20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

UNITED STATES OF AMERICA 115 FERC ¶63,009
FEDERAL ENERGY REGULATORY COMMISSION

AES Ocean Express LLC
v.
Florida Gas Transmission Company

Docket Nos. RP04-249-001

INITIAL DECISION

(Issued April 11, 2006)

APPEARANCES

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20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

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Herbert Grossman, Presiding Administrative Law Judge

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

1. The purpose of this proceeding is to determine appropriate natural gas quality and interchangeability standards to accommodate the introduction of re-gasified liquefied natural gas (LNG) into the Florida Gas Transmission Company (FGT) pipeline system. The Commission specified that the quality specifications and interchangeability standards that are adopted in this proceeding must facilitate increased access to LNG supplies and simultaneously ensure that the introduction of regasified LNG into the FGT system will not have detrimental effects on FGT or its customers.

I. BACKGROUND AND PROCEDURAL HISTORY

2. This proceeding arises in the context of a proposed interconnection agreement between AES Ocean Express, LLC (AES) and FGT. Under the terms of the proposed agreement AES was to deliver large quantities of re-gasified LNG directly into FGT's Market Area, which is defined as the portion of its interstate pipeline system situated east of the Alabama-Florida State line. Ex. FGT-1 at 3/4-7. FGT's Western Division includes facilities west of the Alabama-Florida state line. There are currently three LNG projects proposed to interconnect with FGT at the south end of its Market Area. These projects are proposed by AES, Tractebel Calypso Pipeline, LLC, and Seafarer US Pipeline System, Inc. The Cypress Pipeline Project (Cypress Pipeline), of Southern Natural Gas Company, is proposed to interconnect with FGT at the north end of the Market Area. There are 86 turbines connected to the FGT system; 55 operate with a Dry Low NOx (DLN, also referred to as Dry Low Emission or DLE) combustion system and the remaining 31 operate with a non-DLN combustion system (diffusion burners). Of the 55 DLN turbines, 46 are GE turbines and nine are Siemens-Westinghouse. Ex. LNG-51.

3. On April 5, 2004, AES filed a complaint under Sections 5 and 7 of the Natural Gas Act[1] (NGA) alleging that FGT had insisted on unreasonable conditions in the proposed interconnection agreement. AES raised concerns that the gas quality and interchangeability standards that would apply to the LNG that would be introduced into FGT's system from AES' proposed pipeline were overly restrictive. FGT stated in its answer, filed April 16, 2004, that the conditions it proposed in the interconnection agreement were designed to ensure the operational integrity of its system and to prevent detrimental effects to its system or customers.

4. On June 18, 2004, the Commission issued an order on AES's complaint. *AES Ocean Express*, 107 FERC ¶ 61,276 (2004) (June 2004 Order). That order established hearing and settlement proceedings to address hourly flow requirements and temperature specifications to be included in the interconnection agreement. These two issues were subsequently resolved by settlement. *See Florida Gas Transmission Co.*, 109 FERC ¶ 61,357 (2004); *Florida Gas Transmission Co.*, 110 FERC ¶ 61,148 (2005) (February

[1] 15 U.S.C. § 717

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

2005 Order). Under Section 5 of the NGA, the Commission also required FGT to file revisions to its gas quality and interchangeability standards tariff provisions within 30 days of the June 2004 Order. *June 2004 Order*. The Commission stated that a pipeline seeking an interconnection with another pipeline must satisfy the conditions established in *Panhandle Eastern Pipeline Company*, 91 FERC ¶ 61,037 (2000) (*Panhandle*). *Id*. The Commission also required assurances that the introduction of new LNG supplies into the FGT system will not have detrimental effects on FGT or its customers. *June 2004 Order* at P 26.

5. In compliance with the Commission's June 2004 Order, FGT filed *pro forma* tariff sheets for its Market Area on July 23, 2004. FGT based these standards on two sources of information: (i) the capabilities of the turbine equipment that would receive LNG; and (ii) historical minimum and maximum Btu content in FGT's Market Area. Ex. FGT-1 at 9. In its July 23 filing, FGT reserved the right to revise its proposed LNG quality standards based on the outcome of continuing work on testing, analysis, review of data and factual developments. Ex. FGT-1 at 11, ln. 21-23; Ex. FGT-3 at 2.

6. Numerous protesters raised concerns about FGT's proposed gas quality and interchangeability standards. The Commission established the instant proceeding to address those concerns. *September 2004 Order* at P 1. *AES Ocean Express*, 108 FERC ¶ 61,221 at P 20 (2004) (*September 2004 Order*). In addition to the complainant AES, respondent FGT, and Commission Trial Staff, the following entities are parties to this proceeding: (i) Florida Power & Light Company (FPL); (ii) Florida Gas Utility (FGU), on behalf of Florida Municipal Power Authority and its other members operating gasfired electric generation facilities and Seminole Electric Cooperative, Inc. (Seminole) (collectively, with FPL, Florida Generators); (iii) Florida Power Corporation, d/b/a Progress Energy of Florida (FPC); (iv) BG LNG Services, LLC (BG LNG), (v) Southern; (vi) Peoples Gas System, a Division of Tampa Electric Company, the Associated Gas Distributors of Florida, and the Florida Municipal Natural Gas Association (collectively, LDCs) and (vii) BP Energy Company; Chevron U.S.A. Inc; ConocoPhilips Company; ExxonMobil Gas & Power Marketing Company, a division of Exxon Mobil Corporation; and Shell LNG NA, LLC (collectively LNG Suppliers).

7. Direct and answering testimony was filed on September 19, 2005. Cross-answering testimony was filed on November 7, 2005. On November 23, 2005, FGT proposed a revised set of gas quality and interchangeability specifications in its rebuttal case. *See* Ex. FGT-11. An evidentiary hearing was held before me from December 6 through December 16, 2005. Generally, the LNG Suppliers and AES contend that the broader Interim Guidelines set forth in the NGC+ White Paper should be adopted; BG LNG does not support adoption of standards narrower than those recommended by the NGC+ Work Group; the Florida Generators and FPC support adoption of narrower standards based on the historical operating experience of the pipeline system as proposed in FGT's *pro forma* filing; Southern supports

implementation of FGT's revised gas quality standards on a system-wide basis; the LDCs contend that further testing on end-use appliances and distribution equipment is necessary before FGT's standards are adopted; and Staff supports implementation of FGT's revised standards with two conditions: defer the date of implementation to May 1, 2007, and require further testing of the effect of LNG on end-use equipment.

8. On November 22, 2005, the Commission reached a preliminary determination in support of approving Southern's proposed Cypress Pipeline expansion project. *Southern Natural Gas Co.*, 113 FERC ¶ 61,199 (2005) (*Southern Order*) at P 2. Several LDCs and end-users raised objections to Southern's proposal analogous to the concerns they raised in the instant proceeding. Therefore, the Commission determined that the gas quality and interchangeability issues raised in *Southern* should be resolved here. *Id.*

9. This proceeding also arises in the context of Docket No. PL04-3, in which the Commission held a technical conference to engage natural gas industry members in a dialogue about the policy issues underlying natural gas interchangeability. The NGC+ Work Group and subsequent White Paper were both outcomes of that proceeding. The NGC+ Work Group was a technical work group representing a broad range of the U.S. natural gas industry. The NGC+ Work Group ultimately issued the NGC+ Interim Guidelines in early 2005, a set of recommendations (referred to as NGC+ Interim Guidelines) found in the NGC+ White Paper.

III. POSITIONS OF PARTIES

10. Pursuant to protective order entered during discovery, two documents generated by a turbine manufacturer were given protected status. Because I do not rely on those documents, which I do not find reliable, as fully discussed later in this decision, and because parties are unwilling to release them from protection, I will forgo summarizing arguments directed towards them.

Florida Gas Transmission Company

11. FGT contends that its proposed LNG gas quality and interchangeability standards are reasonable, supported by evidence and appropriate for inclusion in its tariff. FGT I.B. at 18, 20. FGT's proposed LNG tariff language addressing gas quality and interchangeability standards for re-gasified LNG (LNG quality standards) are described in FGT witness Michael Langston's rebuttal testimony (Ex. FGT-11 at 4-5/27) and included in the *pro forma* tariff sheets in Exhibit No. FGT-12 (at 3-4, 7-9). *Id.* at 18-19. FGT argues that its standards reflect a reasonable reconciliation of the competing interests of LNG suppliers, project developers, and electric utilities. FGT R.B. at 1. FGT argues that the applicable legal standard is the just and reasonable standard under Section 4 of the NGA. *Id.* at 8. FGT maintains that any other party that proposed standards has

the burden of first proving that FGT's proposal is not just and reasonable, and second, that its alternative proposal is just and reasonable. *Id.*

12. FGT's proposed Btu standard is: HHV (Btu/scf) at 60º F, 14.73 psia of 1025 to 1110. FGT I.B. at 20. FGT states that its proposed Btu maximum limit of 1110 Btu/scf is reasonable for two reasons: (i) it is identical to the standard proposed by the NGC+ White Paper; and (ii) the proposed Btu maximum limit of 1110 Btu/scf is supported by appliance test data from TIAX, SoCal and the NGC+ White Paper. *Id.* at 21. FGT similarly states that its proposed Btu minimum limit of 1025 Btu/scf is based on FGT pipeline design requirements and FGT's historical minimum Btu level for gas in the Market Area. *Id.* (*citing* Ex. FPL-19). Gas with a higher Btu content yields a more valuable product; however, natural gas takes up the same amount of volume regardless of the Btu content. For this reason, FGT argues that pipeline capacity would be reduced if the Commission approved a lower minimum Btu level for the Market Area. *Id.* at 22.

