Route Alternative was an attempt to minimize the length of pipeline needed by drawing an almost straight line between the Wrens Compressor Station and the proposed interconnection with Transco Zone 4 in Hart County. As shown in figure 3.3-3, the alternative runs east of the proposed route for about 76.7 miles to a point of intersection near MP 184. Overall, the alternative would be about 81 miles long or 2.6 miles shorter than the proposed route.

The advantage of East Route Alternative is that, of the three Northern Segment alternatives analyzed, it would be the shortest route and therefore reduce construction impact by about 32 acres. While it would reduce the amount of hardwood forest land disturbed, it would cross two additional public land areas (Elbert County WMA and Richard B. Russell State Park) and encounter an area of surface mining along the first 10 miles. Reroutes to avoid the WMA, State Park, and surface mining operations would ultimately increase the length of the alternative to the point where it would be longer than the proposed route. Because the East Route Alternative would offer no significant environmental advantage over the proposed route, we eliminated it from further consideration.

Conclusion of Partial Collocation Route Alternatives

We evaluated three alternatives to the Northern Segment which would partially collocate the proposed pipeline with other existing utilities. For the reasons discussed above and summarized in table 3.3-2, we believe that the proposed route (or the proposed route with minor variations to address site-specific issues) is the best selection of the routes considered for the following reasons:

- it would avoid strip mines, and most urbanized areas;
- it would disturb the least amount of wetland acreage; and
- it would avoid the rough terrain and steep side slopes encountered along the AGL corridor. Side-slope construction would entail a wider construction ROW (more disturbance) and increased safety risks for construction workers.

As a general rule, we believe that new pipeline facilities should be placed adjacent to or overlapping with existing utility corridors. This belief is based on the premise that the use of existing corridors (the “common corridor” concept) will limit the proliferation of new utility ROWs and thereby reduce environmental impact. However, the use of existing corridors is not a rule; if corridors are overloaded, not reasonably available, or require a significantly longer construction path, other routing considerations become more important. Our analysis of partial collocation route alternatives indicated that the use of existing corridors in the project area would not provide a significant environmental advantage over the proposed route.

3.3.3 Pipeline Route Variations

Route variations differ from route alternatives in that they are identified to avoid or reduce construction impacts on specific, localized resources such as a residence, cultural resource site, or endangered species habitat.

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Figure 3.3-3
West, Midwest, and East Route Alternatives

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We have not identified any issues or concerns that would necessitate the evaluation of route variations along the Southern Segment pipeline because this portion of the route parallels and largely overlaps Southern's existing pipeline corridor. However, EEC has considered and incorporated numerous reroutes and variations into its proposed Northern Segment route in an attempt to avoid or reduce impacts on specific local resources of agency or public concern raised during open houses, public scoping, and negotiations with individual landowners. These variations would avoid or minimize impacts on residences and private property concerns, a nursing home, a public water line, and a highway crossing. All route variations adopted to date are shown on EEC's filed alignment sheets and have been reviewed as part of our analysis.

COE-Managed Land Route Variations

The proposed route of the Elba Express Pipeline would cross COE-administered lands at five locations. See section 4.8.5 for additional discussion of COE Project Lands.

On the Southern Segment, the route would cross the Di-Lane WMA in Burke County, Georgia, for about 2.7 miles (MPs 74.43-78.13). Here, the pipeline would parallel two existing SNG pipelines. Although construction would require clearing 70 feet of temporary workspace along the edge of the existing pipeline corridor, EEC would require no additional permanent ROW to cross the WMA. Because the proposed route follows an established corridor across the WMA and any additional mitigation beyond EEC's Plan and Procedures (which constitute Best Management Practices) would be developed between EEC, the COE, and the GDNR before construction commenced, we believe that the proposed route would have less impact on environmental resources than development of a new pipeline route which circumvented the WMA. As a result, no alternatives to crossing the Di-Lane WMA were developed.