13. FGT proposes a Wobbe[2] range of 1340 to 1396. FGT claims that its proposed maximum of 1396 is supported by the analysis presented in the NGC+ White paper. *Id.* at 23. The NGC+ White Paper proposes the 1400 upper limit plus or minus four percent variation (+/-4%) from the local historical average gas or the established adjustment or target gas for the service territory. *Id.* (*citing* Ex. FGT-6 at 27). FGT claims that applying the +/-4% range to FGT's historic average Wobbe of 1356 on the East Leg facilities results in Wobbe upper limit of 1410. *Id.* Second, FGT asserts that its pipeline, turbine compressors and other facilities can operate satisfactorily up to a Wobbe maximum limit of 1396. *Id.* at 23 (*citing* Ex. FGT-1 at 14, ln. 12-15). Third, FGT claims its proposed maximum limit of 1396 is acceptable to the LDCs' facilities and end-user equipment served by such facilities. *Id.* at 24. Specifically, Peoples stated during its July 27, 2005 PowerPoint presentation to the Florida Public Service Commission (FPSC) that it supports a Wobbe maximum limit of 1396. *Id.* at 24 (*referring* to Ex. FGT-13 at 5).

14. FGT also emphasizes that the Wobbe level for which a unit is designed and manufactured imposes a constraint that, absent equipment modifications, limits the ability to tune the turbine and use gas at a higher Wobbe level. *Id.* at 28-29. FGT claims that because the DLN turbines are designed for an average Wobbe far below the average Wobbe of FGT's system gas, they may require new equipment and "re-centering" to burn gas at higher Wobbe levels. *Id.* at 31. According to FGT, such modifications would not have been required had the turbines been originally designed for the average Wobbe of FGT's system gas. *Id.* FGT contends that a DLN turbine designed for FGT's Market

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[2] The Wobbe Index is sometimes referred to as the Interchangeability Factor. The definition of the Wobbe Number is based on the heating value and specific gravity of a gas. It measures the interchangeability of fuel gas for traditional end-use equipment and is related to the thermal input to a burner. Ex. FGT-6 at 8.

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

Area average Wobbe of 1356, and tuned to a Wobbe level of 1368.6 could accommodate an upper limit of 1396 because it falls within the +/-5% design limit and +2% tuning limit. FGT states that it was the electric utilities' decision to install DLN turbines designed for a Wobbe level below the historic average of 1356, or historic minimum of 1346, that was a self-imposed constraint. *Id.* at 32-33. FGT asserts that these constraints could easily be remedied with minor mitigating measures such as: control/monitoring equipment; replacing fuel nozzles to re-center the gas fuel system design; and fuel gas heating. *Id.*

15. Sixth, FGT claims that Florida Generator witness Dr. Michael Klassen did not provide reliable testimony or analysis with regard to the Wobbe upper limit. Rather, FGT alleges that witness Klassen based his recommendation of +/-1% variability on historic data and not on turbine design. *Id.* at 36. Finally, FGT argues that there is evidence that auto-tuning[3] would resolve the generators' concerns with respect to the Wobbe maximum of 1396. For instance, FGT states that Siemens-Westinghouse presently has an auto-tuning system in service in California that could be used to address fuel quality concerns. *Id.* at 38 (*see* Tr. at 994/5-20).

16. FGT states that its proposed minimum Wobbe limit of 1340 approximates the historic Wobbe minimum in the FGT Market Area, is reasonable, and is supported by evidence. *Id.* at 40-41. FGT also proposes that the Wobbe rate of change be limited to two percent or less per six minutes. *Id.* at 41. FGT contends that this change limit is supported by the LDCs as appropriate for end-use equipment and further that this change limit addresses the ability of turbines to adjust to changing Wobbe levels in the gas stream, as discussed in the NGC+ White Paper. *Id.* at 41 (*referring* to Tr. 127/20-24 and Ex. FGT-10 at 10).

17. FGT's next set of arguments addresses the gas composition of LNG. FGT asserts that individual gas composition standards are appropriate, as the constituents of LNG are different from the constituents of natural gas. *Id.* at 42. FGT's proposed limits reflect the NGC+ White Paper's recommendation to reflect historical compositions as well as the design requirements of the individual facilities (i.e. - fuel specifications for the DLN turbines in FGT's Market Area, gas composition test results for DLN turbines and operating experience on FGT's facilities). *Id.* at 43-44 (*referring* to Ex. FPL-19). FGT's proposed gas composition limits and accompanying rationale are as follows:

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[3] Auto-tuning is a system designed to automatically adjust the turbine combustion system parameters to maintain reliable operation when the gas supply varies over a defined range

- Methane Number greater than or equal to 80. This standard is based on internal combustion engine warranty requirements as specified in Ex. FPL-19. *Id.* at 44.

- C_1 (methane) greater than or equal to 85 mole percent.[4] This standard is based on the GE fuel specification limit. *Id.* (Ex. FGT-4 at 5).

- C_2 (ethane) less than or equal to10 mole percent. This standard is based on FGT's review of turbine fuel specifications. *Id.*

- C_3 (propane) less than or equal to 2.75 mole percent. This standard is a slightly less restrictive limit than the Siemens-Westinghouse fuel specification limit of less than or equal to 2.5 mole percent and based on a Siemens' test. *Id.*

- C_4+ (butanes+) less than or equal to 1.2 mole percent. This standard is less restrictive than the Siemens fuel specification of 1.0 mole percent. The adjustment is based on the same Siemens test mentioned above with respect to C_3 (propane). FGT states that its proposed C_4+ (butanes+) specification is supported by the LDCs. *Id.* at 45-46 (*citing* FGT-13 at 7).

- C_5+ (pentanes+) less than or equal to .12 mole percent. This standard is based on operating experience on FGT's facilities. FGT witness Langston explained in his direct testimony that this level is used by FGT to ensure there is no liquid fallout. *Id.*

- CO_2 less than or equal to one percent CO_2 and no injected CO_2 as a dilutant. FGT asserts that this CO_2 standard is appropriate because CO_2 is known to have a corrosive effect on pipelines. *Id.* at 47. FGT explains that CO_2 is commonly present in domestic natural gas, but is removed during processing of LNG. FGT also argues that when large quantities of LNG are delivered directly into the Market Area, facilities have either a limited or no opportunity for blending. *Id.* FGT similarly contends that the different standard for CO_2 in the Western Division is due to the fact that FGT is able to blend LNG and domestic volumes received in that division. *Id.* at 48 (*quoting* Ex. FGT-3 at 2). FGT also argues that this standard is appropriate given the increased emphasis on pipeline safety. *Id.* Third, FGT contends that nitrogen injection is an option available to LNG suppliers delivering LNG directly into FGT's Market Area. *Id.* Nitrogen injection is currently used at the Cove Point facility, and additional nitrogen injection facilities, including the Dominion Cove Point LNG have been proposed. *Id.* at 49. FGT states that nitrogen injection does

[4] Mole percent of a gas mixture is the ratio of the number of molecules of a particular component to the total number of molecules in a fixed volume.

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

not present corrosion and safety concerns. *Id.* at 48 (*quoting* Ex. FGT-6 at 70 and Tr. 1588/7-9).

- Total Sulfur less than or equal to two grains per one hundred cubic feet of gas. This limit addresses the need for low sulfur levels in air permit limits. *Id.* at 50. FGT contends that the current Western Division limit of 10 grains per 100 cubic feet of gas reflects the fact that FGT is able to blend LNG and domestic volumes it receives in the Western Division. *Id.* (*quoting* Ex. FGT-3 at 2).

- The following standards are identical to the existing standards approved by the Commission in FGT's Tariff (*see* Revised Pro Forma Sheet No. 102 C, Ex. FGT-12 at 6):

  i. Water Vapor less than or equal to seven pounds per Mcf of gas;

  ii. O_2 less than or equal to 0.25 percent by volume;

  iii. Hydrogen Sulfide less than or equal to 0.25 grain per 100 cubic feet of gas; and

  iv. $CO_2 + N_2$ less than or equal to three percent by volume.

18. FGT's proposed maximum temperature standard of 120 degrees Fahrenheit is based on the current standards approved by the Commission in FGT's Tariff. *Id.* at 50 (*see* Revised Pro Forma Sheet No. 103, Ex. FGT-12 at 7.) FGT witness Langston explains that a minimum temperature standard is necessary to avoid adverse impacts to FGT's or its customers' facilities from excessive cold gas which could cause freezing of valves or liquid hydrocarbon fallout. *Id.* at 51 (*quoting* Ex. FGT-1 at 8/4-7). Instead of establishing a uniform minimum temperature, FGT proposes that the minimum standard shall be determined on a case-by-case basis based upon pipeline operating conditions both downstream and at the receipt location. *Id.*

19. FGT next argues that, at this time, its quality standards for LNG should apply solely to the Market Area, and not the Western Division. FGT explains that there are physical differences between the facilities in the Western Division and Market Area that lead to differences in the blending capabilities of each division. *Id.* at 52. The primary physical difference between the two divisions is that the mainline of the Western Division is continually increasing along its west to east flow path and whereas pipeline capacity in the Market Area decreases along the mainline. *Id.* at 52-53. This, in combination with the large quantities of LNG flowing directly in to the Market Area, will not allow for the same degree of blending of domestic gas and LNG that takes place in the Western Division. *Id.* at 54 (*quoting* Ex. FPL-16 at 3).

20. FGT argues that both the electric utilities and the LDCs failed to demonstrate that they would incur additional costs as a result of LNG. Rather, FGT argues that neither presented evidence that proves costs would be significantly different from or substantially more than those costs typically incurred in the normal course of business. *Id.* at 64. According to FGT, it was the electric utilities' decision to install DLN turbines designed for a Wobbe below the average Wobbe on the FGT system. *Id.* FGT alleges that a significant portion of the cost of the mitigating measures involves costs related to fuel covers, which only arise due to the low Wobbe design number. *Id.* at 66-67 (*citing* Tr. 992/23 – 993/10).

21. FGT asserts that the equipment modifications suggested by PE/FPC witness Francis David Fitzgerald would be sensible even without deliveries of LNG. *Id.* at 68. For example, FGT argues that modifications such as performance heaters will improve the performance and efficiency of the plant, which in turn prevents liquid fallout. *Id.* at 69 (*citing* Tr. 667/1-11). FGT explains that remote tuning also improves efficiency, reduces wear and extends the life of the equipment. *Id.* at 70-71. FGT declares that there is a cost savings of five hundred thousand to one million dollars per turbine every year and half as a result of low turbine dynamics, reduced wear and extended equipment life. *Id.* at 71. FGT alleges that auto-tuning is similarly beneficial for purposes of optimizing DLN turbine dynamics, reducing wear and extending service life. *Id.* at 72.

22. FGT argues that there is no evidence that LNG will cause an increase in the number of leaks in the compression couplings of the Florida LDCs. *Id.* at 56. FGT asserts that the LDC's technical expert on compression leaks, witness Peter J. Loftus, was unable to definitively state whether regasified LNG would cause an increase in compression coupling leaks or any adverse effects on Florida LDC's systems without more data or testing. *Id.* at 56-57 (*citing* Tr. 1275/2-13 and Ex. PJL-1 at 12/4-16). Witness Loftus bases his analysis on the Environ Report which assessed the cause of compression coupling leaks in Washington Gas' system in Maryland. The four possible causes of compression coupling leaks identified in the Environ Report were: aging seals, a change in gas composition, decreasing ground temperatures with the onset of winter and the use of hot coal tar as an encapsulant during installation. *Id.* at 58 (*citing* Ex. PJL at 5/12-20). FGT argues that simply characterizing LNG as a "potential cause" does not prove that LNG will cause an increase in the number of compression couplings leaks. *Id.* at 57-58 (*quoting Id.* at 12/16-23). FGT alleges that the flaw with witness Loftus' approach is that he fails to present a scientific analysis that examines the differences between the compression couplings of Washington Gas and the Florida LDCs. *Id.* at 58. FGT asserts that significant differences include the higher ground temperature in Florida as compared to Maryland, and the non-use of hot tar on FGT's system. *Id.* FGT believes that these differences could lead to an entirely different result in Florida. *Id.* FGT additionally argues that Dr. Loftus's six-part "principal hypothesis" on the causes of increased compression coupling leaks on Washington Gas' system is inapplicable to the

Florida LDCs because it is entirely dependent upon the issue of ground temperature, which is warmer in Florida. *Id.* at 60.

23. In addition, FGT contends that LDCs regularly experience a large number of leaks and incur the cost of repair in the ordinary course of business. *Id.* at 73. People's witness Lewis M. Binswanger testified that Peoples experiences five to ten thousand leaks annually, and of those leaks, only forty to fifty are coupling leaks. *Id.* at 73-74 (*citing* Tr. 1062/17- 1063/15). In addition, FGT states that the LDCs are currently installing polyethylene pipe, which does not involve use of compression couplings in its new systems or system expansions. *Id.* at 74. Accordingly, FGT argues that the compression coupling issue is limited to older facilities, and that those facilities could require replacement due to the age of the facilities, regardless of the introduction of LNG. *Id.* at 75. If there were to be an increase in compression coupling leaks, FGT suggests injecting heavy hydrocarbons (C_5+) into the gas stream instead of replacing thousands of compression couplings. *Id.* (*citing* Ex. FGT-11 at 7/8-17).

24. FGT states that the facilities at issue are not pipeline facilities "used and useful" by the pipeline in the transportation of natural gas to its customers, and thus, these costs are not a cost of pipeline service and should not be included in pipeline rates. *Id.* at 78. For this reason, FGT argues that the FPSC, and not the Commission, has the jurisdiction to determine whether the costs are prudent. *Id*. FGT also argues that as done previously, each entity should be responsible for its own cost with regard to costs incurred to address gas quality issues. Witness Langston explained that in the past when a gas supplier delivered gas that had a reduced level of heavy hydrocarbons, which caused leaks, compression couplings had to be replaced. That cost was included in the LDC's operation and maintenance expenses as part of its cost of service. *Id.* at 78-79.

25. FGT asserts that it is reasonable to require each entity to be responsible for its own costs due to the benefits each entity will receive. These benefits include: the future option to purchase LNG; the impact the availability of LNG will have on the pricing of other supplies; and increased gas supply alternatives. *Id.* at 80. Fourth FGT asserts that there is no basis to shift costs to other entities because the LDC alone will receive all of the benefits of its own expenditures. *Id.* at 81. Specifically, FGT maintains that equipment modifications such as adding heaters or auto-tuning are sensible business expenditures regardless of whether there are no LNG deliveries to Florida, and shifting costs from one entity to another would cause unfair subsidization. *Id.* FGT mentions that FPL incurred the full cost of the heaters it installed and receives benefits from preheating fuel gas on all of its turbines. Because of the benefits of efficiency and of avoiding liquid fallout and because FPL has already incurred the cost of installing its own heaters, it would be unfair to shift the cost. *Id.*

26. Next, FGT asserts that because each utility's plans and, consequently, its cost decisions, are different from one another, entities should not bear the costs of other

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

entities. *Id.* at 82. FGT claims that different business entities will make different business decisions. Some will decide to install different equipment or spend more money. Therefore, the cost should not be spread out because it would be unfair to require entities to pay for one another's equipment. *Id.* FGT also suggests that electric utilities and LDCs have an incentive to take the most cost-effective approach if they are responsible for their own costs, since such costs are subject to review by the FPSC. *Id.* at 83. Seventh, FGT argues that FERC should not usurp the FPSC's regulatory authority to review costs incurred by electric utilities or LDCs because the FPSC has the expertise and experience to review such issues. *Id.* at 84.

27. Finally, FGT argues that the proposal to spread costs out among FGT's customers would be anti-competitive and would result in FGT's subsidizing its competitors as FGT's rates would include costs to accommodate LNG while its competitors would not have to include such costs in their rates. *Id.* For example, FGT and Gulfstream Natural Gas System (Gulfstream) compete for FPL's business; if LNG costs are included in FGT's rates, its rates would be higher and thus in a less competitive position. *Id.* at 85. FGT disagrees with Ocean Express' argument that *Columbia Gas Transmission Corp*, 13 FERC ¶ 61,102 (1980) (*Columbia*), is applicable and to that end maintains that *Columbia* did not involve the highly anticompetitive effects discussed here. *Id.* at 87.

28. FGT disagrees with contentions by FPL that its 1989 Service Agreement for Firm Transportation Service (1989 Service Agreement), dated Nov. 1, 1989, affords FPL the contractual right to protect DLE units. FGT maintains that the 1989 Service Agreement expressly provides FGT with the unilateral right to file changes to its tariff. FGT R.B. at 31.

AES Ocean Express, LLC

29. AES contends that FGT's proposed tariff changes are not just and reasonable under Section 5 of the NGA and do not comply with the requirements set forth in the Commission's June 2004 Order. AES I.B. at 8. According to AES, the Commission evaluates proposed quality standards by examining whether the standards are consistent with the standards used by other pipelines in the region and whether those specifications would impede the interchange of gas at pipeline interconnects. *Id.* AES contends that FGT's current proposal would fail this test. Rather, AES supports the adoption of standards that are consistent with the recommendations of the NGC+ Work Group.

30. AES asserts that FGT's proposed upper Wobbe limit of 1396 is overly restrictive and would obstruct the development of a LNG market in spite of the Commission's June 2004 Order. *Id.* at 10. Instead, AES suggests an upper limit of 1400, as recommended by the NGC+ Work Group. AES submits that an upper limit of 1400 is consistent with FGT's shippers' requirements and falls within the fuel specifications of the GE turbines owned by FPL. *Id.* at 9-10 (*citing* Tr. at 719-720).

31. AES next contends that FGT's proposed limitations on hydrocarbons are overly restrictive. FGT states that its specifications are "along the lines of the NGC+ recommendation." However, AES finds FGT's proposal to be quite different, and without explanation. *Id.* at 11 (*quoting* Ex. FGT-11). AES observes that the NGC+ Work Group recommends a limit for butanes and heavier hydrocarbons (C_4+) of 1.5 mole percent, but set no limits for C_1, C_2 or C_3. *Id.* (*citing* Ex. FGT-6 at 27). AES next argues that FGT's proposed limit on carbon dioxide (CO_2) of less than or equal to three percent by volume with no more than one percent CO_2 and no injected CO_2 as a dilutant is unjust, unreasonable, and without support. *Id.* at 12. AES comments that FGT's CO_2 limitation is different from FGT's July 2004 Compliance Filing, as well as the NGC+ White Paper recommendation of four mole percent limit on total inerts, which does not single out CO_2 over any other inert. *Id.* at 13 (*citing* Ex. FGT-6 at 27). AES argues that such a limit on the use of inerts as a dilutant would have the effect of decreasing LNG supply. *Id.* at 12 (*citing* Tr. at 1581/23-1582/3). AES alleges that FGT witness Klassen admitted that FGT has no experience with issues regarding inert levels under the current FGT scheme, and actual operational data for the FGT system demonstrates that CO_2 levels have in the past exceeded one mole percent. *Id.* at 14.

32. AES next argues that FGT failed to justify why it proposed different quality specifications for the Western Division and Market Area. AES asserts that applying unique standards for regasified LNG in the Market Area is unfair discrimination in favor of the Gulf Coast suppliers and project developers. *Id.* at 16. AES asserts that dividing the FGT system contradicts the Commission admonition that any standard "must have general applicability or be applicable to a specific class of rate schedule." *Id.* AES disagrees with FGT's reasoning that the February 2005 Order approving minimum temperature requirements at five different points on the FGT system indicated the Commission's willingness to have a different sets of quality specifications for different portions of the FGT system. *Id.* at 15-16.