On the Northern Segment, COE-administered lands would be crossed at four locations. At three locations, we evaluated routing variations to crossing COE parcels. At the fourth location (the Savannah River crossing), discussions between EEC and the COE resulted in a reroute that the COE believes would minimize impact on Project and Mitigation Lands associated with the Hartwell and Richard B. Russell Projects by keeping EEC's ROW as close to contiguous as possible to Transco's existing ROW and limiting the sprawl of natural gas pipelines in the area. Our route variation assessments for the remaining three locations are presented below. We are recommending that none of the variations be adopted for the reasons presented.

Little River Variation

At MP 134.9, the proposed route would cross the Little River within a 0.5-mile parcel of COE Project Land associated with the J. Strom Thurmond Project. This parcel is locally known as the Clarks Hill WMA and straddles the line between McDuffie and Wilkes County, Georgia. As an alternative to crossing the WMA, we evaluated a route to the west of the proposed crossing location. The route evaluated is presented in figure 3.3-4. Table 3.3-3 compares the impacts of the Little River Variation to the corresponding segment of the proposed route.

TABLE 3.3-3

Little River Variation Comparison

Environmental Factor	Unit	Little River Variation	Corresponding Segment of Proposed Route
Length	Miles	5.0	2.5
Construction disturbance a/	Acres	75.7	37.9
Perennial waterbody crossings	Number	2	3
Major waterbody crossings	Number	1	1
Wetland crossing	Feet	1,500 b/	19
Forest land crossing	Miles	4.6	2.4
Open land crossing	Miles	0.4	0.1

a/ Based on a nominal ROW width of 125 feet
b/ NWI Mapped Wetland

As shown, the Little River Variation would cross one less perennial stream than the corresponding segment of the proposed route. However, it would essentially be double the length of the proposed route in this area and result in proportionally greater impacts on soil, wetland, and vegetation resources. The COE has developed a mitigation plan in coordination with other appropriate resource agencies that EEC has agreed to implement in addition to its Procedures (see appendix M). This mitigation plan includes construction and restoration items that would minimize the impact (during construction and operation) from the proposed river crossing, such as: requiring the use of silt curtains during construction; once construction is initiated at the Little River stream crossing location, restoration activities would be performed continuously until completed; and requiring that the riparian area be replanted with shallow rooted shrubs. For these reasons, we believe that the Little River Variation does not offer an environmental advantage over EEC's proposed route, and therefore eliminated this alternative from further consideration.

Beaverdam Creek Variation

Near MP 171 in Elbert County, Georgia, the proposed route would cross two parcels of COE Mitigation Lands associated with the Richard B. Russell Project. These parcels, totaling about 4,115 feet overall, contain the primary stem of the Beverdam Creek and several tributaries. As an alternative to crossing these Mitigation Lands, we evaluated a route that would run west of the proposed crossing location. The route evaluated is presented in figure 3.3-5. Table 3.3-4 compares the impacts of the Beaverdam Creek Variation to the corresponding segment of the proposed route.

The advantage of Beaverdam Creek Variation is that it would not cross any perennial streams (and avoid a major waterbody) compared with the corresponding segment of the proposed route. However, to circumvent a relatively short stretch of COE Mitigation Lands, this alternative would be 4.2 miles longer and affect proportionally greater acreages of soil, wetland, and

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Figure 3.3-4
Little River Variation

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Figure 3.3-5
Beaverdam Creek Variation