33. AES argues that there is no practical way to apportion responsibility for equipment modification costs among LNG suppliers and project sponsors. AES R.B. at 11-12. AES argues that under the Commission's cost allocation policies, facility modification costs required to accommodate the delivery of regasified LNG should be spread system-wide among the power generators, LDCs and electric utilities who will benefit from the introduction of regasified LNG to the FGT system. AES I.B. at 17 (referring to Commission Policy Statement, 88 FERC ¶ 61,227 (1999) at 61,746 n.12). AES argues that the introduction of regasified LNG into the FGT system will benefit all consumers in Florida, regardless of whether they directly purchase regasified LNG, particularly as the two interstate gas lines that currently serve the area are unable to fulfill the growing demand for natural gas. *Id.* at 17-18. AES argues that by diversifying supply and enhancing reliability, AES' pipeline project will increase competition in the natural gas

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

marketplace, ultimately resulting in lower prices as a result of an increase in supply alternatives. *Id.* at 19 (*citing* Ex. FGT-11).

34. AES also observes that in the past, LDCs and electric utilities have borne the costs of modifying their facilities to accommodate changes in the composition of the gas that they receive. *Id.* at 19 (*citing* Tr. at 1034/6-10). AES asserts that if such costs are imposed on the LNG supplier, the LNG supplier may ultimately end up subsidizing the power generator's access to a new supply of resources. *Id.* at 20. AES also cites the Commission rulings in *Columbia, supra,* and *Cove Point LNG Ltd. P'ship,* 97 FERC ¶ 61,276, 62,268 (2001) (*Cove Point*) as recognition that modification costs should be spread system-wide upon finding that three criteria are met: (i) costs are incurred as a direct result of LNG entering into the system, (ii) costs were reasonable, prudent and necessary to permit the safe utilization of LNG and (iii) the costs are a one-time, nonrecurring nature. *Id.* AES asserts that the Florida Generators' suggestion that based on *Columbia, supra,* the LNG Suppliers and project sponsors should bear the costs of facility modification is flawed; in response, AES states that *Columbia, supra,* did not actually bear any costs. Rather, the pipeline was authorized to allocate and recoup the costs pro rata from its wholesale customers. AES R.B. at 13. Thus, AES suggests that reimbursable costs, as determined by *Columbia, supra,* should be spread system-wide to FGT shippers, and costs not meeting the Columbia test should be borne directly by the entities that incur them. AES R.B. at 14.

LNG Suppliers

35. The LNG Suppliers advocate the adoption of broad standards. The LNG Suppliers contend that the demand for natural gas in Europe and developing countries is expected to grow even faster than in the United States. LNG Suppliers I.B. at 7. The LNG Suppliers claim that the decision in this proceeding will impact the entire United States, as numerous other projects are proposed for FGT's Market Area and will be governed by the standards established here. *Id.* at 16-17.

36. The LNG Suppliers assert that adoption of the NGC+ Interim Guidelines will maximize LNG availability to Florida and the United States and thereby increase supply options. *Id.* at 9. The LNG Suppliers argue that the NGC+ Interim Guidelines were intentionally conservative, and intended to be expanded, not contracted. *Id.* at 9-10. Consistent with the NGC+ Interim Guidelines, the LNG Suppliers propose a Wobbe range of 1302-1400 (+/-4% Wobbe Index from the five-year historical average of 1356, subject to a maximum of 1400), limit the heating value to a maximum of 1110 Btu/scf and compositional maximums of 1.5 mole percent for butanes-plus, and four mole percent for total inerts. *Id.* at 10 (*citing* FGT-6 at 27). The LNG Suppliers assert that it is unnecessary to require standards for other parameters in FGT's tariff, and that adoption of such standards would only act to restrict LNG imports. *Id.* at 12. The LNG Suppliers

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

also contend that the Modified Wobbe Index (MWI)[5] is not an appropriate measure at pipeline receipt points because temperature fluctuates between the point of receipt into the pipeline and point of delivery to the gas turbine. *Id.* at 23-24.

37. The LNG Suppliers contend that it would be unreasonable to adopt the least-common-denominator approach as it would disallow generators with more flexible facilities to take full commercial advantage of their superior ability to cope with variations in fuel gas quality. *Id.* at 31-32. The LNG Suppliers claim that based on witness Dr. Chris Marsland's analysis of the particular turbines and related warranties and service agreements at issue, the adoption of the standards proposed by the LNG Suppliers is a practical solution. *Id.* at 33-34. The LNG Suppliers assert that its proposed standards are narrow enough to protect Florida's consumers, but not so restrictive as to unreasonably constrict worldwide LNG supply sources from reaching the United States domestic markets. *Id.* at 34.

38. The LNG Suppliers state that the NGC+ Interim Guidelines are conservative as compared to specifications followed in other regions of the world. For that reason, the LNG Suppliers argue that if restrictive standards are adopted, it could restrict the supply options available for LNG importation, which will increase prices to U.S. consumers. *Id.* at 43. In order to meet specifications that are stricter than those the LNG Suppliers propose, additional processing through blending, inert injection or removing natural gas liquids from the vaporized LNG (referred to as NGL extraction) would be required. *Id.* at 44. The LNG Suppliers argue that all of these options involve substantial capital investment and operational costs. *Id.* The LNG Suppliers assert that blending is not an option in the Florida market because there are not sufficient volumes of low Btu gas available for blending. *Id.* Next, the LNG Suppliers explain that inert injection involves adding inert compounds to the vaporized gas stream to bring it within the relevant gas quality specifications. *Id.* at 45. The LNG Suppliers contend that this option is not workable because it will add costs and could violate tariff specifications; and further specify that FGT's proposed 3% ceiling for combined inert injection limits the ability to use this option by itself to manage the heat content of vaporized LNG. *Id.* Finally, the LNG Suppliers argue that NGL extraction is not an effective option because it is very costly and only feasible when a nearby market exists for the removed liquids. *Id.* at 46. Further, the LNG Suppliers assert that it is not technically feasible to achieve a level of 1372 through propane extraction alone. *Id.*

39. The LNG Suppliers argue that if the standards they propose are adopted, FGT's customers will be able to access 21% of the natural gas from current LNG production sources without the need for additional processing, as opposed to 15% if FGT's original

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[5] MWI is similar to the Wobbe Index but the MWI incorporates a temperature variable.

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

compliance filing with a maximum HHV 1075 Btu/scf and Wobbe Index of 1372 are adopted. *Id.* at 18. The LNG Suppliers explain that if the LNG gas stream with an HHV limit of 1110 Btu/scf is injected with two percent nitrogen, FGT's customers would have access to 86 % of natural gas from current LNG production sources, but with the limit of 1075, even with the injection of two percent nitrogen, only 15 % of LNG would be available. *Id.* at 18-19 (*citing* LNG-41 at 10). Finally, the LNG Suppliers assert that the adoption of gas quality standards based on the NGC+ Interim Guidelines is the most cost-effective way to maximize LNG imports. *Id.* at 22. The LNG Suppliers contend that upstream LNG importers and terminal operators will have to incur significant costs to satisfy standards based on the NGC+ Interim Guidelines, and end-use consumers should incur little or no cost for modifications. *Id.*

40. The LNG Suppliers argue that the standards they have proposed are consistent with the fuel gas specifications provided by the turbine manufacturers. The LNG Suppliers contend that all GE turbines support a Wobbe Index range wider than what it proposes and a significant portion of the Siemens-Westinghouse turbines support a range equal to the standards it proposes. *Id.* at 26-27. The LNG Suppliers explain that if a gas turbine on the FGT system is tuned to burn the average historic gas quality with a Wobbe Index of 1356, and the turbine burned LNG at the 1400 Wobbe cap, it would only be 3.3% above the average historic gas quality and thus within the GE fuel specification range for MWI of +/-5%. *Id.* at 31. The LNG Suppliers also explain that though the 3.3% variation is beyond Siemens-Westinghouse's most stringent specification of +/-2%, the turbine owner could use fuel heating to ensure that the gas quality does not surpass the Gas Index variation limitation of +/-2%. *Id.* Thus, the LNG Suppliers claim that if properly tuned, Florida consumers' appliances and equipment will perform safely and efficiently, and without a material change to air pollutant emissions if its proposal is adopted. *Id.* at 35.

41. The LNG Suppliers assert that the record does not support a finding that the introduction of LNG will cause negative impacts to the LDC pipeline infrastructure or cause an increase in compression coupling leaks on the distribution system. *Id.* at 37. The LNG Suppliers disagree with witness Loftus' findings based on conclusions in the Environ Report that compression coupling leaks on the Washington Gas Light Company (Washington Gas) system in Maryland during the 2003-04 winter heating season resulted, in part, from the introduction of LNG. *Id.* First, the LNG Suppliers state that the Washington Gas installation practice was identified as a potential contributor to the leaks on the gas system and possibly major cause of leaks on the distribution system. *Id.* at 38. Second, the LNG Suppliers assert that Washington Gas used hot coal tar as an encapsulant to protect the compression couplings from corrosion whereas the LDCs used cold applied tape coat mastic, and thus should not be as prone to leaking. *Id.* at 37-38 (*citing* Tr. 1087/21-1088/19). Third, the LNG Suppliers also draw a distinction between the temperature differences between Florida and Maryland, and assert that this difference, which was identified as a contributing factor for the leaks that Washington Gas

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

experienced, invalidates the comparison of the two systems. *Id.* at 39-40. Fourth, the LNG Suppliers argue that application of the Environ Report is inappropriate since witness Loftus did not analyze the Florida system, and did not consider whether the differences between Florida and Maryland could be meaningful for purposes of applying the Environ Report to the Florida situation. *Id.* at 40. Finally, the LNG Suppliers argue that the Environ Report is unreliable as applied here, because the Environ Report failed to quantify the relative significance of each possible contributing factor and thus, it is based on poor scientific analysis. *Id.* at 41.

42. The LNG Suppliers argue that any costs associated with the adoption of the standards that they propose should be borne by the entity incurring those costs. *Id.* at 50. The LNG Suppliers contend that only the customer who makes an end-use system modification will reap the benefits of that modification, and for that reason the entity that makes the modification should pay for it. *Id.* at 51. The LNG Suppliers state that FGT's other customers should not be forced to subsidize the system enhancements of other entities; rather, under the *Memphis Clause*[6], FGT's customers assume a risk that gas quality standards could change at any point. *Id.* at 52. Finally, the LNG Suppliers argue that historically Florida utilities have paid for their own system modifications when necessary. *Id.* at 53.