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TABLE 3.3-4

Beaverdam Creek Variation Comparison

Environmental Factor	Unit	Beaverdam Creek Variation	Corresponding Segment of Proposed Route
Length	Miles	9.2	5.0
Construction disturbance a/	Acres	139.4	75.7
Perennial waterbody crossings	Number	0	9
Major waterbody crossings	Number	0	1
Wetland crossing	Feet	2,900 b/	287
Forest land crossing	Miles	8.5	4.5
Open land crossing	Miles	0.7	0.5

a/ Based on a nominal ROW width of 125 feet
b/ NWI Mapped Wetland

vegetation resources. The COE has developed a mitigation plan in coordination with other appropriate resource agencies that EEC has agreed to implement in addition to its Procedures (see appendix M). This mitigation plan includes construction and restoration items that would minimize the impact (during construction and operation) from the proposed river crossing. In addition to the mitigation measures outlined in the Little River Variation, EEC would place rip-rap along the lake bottom and rock piles at the shoreline crossing locations to prevent shoreline erosion and scour. As a result, we believe that the Beaverdam Creek Variation does not offer a significant environmental advantage over EEC's proposed route and eliminated this alternative from further consideration.

Coldwater Creek Variation

The proposed route would cross Coldwater Creek at MP 178 within a 950-foot parcel of COE Mitigation Land associated with the Russell Project in Elbert County, Georgia. As an alternative to crossing this ribbon of Mitigation Land on the banks of Coldwater Creek, we developed a route that again headed west to an upstream crossing location. The route evaluated is presented in figure 3.3-6. Table 3.3-5 compares the impacts of the Coldwater Creek Variation to the corresponding segment of the proposed route.

The primary advantages of the Coldwater Creek Variation versus the proposed route is that it would cross one less perennial stream and avoid a major waterbody. However, an additional 2.2 miles of disturbance to soil, wetland, and vegetation resources would result from avoiding less than 1,000 feet of COE Mitigation Land. The COE has developed a mitigation plan in coordination with other appropriate resource agencies that EEC has agreed to implement in addition to its Procedures (see appendix M). This mitigation plan includes construction and restoration items that would minimize the impact (during construction and operation) from the proposed river crossing. In addition to the mitigation mentioned in the Little River Variation discussion, EEC has agreed to place rip-rap over the entire stream bottom to prevent stream scour. As a result, we believe that the Coldwater Creek Variation does not offer an environmental advantage over EEC's proposed route, and eliminated this alternative from further consideration.

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Figure 3.3-6
Coldwater Creek Variation

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TABLE 3.3-5

Coldwater Creek Variation Comparison

Environmental Factor	Unit	Coldwater Creek Variation	Corresponding Segment of Proposed Route
Length	Miles	4.7	2.5
Construction disturbance a/	Acres	71.2	37.9
Perennial waterbody crossings	Number	3	4
Major waterbody crossings	Number	0	1
Wetland crossing	Feet	500 b/	0
Forest land crossing	Miles	3.9	1.6
Open land crossing	Miles	0.8	0.9

a/ Based on a nominal ROW width of 125 feet
b/ NWI Mapped Wetland

Middleton Area Variation

One commenter suggested a route variation between MPs 167.8 and 170.5 to avoid crossing a hay field and passing "extremely close" to a residence, both on the commenter's property. This alternative route would begin at the crossing of Ed Mills Road at MP 167.8, traverse west and parallel Lithia Springs Road to a point just east of the intersection of Jenkins Road and State Highway 72, cross State Highway 72, traverse to the east of Jenkins Road, intersect Old Middleton Road to the west of Martin Grove Church and cemetery, and traverse easterly to intersect the proposed route at MP 170.5 prior to the Beaver Dam Creek crossing. The route evaluated is presented in figure 3.3-7. Table 3.3-6 compares the impacts of the Middleton Area Variation to the corresponding segment of the proposed route.

Both the proposed route and route variation would be 14,300 feet long, cross a similar number of streams and wetlands, and impact a similar acreage of forested lands. However, the route variation would affect a greater number of landowners than the proposed route, including a more densely populated area near the intersection of Jenkins Road and State Highway 72 than the rural properties crossed by the proposed route. The route variation also would cross an inactive landfill site located southeast of the intersection of Jenkins Road and State Highway 72, which would require investigations as to whether pipeline construction could breach landfill containment of any potentially hazardous materials. As a result, we believe the Middleton Area Variation does not offer an environmental advantage over EEC's proposed route, and eliminated this alternative from further consideration.[6]

[6]Based on our examination of aerial alignment sheets and a site visit, the nearest structure appears to be well over 500 feet from the proposed pipeline route on this property. Further, during a field investigation of the route across this property on May 8, 2007, the commenter verbally stated that he had changed his mind and was "satisfied" with the proposed alignment across his property.

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Figure 3.3-7
Middleton Area Variation

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TABLE 3.3-6

Middleton Area Variation Comparison

Environmental Factor	Unit	Middleton Area Variation	Corresponding Segment of Proposed Route
Length	Miles	2.7	2.7
Construction disturbance a/	Acres	41.0	41.0
Perennial waterbody crossings	Number	1	1
Major waterbody crossings	Number	0	0
Wetland crossing b/	Feet	0	0
Forest land crossing	Miles	1.6	1.4
Open land crossing	Miles	1.1	1.3

a/ Based on a nominal ROW width of 125 feet
b/ NWI Mapped Wetland

3.3.4 Other Pipeline Issues

Southern Segment Design

A public comment was received requesting analysis of whether the proposed 42-inch-diameter pipeline could be reduced to a 36-inch-diameter pipeline along the Southern Segment (MPs 0.0 to 104.8). Based on detailed hydraulic and engineering analysis, EEC has determined that a 42-inch-diameter pipeline with a Maximum Allowable Operating Pressure (MAOP) of 1,250 pounds per square inch (psi) would be required for the entire Southern Segment and first 10 miles of the Northern Segment of the Elba Express Pipeline.[7] A smaller-diameter pipeline would compromise EEC's ability to ensure firm capacity and reliable delivery of required natural gas volumes to the target markets. Therefore, we conclude that a smaller-diameter pipeline design for the Southern Segment would not meet the Project purpose and need, and this alternative is eliminated from further consideration.

Initial Ten Miles of Southern Segment

When EEC filed its application with the FERC, Southern already had a Commission Certificate[8] to construct and operate the Cypress Expansion Project, which would involve construction of about 9.8 miles of 30-inch-diameter pipeline between the Port Wentworth Meter Station (Elba Express Pipeline, MP 0.0) and the Rincon Gate Meter Station (Elba Express Pipeline, MP 9.8) near Rincon, Georgia. This 9.8-mile-long segment of the Cypress Pipeline is planned for construction along Southern's existing ROW in 2010 as Phase III of the Cypress Pipeline.

[7] It is also noteworthy to recall that between MPs 0.0-9.7, the 42-inch-diameter Elba Express Pipeline would be built in the place of the authorized 30-inch-diameter Cypress Pipeline. Elba would transport the natural gas originally proposed to be carried by the Cypress Pipeline, eliminating the need for a second pipeline.

[8] See Order Issuing Certificates, issued on June 15, 2006, in Docket Nos. CP05-388-000 (Southern Natural Gas Company) and CP06-1-000 (Florida Gas Transmission Company).

Based on public comments collected during EEC's Open Houses and scoping, EEC examined three possibilities for reducing construction impacts associated with two pipelines (Elba Express and Cypress) being constructed immediately adjacent to one another along the existing Southern ROW in the interval between Port Wentworth and Rincon. Alternatives considered included:

- Replacement Pipeline Alternative – replacing one of Southern's existing (smaller diameter) pipelines in the ROW with either the Cypress or Elba Express Pipeline;
- Reduced Separation Alternative – constructing the Cypress and Elba Express Pipelines closer together in this area to avoid or minimize the need for additional ROW; and
- One Pipeline Alternative – constructing one pipeline to carry the volumes of both the authorized Cypress Expansion Project and the proposed Elba Express Pipeline.