BG LNG

43. The standards that BG LNG supports are consistent with the recommendations of the NGC+ Work Group. BG LNG states that LNG will be an essential component of the United States' ability to meet its future energy demands. BG LNG I.B. at 1. BG LNG states that it has not taken a position on the issue of whether the gas quality specifications in FGT's tariff must apply equally to FGT's Western Division and Market Area. BG LNG R.B. at 29. BG LNG does not object to the proposed limits to carbon dioxide and nitrogen combined, oxygen, hydrogen sulfide, total sulfur and water vapor, so long as the limitations are applied equally to both domestic gas and LNG supplies connected to FGT's Market Area.

44. BG LNG does not support specifications narrower than: HHV of 1000 to 1110 and Wobbe of 1302 to 1400 (which represents +/-4% from the historical average 1356, subject to a maximum of 1400). BG LNG I.B. at 7. If the Commission finds additional gas composition specifications should also be included in FGT's Tariff, BG LNG supports specifications no more restrictive than the following:

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[6] A *Memphis Clause* provides a pipeline company the right to unilaterally change its rates, subject to the restrictions of the Natural Gas Act. *See United Gas Pipeline Co. v. Memphis Light, Gas and Water Division et al.*, 358 U.S. 103 (1958)

- C_1 (methane) greater than or equal to 85 mole percent
- C_2 (ethane) less than or equal to 15 mole percent
- C_3 (propane) less than or equal to 2.5 mole percent
- C_4+ (butane and higher**)** less than or equal to 1 mole percent
- CO_2 + N_2 less than or equal to 3 vol. %, less than or equal to 1% CO_2 and no injected CO2
- O_2 less than or equal to 0.25 vol. %
- Max Temp less than or equal to 120°F
- Hydrogen Sulfide less than or equal to 0.25 grains per 100 scf
- Total Sulfur less than or equal to 10 grains per 100 scf
- Water Vapor less than or equal to 7 lbs. per 1,000 Mcf

Id. at 7-8.

45. In the absence of further testing, BG LNG argues that the NGC+ Work Group's recommendations are a reasonable starting point for establishing gas quality specifications. *Id.* at 12. BG LNG argues that those standards are consistent with the fuel specifications published by GE and Siemens-Westinghouse, will not materially affect end-use appliances and will meet the Commission's policy to increase the diversity of natural gas supplies available to the FGT Market Area. BG LNG explains that in developing its recommendations, the NGC+ Work Group considered the impact of changing natural gas composition on appliances, combustion turbines and other equipment, as well as the considerations raised by the Florida Generators (i.e. - combustion dynamics, flashback, lifting, blowout, incomplete combustion, yellow tipping and changes in emission characteristics). *Id.* at 12-13. BG LNG asserts that the FGT Market Area, with a historical Wobbe value of 1356 and mean HHV of 1042, is the type of market for which the NGC+ Interim Guidelines were designed to apply. *Id.* at 14. BG LNG also contends that GE specifications provide that once tuned, GE turbines can operate within +/-5% from the design MWI so long as the MWI remains 40-54. *Id.* at 15. BG LNG explains that a Wobbe value of 1400 is only 3.2% above FGT's historical average of 1356, and that it is within GE's maximum specification, as gas with a Wobbe of 1400 would have a MWI of less than or equal to 54 at a gas inlet temperature of 85 degrees or higher. *Id.* (*citing* Ex. LNG-72). BG LNG similarly asserts that with the installation of auto-tuning, Siemens-Westinghouse DLN turbines provide for a +/-4%

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

variation from the design MWI for the turbine, and thus if tuned to 1356, would be within the 1400 Wobbe limit. *Id.* at 15-16.

46. BG LNG asserts that FPL, the Florida Generators, Progress Energy and the LNG Suppliers have all failed to meet their respective burdens of proof under the NGA. *Id.* at 10. BG LNG argues that pursuant to Section 4 of the NGA, FGT has the burden of proving that its proposed gas quality specifications are just and reasonable. *Id.* at 9-10. BG LNG asserts that under Section 5 of the NGA, any party, other than FGT, proposing a change to FGT's current tariff provision bears the burden of proving that the existing tariff is unreasonable and the party's proposed changes are just and reasonable. *Id.* at 10 (*citing Gulf South Pipeline Co., LP*, 104 FERC ¶ 61,160 at P 17 (2003)).

47. BG LNG next argues that the record does not support any standard narrower than the NGC+ Work Group's recommendations. *Id.* at 16. Specifically, BG LNG asserts that no party has demonstrated that any operational or emissions problems will arise in gas turbines from a gas supply with a Wobbe value within the range of +/-4% from 1356. *Id.* at 17. BG LNG alleges that witness Klassen did not testify that FGT's proposed gas quality specifications would cause problems, but rather that they were possible risks. *Id.* at 18 (*citing* Tr. at 406/2-8). BG LNG also asserts that witness Klassen did not provide any evidence that his opinion that an acceptable Wobbe range of +/-1% from 1356 is more valid than that of the NGC+ Work Group. *Id.* at 10. BG LNG also states that witness Klassen's proposed Wobbe variability range is narrower than the acceptable ranges specified by GE and Siemens-Westinghouse. *Id.* at 19. BG LNG argues that the Florida Generators and Progress Energy incorrectly assert that the turbines require additional equipment to accommodate a +/-5% variation from the historical mean Wobbe value of 1356. BG LNG asserts that the Florida Generators' real concern is that many GE turbines in Florida are designed for a Wobbe below the historical level; the Wobbe for the Hines Unit 3 Siemens DLN turbine was 1335 and the actual design Wobbe for Progress Energy's gas turbines was approximately 1310. *Id.* at 22 (*citing* Tr. at 941-942). Finally, BG LNG mentions that Progress Energy entered into long-term contracts with BG LNG to bring on to the FGT system regasified LNG with a maximum Wobbe of 1396. *Id.* at 23.

48. BG LNG next argues that the record lacks evidence that gas within the Wobbe variability range of +/-4% will cause emissions problems. *Id.* Specifically, BG LNG asserts that none of the twenty exhibits submitted by witness Klassen in support of his testimony supports this conclusion, including FG-2 which was presented to the NGC+ Work Group. *Id.* at 23. BG LNG similarly argues that the Nord/Anderson testing cited by witness Fitzgerald does not support his conclusions with respect to emission problems because that test involved an Alstom turbine which is not installed in FGT's Market Area. *Id.* at 24. BG LNG asserts the second test cited by witness Fitzgerald was not entered into the record. *Id.*

49. Next, BG LNG argues that the record does not support imposing more restrictive specifications on LNG supplies than on domestic gas supplies. *Id.* at 25. First, BG LNG argues that FGT failed to provide an explanation as to why the gas quality standards should be different for the two sources of gas supply. *Id.* at 26. BG LNG points out that under FGT's current tariff provision, end-users are not guaranteed that future sources of domestic gas suppliers will have the same chemical composition as the current supply. *Id.* Third, BG LNG asserts that a uniform set of specifications is necessary to ensure that gas supply sources are interchangeable. *Id.* at 27.

50. BG LNG argues that it has not been established that an increased rate of compression coupling leaks will occur as a result of the introduction of revaporized LNG into the FGT Market Area. *Id.* at 29. BG LNG argues that LDC witness Loftus admitted that he is not an expert on the subject, and for that reason, his testimony should not be given any weight. *Id.* at 29-30. BG LNG asserts that the Environ Report relied on by witness Loftus does not conclude that LNG was the primary cause of the increase in compression coupling leaks experienced on the Washington Gas system. *Id.* at 30. BG LNG asserts that witness Loftus has identified eight potential contributing factors during his testimony, and only three were associated with LNG (humidity change, C_5+ change and C_2, C_3, C_4 change), and witness Loftus did not provide a scientific basis for eliminating four other potential causes (ground conditions, earthquake, pressure increase and sealing surface conditions). *Id.* at 31. BG LNG states that an April 2004 internal study, performed by Washington Gas, found that the primary reasons the high rate of compression couplings occurred was: creeping of the soil and faulty tightening by the construction crew; and other documents revealed that the application of a thick layer of 400 degree tar to each joint could melt, degrade material or accelerate relaxation of the seal. *Id.* at 32 (*citing* Ex. LNG-85).

51. It is the position of BG LNG that the costs for turbine equipment upgrades should be borne by the turbine owners, not gas suppliers. BG LNG argues that the Commission does not have the legal authority under either the NGA or Energy Policy Act of 2005 (EPAct 2005) to direct payments among parties. *Id.* at 34. BG LNG states that there are several practical challenges associated with the proposals to spread out the costs of modifications including the following: (i) it is not clear who the responsible party should be; (ii) the parties calling for the compensation failed to explain how responsibility for equipment modification will be apportioned among LNG suppliers; and (iii) there is no method for determining what costs are reasonable for a particular turbine. *Id.* at 34-36.

52. Next, BG LNG argues that a new gas supply should not be required to pay for equipment upgrades that a prudent turbine owner should have already installed. *Id.* at 37. BG LNG argues that given the benefits of heating, such as increased efficiency and prevention of liquid dropout, a prudent turbine owner would have installed heating when the turbine was first commissioned. *Id.* at 28. BG LNG similarly suggests that a prudent Siemens-Westinghouse turbine owner, aware of the turbine's sensitivity to minor gas

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

variations, should have installed auto-tuning prior to this proceeding. *Id.* at 39. BG LNG also asserts that a GE gas turbine owner with turbines designed for the five-year historic Wobbe average of 1356 should not have to make any equipment modifications. *Id.* at 37. BG LNG similarly asserts that there is not a basis for assigning the upgrade costs for an owner of a Siemens-Westinghouse turbine that was designed for a mean Wobbe value less than 1356. *Id.* at 38.

53. BG LNG also argues that a supplier of new gas, including FGT should not be required to pay for maintenance costs that are routinely incurred by turbine operators. *Id.* at 40. BG LNG states that FPL witness Gary Driebe admitted that tuning a turbine once in a given year is normal, and further that tuning is performed to reduce wear on gas turbine equipment, which saves five hundred thousand to one million dollars every year and a half. *Id.* at 40-41 (*citing* Tr. 676-77).

54. Finally, BG LNG argues that the introduction of new LNG supplies will provide benefits to customers that outweigh any cost of adapting to new supplies. *Id.* at 41. BG LNG states that FPL's customers will benefit by improving the reliability of gas supply, competition between gas sources and increased flexibility in available gas supply options. *Id.* BG LNG also mentions that FPL witness Driebe stated that FPL had requested that LNG be brought into Florida to help meet demand and add supply security. *Id.* at 42 (*citing* Tr. 660-61). BG LNG similarly mentions that Progress Energy made statements before the FPSC that opportunities for purchases of LNG should decrease fuel and transportation prices over the long term. *Id.* at 43 (*citing* Ex. SNG-20). BG LNG claims that, since end-users such as the LDCs, Florida Gas Utilities, JEA and Seminole will benefit in terms of lower natural gas fuel costs due to increased availability of supply and as beneficiaries of this downward pressure on natural gas market prices, it is not unreasonable for these end-users to pay for equipment upgrades. *Id.*

Southern

55. Southern's interest in this proceeding stems from the application it filed in Docket No. CP05-388 for a certificate of public convenience and necessity to construct and operate an expansion of its Cypress Pipeline. Southern I.B. at 5. The Cypress Pipeline will connect Southern's existing Wrens-Savannah pipeline in Georgia to a point of interconnection with FGT's Jacksonville Lateral in Clay County Florida. *Id.* at 5-6. Southern argues that the interconnection between FGT and the Cypress Pipeline should be treated as a supply-area interconnection even though it is located in FGT's traditional Market Area. For this reason, Southern explains that even though the Cypress Pipeline is located in FGT's Market Area, it will function as though it is located in the Western Division. *Id.* at 23.

56. Southern argues that FGT's proposed gas quality standards should not be limited to the Market Area, and instead should be applied on a system-wide basis. FGT argues

that, due to the blending capabilities of the Western Division, it is unnecessary to extend its proposed standards to the Western Division. Southern contends that FGT's assumption is incorrect because Southern's Cypress Pipeline, which will interconnect with FGT in Clay County, Florida, will supply blended gas stream to the FGT Market Area. *Id.* at 22. Given the numerous LNG projects proposed in the Western Division, Southern argues that it is erroneous for FGT to assume the Western Division will continue to have the ability to supply a blended supply to the Market Area. *Id.* at 22-23. In addition, Southern argues that FGT's proposed specifications should be applied on a system-wide basis because selective implementation would result in disparate treatment of competing LNG terminals and would therefore be unduly discriminatory. *Id.* at 25.

57. Southern supports the gas quality standards proposed by FGT. Southern argues that FGT's proposed standards are just and reasonable and are not unduly burdensome to any party affected by them. *Id.* at 13. Southern also believes that the guidelines proposed by FGT will provide a competitive opportunity to attract regasified LNG to its system from Egypt, Trinidad, Equatorial Guinea and Qatargas IV, which have Wobbe values ranging from 1361-1384. *Id.* at 14 (*citing* Ex. SNG-17 at 4). Southern also argues that FGT's proposal should be approved because it is consistent with the NGC+ Work Group's Interim Guidelines as well as the fuel gas specifications of GE and Siemens-Westinghouse. Finally, Southern argues that FGT's proposed specifications are compatible with the Commission's policy in *Panhandle*, *supra*, as there has not been evidence presented that demonstrates that adopting FGT's specifications will be detrimental to any of its customers. *Id.* at 17.

58. Southern asserts that the parties opposing FGT's proposed quality specifications failed to demonstrate that modifying their facilities would be either impossible or unduly burdensome. *Id.* at 16-17. In developing its proposed guidelines, FGT reviewed the fuel gas specifications of GE and Siemens-Westinghouse turbines. When the specifications of one manufacturer were more restrictive than the other; Southern contends that FGT used the more restrictive specification. *Id.* at 20. In addition, Southern asserts that the proposed specifications for ethane, propane, butane and heavier hydrocarbons (C_4+), pentane and hydrocarbons (C_5+) are acceptable for the operation of GE and Siemens-Westinghouse turbines and should be approved. *Id.* at 21.

59. Southern submits that there is no credible evidence that costs will be required for modifications to turbines as a result of the adoption of FGT's proposed gas quality specifications. *Id.* at 28. Therefore, Southern asserts that it is premature to make a determination that the introduction of regasified LNG will cause remediation and/or retrofitting costs. *Id.* at 34. In addition, Southern states that there are numerous defects with the evidence that Florida Power witness Fitzgerald relied on to support his finding that the implementation of the proposed FGT fuel tariff would significantly increase the likelihood that Progress Energy's fleet of turbines would experience adverse impacts. *Id.* (*citing* Ex. EP-1 at 9-10). First, Southern argues that there is no known test data that

demonstrates that turbines operate successfully while being exposed to varying fuel quality streams. *Id.* at 29. Rather, it contends that the fact that the proposed specifications are consistent with NGC+ Work Group and GE and Siemens-Westinghouse fuel gas specifications substantially proves their acceptability and negates the lack of operational data. *Id.* at 29-30. Second, Southern argues that tests using synthetic LNG with heavy hydrocarbons (C_4+) that exceed the manufacturers' specifications to stimulate a high Wobbe value on turbines similar to Progress' do not predict the potential impact on combustion dynamics on Progress' turbines, because each turbine is unique. Third, Southern criticizes witness Fitzgerald's use of the 2003 International Joint Power Conference test of a large gas turbine because Fitzgerald was not familiar with the turbine nor did he know the constituencies of the gas used.

60. Southern next responds to the testimony offered by Florida Generator witness Klassen, who testified that the DLE turbines are not capable of handling large changes in gas composition without retuning, that retuning is not always possible, and that, consequently, the turbines' performance may be adversely affected. *Id.* at 33. Southern characterizes Dr. Klassen's testimony as "theoretical," stating that it is not known what magnitude of change a turbine can tolerate. *Id.* at 33. Southern next turns to the testimony of the LDCs' witness Loftus, who stated that the LDCs should exercise "vigilance" when a new source of supply is being received. *Id.* at 34. Southern alleges that this is not sufficient to support a finding that the LDCs are going to incur any costs. *Id.* at 34-35. Southern next mentions that witness Loftus agreed with witness Langston's finding that "additional information and/or testing is required to determine whether regasified LNG would have any adverse effects." *Id.* at 34 (*citing* Ex. PJL-1 at 10)

61. Southern argues that LDCs are not entitled to reimbursement for costs that may be associated with compression coupling seals because there is no credible evidence that regasified LNG will have a detrimental impact on those seals. *Id.* at 43. Southern argues that the Environ Report, which the LDCs relied heavily upon, failed to provide a complete analysis of the role that several potential factors might have played, such as defective couplings, installation practices and ground movement. *Id.* at 51. Southern remarks that it was particularly questionable to exclude the defective couplings as a direct cause when data indicated that the application of hot coal tar caused a coupling to leak. *Id.* Southern also alleges that Washington Gas was "shaping the outcome" of the Environ Report by focusing the theory of causes on LNG, rushing the analysis process and stating at the initial meeting what it expected out of the process. *Id.* at 57. Southern similarly alleges that Washington Gas exercised direct control over the information upon which witness Loftus based his analysis by restricting his access to memos. *Id.* at 49. Specifically, Southern contends that witness Loftus failed to independently investigate the historic use of LNG on the Washington Gas system during the period of August 1978 through June 1979, and if he had known that information, witness Loftus might have reevaluated his hypothesis that LNG was a contributing factor to the increase in compression coupling leaks experienced in 2003. *Id.* at 46-47. Finally, Southern

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

criticizes witness Loftus for failing to investigate the experiences of other markets where domestic gas was displaced by "drier" gas supplies. *Id.* at 47.

62. Southern disagrees with the LDCs and Florida Generators' claims that the LNG project sponsors should have the obligation to reimburse them for any remediation of retrofit costs they incur as a result of the introduction of regasified LNG. *Id.* at 37. Southern asserts that such costs should be reviewed or denied in the state regulatory process. *Id.* at 37-38. Southern argues that such modifications are discretionary and may be recovered from the operators' ratepayers as operation and maintenance costs. *Id.* at 12. Southern argues the *Columbia, supra*, concept of socializing costs is inconsistent with the competitive structure of today's market. *Id.* at 12. Rather, Southern contends that *Columbia, supra*, is outdated precedent and that old concept of end-use curtailment has been replaced with the belief that gas supplies and transportation capacity should go to the party that values it the most and is willing to pay for it. *Id.* at 38. Should the Commission determine that such costs should be socialized, Southern argues that the appropriate method is to have the costs reimbursed by FGT and then collected through its rates from all the users of the FGT system. *Id.* at 39.

63. Southern argues that the cost responsibility issue should not be addressed in this proceeding. First, Southern asserts that the presiding judge is not obligated to address it. *Id.* at 35. Southern argues that the scope of the proceeding was established to address the issue of quality specifications proposed by FGT; as FGT did not propose a cost recovery mechanism in its filing, it is not an issue in this proceeding. *Id.* Second, Southern claims that the issue of cost responsibility is of interest to the entire natural gas industry, and as such, the issue should not be addressed in an individual pipeline proceeding. *Id.* Rather, Southern asserts that Docket No. PL04-3, which the Commission established to address policy issues arising from natural gas interchangeability, is a more appropriate forum to decide this issue. *Id.* at 35-36. Finally, Southern asserts that the cost of turbine modifications should be included as normal operating and maintenance costs, and that costs should not be shifted to other parties. *Id.* at 36-37.