During Pre-Filing, EEC studied these options, the existing Southern pipeline corridor, and the challenges that constructing two new large diameter pipelines along this 9.8-mile-long interval would pose. Taking a fully-operational pipeline used to fulfill firm transportation obligations out of service for replacement would create serious problems for Southern, as well as being a poor economic decision. On the other hand, reducing the separation distance between two large-diameter pipelines would present problems during construction as well as long-term maintenance concerns. Further, construction through the saturated soils common in this interval of Southern's system would result in a wider trench during construction, making reduced separation difficult to achieve and possibly threatening the stability of the existing adjacent pipelines.

While the One Pipeline alternative may appear attractive, it would pose a number of unique difficulties. For instance, both projects are on different schedules. They have different tariffs and belong to different companies. Different agreements are in place with different obligations for different customers. Further, the Cypress Project received a FERC Certificate in June 2006 while the Elba Express Pipeline is still in the permitting stage. And finally, if the second project is not constructed for some reason, then the first project would be unnecessarily burdened with the increased cost of the larger capacity pipeline.

In the end, EEC and Southern (working with the shippers of the two projects) agreed to implement the One Pipeline Alternative and presented this option as EEC's proposed action in its FERC application. This approach required the hydraulic design of the Elba Express Pipeline to be modified such that 10 more miles of 42-inch-diameter pipeline would be needed, as well as construction of an additional meter station at Rincon Gate to segregate the Elba Express and Cypress volumes. However, use of this alternative would reduce overall environmental impact associated with pipeline construction in the interval between Port Wentworth and Rincon Gate, and reduce congestion impact in an already and increasingly crowded area.

3.3.5 Aboveground Facility Site Alternatives

Elba Express Compressor Station

Phase B of the proposed Elba Express Pipeline Project would involve construction of the Elba Express Compressor Station in the vicinity of northwest Screven County or southeast Jenkins County, Georgia. After reviewing several locations, EEC investigated two locations in detail: the proposed site in Jenkins County (MP 58.5; see map 7 in appendix B) and an alternate site

nearby in Screven County (at the same location of the proposed MLV #4, MP 53.3; see map 6). Based upon engineering, economic, and environmental impact considerations, EEC determined that the Jenkins County site would best satisfy the purpose and need of the Project. Figures 3.3-7 and 3.3-8 are aerial photographs with land use overlays of the proposed site in Jenkins County and the alternate site in Screven County, respectively.

EEC selected the proposed Jenkins County site over the alternate Screven County site for several reasons. First, the Screven County site is closer to noise sensitive areas (NSAs). The Jenkins County site has one NSA approximately 1,400 feet from the site (a church) and a second NSA approximately 3,500 feet from the site (a house used as a hunting lodge). The closest permanent residence is located approximately 1.1 miles from the Jenkins County site. The Screven County site has two NSAs approximately 1,500 feet from the site and several NSAs approximately 1,800 feet from the site. Most of these NSAs are full time residences. Secondly, the area that surrounds the Jenkins County site generally is wooded, and the site is not visible from the nearby highway. The Screven County site is more visible from nearby roadways so the visual impacts of the Jenkins County site would be less than those of the Screven County site. Finally, the Jenkins County site is very close to a high voltage power line. In the event electric-driven compressors are selected for the Elba Express Compressor Station, a power source for the compressors would be readily available.

In the case of the Screven County site, if electric-driven compressors were selected, a new high voltage power line would have to be constructed to the site, which would cause additional impacts. Based on these factors and our visit to both sites, we support EEC's selection of the Jenkins County site.

Miscellaneous Facilities

EEC proposes to construct eight meter stations, 11 MLVs, two pig launchers (42-inch and 36-inch), and two pig receivers (42-inch and 36-inch) as part of the proposed Project. Our review of the proposed sites raised no issues (*e.g.*, proximity to residences, impacts to wetlands) that warranted the identification and analysis of alternative sites for these proposed facilities.

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Figure 3.3-8
Proposed Elba Express Compressor Station Site in Jenkins County, Georgia

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Figure 3.3-9
Alternative Elba Express Compressor Station Site in Screven County, Georgia

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