64. If a determination is made that it is appropriate to address the cost responsibility issue in this proceeding and that reimbursement is warranted, Southern argues that the Commission should establish a safe harbor Wobbe index range of 1340-1383. *Id.* at 41. Southern argues that the evidence demonstrates that no modifications are necessary for existing turbines to burn regasified LNG with a Wobbe value of 1329-1383. *Id.* Southern submits that no witness in this proceeding offered evidence that any equipment has been adversely impacted by FGT's historical gas supply. *Id.* at 40. Southern submits that without a safe harbor provision, turbine operators could receive reimbursement for the cost of purely operational and discretionary equipment modifications. *Id.* at 41. Southern claims the floor of 1340 is consistent with the minimum specification proposed by FGT. *Id.* at 41-42. Southern states that the proposed ceiling of 1383 was determined on both FGT's historical range of variability and general consensus that +/-2% range of

variability is acceptable. *Id.* at 42. Southern suggests setting up monitoring points, and if the recorded Wobbe at a monitoring point exceeds 1383 for fifteen consecutive days, then any equipment modifications made by a turbine operator downstream of that point within the preceding 24 months will be presumed to have been made in anticipation of receiving regasified LNG with a Wobbe in excess of 1383 and will be eligible for inclusion in the cost reimbursement procedures adopted by the Commission. *Id.* at 43.

Florida Generators

65. The Florida Generators advocate the adoption of gas quality and interchangeability standards based on the historical operating experience of the pipeline system as proposed in FGT's July 23, 2005 *pro forma* filing, subject to two modifications: (i) a +/-1% variability limit on the Wobbe Index range; and (ii) the adoption of the standards on a system-wide basis. The Florida Generators state that they may be willing to endorse a Wobbe range broader than +/-1% if further testing conducted on DLE turbines reveals that no adverse impacts will occur to the turbines when supplied with natural gas with a changing composition. Florida Generators I.B. at 51. The Florida Generators further argue that the costs of modifications and end-user equipment should be the responsibility of the project sponsors. *Id.* at 1. The Florida Generators contend that the applicable legal standard in this proceeding is Section 5 of the NGA. *Id.* at 3.

66. According to the Florida Generators, the gas delivered to FPL's power plants has had a Wobbe range of 1346-1371 (+/-1%) over the past five years. *Id.* at 33. The Florida Generators state that the DLE turbines on the FGT system have a history of operating reliably within this range and the turbines manufactured by Siemens-Westinghouse and GE, have been designed, installed and tuned to accommodate this range. The Florida Generators explain that the introduction of LNG in to the FGT Market Area could result in changes to the delivered gas stream, causing power plants to have to switch from one fuel composition to another, which in turn will cause many generating units to operate with both domestic and imported gas streams. *Id.* at 20. The Florida Generators contend that currently, the DLE turbines accept the gas "as is," and the turbines are limited in their ability to respond to variations in the gas stream.

67. The Florida Generators assert that the evidence presented demonstrates that significant operational problems, costs and environmental compliance issues may result from variations in gas quality and streams. Florida Generators' witness Klassen concluded that utilization of gas with a wide variation in gas composition is likely to result in increased combustion dynamics, which can cause hardware damage and increased emissions leading to noncompliance with environmental regulations. *Id.* at 22. In addition, witness Klassen explained that DLE turbine equipment operators are required to meet strict on CO and NOx standards and to avoid visible exhaust plumes. *Id.* at 24. The formation of NOx is temperature dependent, and a small increase in temperature can

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

lead to large increases of NOx. The Florida Generators warn that an increase in NOx emissions could lead to plant shut-downs due to permit violations. *Id.* at 25.

68. The Florida Generators assert that if broadened interchangeability standards are adopted, equipment modifications will be required to avoid operational risks; however, due to cost and technological constraints, the options currently available are not practical. The Florida Generators contend that manual retuning is not a practical option because DLE equipment cannot respond to significant short-term changes in gas properties while retaining stable, low emissions operation. *Id.* at 79 (*citing* Ex. FG-1 at 19). The Florida Generators similarly contend that fuel blending is not practical as it would require installation of sensors, control systems, blending equipment and a source of dilutents; specifications for such systems are not available. *Id.* at 80 (*citing* Ex. FG-1 at 20). Application of selective catalytic reduction (SCR) technology to reduce NOx is impractical for presently constructed units due to cost (ten million dollars in capital costs and over four million dollars annually operating costs for GE 7FA units), space limitation and complexity of retrofitting facilities. *Id.* (*citing* Ex. FG-7 at 18). Changing fuel nozzles is not practical because nozzles would have to be changed every time the gas constituents change. *Id.* Finally, while the Florida Generators acknowledge that, while auto-tuning systems hold promise as a means of addressing combustion stability and related problems in DLE turbines, the systems are currently under development. *Id.* at 81.

69. The Florida Generators argue that FGT's quality standards should be applied system-wide. In support of its contention, the Florida Generators argue that a limited application of quality standards to FGT's Market Area is not justified by the evidence. *Id.* at 66. The Florida Generators assert that it is unclear whether FGT can maintain gas specifications to its markets through the blending of gas it receives in its Western Division. *Id.* at 67.

70. The Florida Generators contend that the parties who support adoption of the NGC+ Interim Guidelines have not demonstrated that those standards are just and reasonable. Florida Generators R.B. at 12. The Florida Generators argue that the process by which the NGC+ Work Group developed the White Paper is not a matter of public record, and evidence on the record does not support a Wobbe Index range of +/-4%. *Id.* at 16-17 (*citing* Ex. FPL-4). The Florida Generators find the evidence the LNG Suppliers presented, such as a showing that the NGC+ Work Group recommendations are similar to U.K. specifications, to be irrelevant. *Id.* at 55. The Florida Generators also argue that the NGC+ Work Group contemplated that its recommendations would be modified in accordance with local characteristics, not adopted as written. *Id.* at 16. Finally, the Florida Generators point out that the NGC+ Work Group intended for its guidelines to be effective for an interim period of no more than three years. *Id.* at 16-17 (*citing* Ex. FPL-4).

71. The Florida Generators disagree with LNG Supplier witness Dominic Santavicca's conclusion that a Wobbe Index variability of +/-5% is unlikely to compromise the operability or emissions of DLE turbines. *Id.* at 27. (*citing* Ex. LNG-42). The Florida Generators state that witness Santavicca conceded that he could not predict the impacts of LNG on DLE equipment and has not conducted his own laboratory experiments with LNG. *Id.* The Florida Generators also do not believe that witness Santavicca's conclusions based on his CHEMKIM-III/GRIMECH 3.0 simulation should be given any weight because he excluded butane and higher hydrocarbons (C_4+) from the gases he modeled. *Id.* at 29-30. Finally, the Florida Generators disagree with witness Santavicca's assessment that brown plumes are not a significant environmental concern. *Id.* at 31.

72. The Florida Generators disagree with the LNG Suppliers' assertion that adoption of a heating value maximum of 1,110 Btu/scf is necessary to attract international sources of LNG. The Florida Generators submit that the only supply that falls above the originally proposed maximum of 1,075 Btu/scf is Nigeria. *Id.* at 68. However, the Florida Generators reveal that the 1,110 attributed to Nigeria by witness Dr. Jay Lukens may be too low; Poten & Partners reports a value of 1116 for Nigeria. *Id.* at 69 (*citing* Ex. FPL-4 at 7). The Florida Generators also claim that the LNG Suppliers have not supported their claims that processing LNG to a lower heating value is not viable. *Id.* at 74-75. Rather, the Florida Generators assert that such costs should be considered part of the overall cost of an LNG project. *Id.* at 89. Witness Lukens stated that he had not performed a quantitative analysis of what additional costs would be needed. The Florida Generators submit that the capital investment for an LNG supply train is 2.5 to 4.5 billion dollars, whereas the injection and NGL stripping option ranges from 18.5 to 40 million dollars, one percent of the overall capital investment, and that this, in combination with anticipated substantial profits would not deter LNG suppliers from entering the U.S. market. *Id.* at 75 (*citing* Ex. FPL-7). The Florida Generators also state that many future LNG plants are incorporating designs to manage the gas quality at the LNG production site in anticipation of entering new markets that require lower heating value LNG. *Id.* at 76.

73. Next, the Florida Generators address the issue of whether the adoption of the gas quality and interchangeability standards will require any entity to incur costs. The Florida Generators advise that to avoid costs, the LNG suppliers will need to invest in processing equipment to render regasified LNG into pipeline quality gas. *Id.* at 70. The Florida Generators argue that the LNG suppliers have numerous options for processing LNG in order to meet the gas standards it proposes. The Florida Generators list a number of options for managing the gas quality at the LNG terminal site. *Id.* at 71. The Florida Generators suggest that the heating value of LNG can be changed by extracting hydrocarbons or injecting nitrogen, and further, that some of the LNG import terminals that plan to supply to the FGT system have plans to add such mechanisms. In addition, studies commissioned by Southern found four mechanisms to control gas quality: (i)

managing gas inventory and blending the gas in storage to reduce Btu content of the sendout gas stream; (ii) blending; (iii) injecting inerts at the outlet of the LNG import terminal; and (iv) processing the gas to separate the methane and a percentage of the ethane and propane to yield an acceptable Btu composition. *Id.* at 72-73 (*citing* Ex. FPL-50).

74. Lastly, the Florida Generators argue that the upstream parties should bear the costs required to accommodate deliveries of LNG. FGT witness Langston stated that the parties upstream from FGT would assume the burden of the costs associated with compliance of the temperature provision contained in the July 23 filing. *Id.* at 86-87. The Florida Generators mention two other instances where the LNG supplier has the ultimate burden of making regasified LNG compliant with U.S. pipeline tariffs: (i) Marathon Oil Company is required to reimburse Southern for all costs in connection to tendering gas that does not meet Southern's quality specifications (*id.* at 87 (*citing* Tr. at 145)); and (ii) Southern has the obligation of addressing issues relating to the introduction of LNG from the Elba Island expansion into downstream pipelines other than Southern's. *Id.* at 88. The Florida Generators also contend that the *Columbia, supra*, precedent is still relevant and, consistent with that precedent, the project sponsor should bear the costs of compliance. *Id.* at 90-91.

Florida Power & Light

75. FPL states that it supports the adoption of the broadest LNG standards that will have no detrimental effects on FGT or its customers. FPL I.B. at 2. FPL joins the arguments of the Florida Generators with regard to: (i) standard of review; (ii) suggested interchangeability specifications; (iii) whether equipment modification will be required due to the introduction of LNG; and (iv) cost responsibility. FPL independently describes the potential impact of LNG that does not meet "appropriate" quality and interchangeability standards on its generating facilities and argues that under an existing service agreement, FGT is obligated to continue delivery of low Btu gas to specified FPL facilities. *Id.* at 1.

76. FPL asserts that it is the largest operator of customer equipment on the FGT system, serving more than eight million people across eastern and southern Florida. *Id.* at 4. FPL explains that it is highly dependent upon a suitable supply of natural gas in that, of the 20,834 megawatts of FPL-owned generation capability, 8,376 megawatts (40%) of its generation capability are primarily natural gas fired and 7,988 megawatts (38%) are natural gas and oil fired. *Id.* (*citing* Ex. FPL-1 at 2-3).

77. FPL claims that a large portion of its generating capacity consists of facilities that are sensitive to variations from the historic gas supply. Therefore, FPL asserts that an inability to use natural gas because of interchangeability or quality concerns would be catastrophic. *Id.* FPL states that it has gas fired facilities with newer DLN turbines that

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

require a gas supply with a consistent Wobbe Index. FPL is concerned that if the LNG has characteristics that are different from the historical domestic gas stream, the introduction of regasified LNG into the FGT Market Area could result in changes to the current delivered gas stream. *Id.* at 7. FPL explains that also, depending upon market use near the LNG supply source, regasified LNG would move further in to the FGT system. *Id.* at 5. FPL specifically highlights three facilities located on FGT's East Leg, downstream of the proposed interconnections for the introduction of LNG, that will require a gas supply with a consistent Wobbe Index: (i) the Martin Plant, located near Indiantown, Florida, which connects to FGT at the location projected to be the point where regasified LNG from the south meets domestic supply from the north on the FGT system; (ii) the Turkey Point Plant, located south of Miami, Florida, at the southern end of the FGT pipeline downstream of the proposed Bahamian LNG, which may have to accommodate domestic supply when LNG stops flowing; and, (iii) the Sanford Plant, located near Sanford, Florida, located downstream of the proposed interconnections. *Id.* at 5, 8.

78. FPL explains that, historically, FGT has supplied the FPL plants with a gas supply originating in the Gulf of Mexico region and since June 2005, from Gulfstream. *Id.* at 6. FPL claims that the domestic gas stream it has historically received from FGT has been fairly consistent in terms of quality, with a Wobbe Index variation of 1346-1371, +/-1% from the average based on the last five years of data. *Id.* FPL states that there have not been any operational problems from this consistent gas stream. FPL R.B. at 5. FPL submits that its generating facilities have been designed and tuned to accommodate the characteristics of the domestic gas supply that FGT has historically delivered. FPL I.B. at 10. FPL claims that its turbines would have operational reliability problems in accommodating the LNG supply unless the quality of LNG supplies is limited so that its composition does not widely vary from domestic supplies. *Id.*

79. FPL asserts that similar concerns exist with the Cypress Project. *Id.* at 8. The Cypress Project is located in northern Florida. There, the project would interconnect with FGT in the vicinity of Compressor Station 16. *Id.* FPL asserts that there would not be a significant opportunity to blend LNG with domestic gas prior to that gas's entering the Sanford Plant given that the delivered gas stream would be commingling varying regasified LNG with domestic gas by the time the gas stream arrives at downstream points, including the Sanford Plant. *Id.*

80. FPL submits that it has considered modifications to its DLE units to accommodate wider variations in gas supply. However, at present, its DLE's combustion systems have been tuned to burn the existing domestic gas quality stream. *Id.* at 10-11. FPL explains that, although once tuned, its units could accept a certain range of gas quality variation, the units could still experience adverse impacts. *Id.* at 11. FPL also mentions that the existing process of tuning a unit is manual and requires a tuning specialist and hours of operating time on the same fuel that the machine is expected to burn. *Id.* FPL relies on

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

the arguments of the Florida Generators to respond to assertions that a widely varying gas composition would not adversely affect FPL's DLE turbines. FPL R.B. at 6. FPL submits that if the turbines were retrofitted with the auto-tuning feature, the range of gas fuel variation would increase, but would still remain limited. FPL I.B. at 11. FPL also mentions that the auto-tuning technology GE is contracted to provide by 2007 for FPL's DLE units on the FGT system is still in the conceptual design phase and expected in the 2007 time frame. *Id.*

81. FPL asserts that its 1989 Service Agreement with FGT is an exception to the general argument made by the LNG Suppliers that nothing in FGT's customers' service agreements guarantees that the gas quality in FGT's Market Area will remain at historic levels. FPL R.B. at 7. Under the terms of the Agreement, FPL maintains that FGT agreed to use due diligence to obtain necessary regulatory authorization for the transportation of low Btu gas for which FPL has reserved capacity. FPL I.B. at 13. FPL asserts that the 1989 Service Agreement is in effect through July 31, 2015. *Id.* at 14. FPL argues that this right exists independently of generic FGT or national standards. *Id.* In order to deny this contractual right, FPL asserts that FGT would have to demonstrate that such denial is required by the "practically insurmountable" *Mobile Sierra* public interest standard. *Id.* (*citing Papago Tribal Util. Auth. v. FERC*, 723 F.2d 950, 954 (D.C. Cir. 1983), *cert. denied*, 467 U.S. 1241 (1984)). FPL also submits that under the terms of its 1989 Service Agreement, any cost FGT would incur to meet its contractual obligations to FPL would be FGT's responsibility. FPL similarly contends that its 1989 Service Agreement, as a precedent agreement, is exempt from the *Memphis* clause contained in FGT's tariff. FPL R.B. at 8.

Florida Power Corporation d/b/a Progress Energy of Florida, Inc.

82. FPC asserts that the interchangeability and gas quality standards that are adopted should provide for gas that the existing gas-fired combustion turbines on the FGT system are capable of burning without impairment of operations, damage to equipment or violation of air quality permits. FPC I.B. at 8-9. FPC argues that the appropriate legal standard for this proceeding is set forth in Section 5 of the NGA. *Id.* at 6. FPC contends that it is not logical to place a burden on parties who propose competing gas quality standards to show that FGT's existing tariffs is unjust and unreasonable since the Commission already made that determination. FPC R.B. at 5. FPC states the Commission's obligation is to determine which of the competing proposals for interchangeability and gas quality standards on the FGT system is best suited to address the concerns raised by the Commission in its June 2004 Order. FPC I.B at 6.

83. Like the Florida Generators, FPC contends that the interchangeability standards should reflect the historic variation in gas quality experienced on the FGT system. FPC presents information that the historic variation in gas quality on the FGT system has been narrow. FPC states that over the past five years, the minimum Wobbe value was 1338

and the maximum was 1371, and averaged approximately 1356. *Id.* at 9. FPC asserts that the variation in some portions of the FGT system were even smaller. *Id.* FPC states this yields an absolute Wobbe variation of +1.1%, which is significantly smaller than the +/-4% range proposed by FGT and the LNG Suppliers. *Id.* at 9-10.

84. FPC witness Fitzgerald testified that FPC's turbines have been manufactured, constructed and tuned to a Wobbe range of 1342-1367, and as a result are not able to burn substantially different fuel compositions. *Id.* at 14. FPC asserts that adopting substantially broader standards will create significant risks for existing customers for three reasons: (i) available data indicates that there are risks associated with changes in fuel composition and Wobbe values similar to those proposed by FGT and the LNG Suppliers; (ii) all the expert witnesses agree that there are not enough data to predict turbine performance; and (iii) more testing is needed to determine the effects that varying gas compositions and heating values will have on turbine performance. *Id.* at 11.

85. FPC maintains that standards that limit gas variability are necessary for generators with DLE combustion systems to both meet environmental emissions requirements and to obtain acceptable hardware lifetimes. *Id.* at 12 (*citing* Ex. FG-1 at 3-4). According to witness Fitzgerald, variations in the Wobbe value above 2% could cause the six Siemens-Westinghouse DLN turbines located in the FPC Hines Plant to experience a significant increase in NOx emissions. *Id.* at 14 (*citing* Ex. PE-1 at 9). Further, witness Fitzgerald explained that tests conducted on a turbine similar to those at the Hines Plant indicated that a 4% increase in Wobbe value translated into a 33% increase in NOx emissions. *Id.* at 15 (*citing* Ex. PE-3).

86. FPC argues that neither the FGT nor LNG Supplier proposals are appropriate for use on the FGT system. FPC argues that the gas quality ranges proposed by FGT and the LNG Suppliers would violate the Siemens-Westinghouse fuel specifications which limit the Wobbe value variation to +/-2% for DLE equipment with emissions limits of 25 ppm NOx or less. *Id.* at 19 (*citing* Ex. FGT-5). Thus, FPC asserts the Siemens-Westinghouse turbine Wobbe limit is 1383, and that the introduction of gas above that limit would void warranties and service contracts. *Id.* FPC further argues that without publicly available data to demonstrate otherwise, the gas quality limits proposed by the LNG Suppliers may not result in deliveries that are interchangeable with FGT's current gas stream. *Id.* at 20. Finally, FPC asserts that the LNG Suppliers' witness Marsland failed to address Finding 10 of the NGC+ White Paper which requires consideration of historical regional gas compositional variability or Finding 6 which states that acceptable interchangeability ranges for specific regions may be more restrictive as a consequence of historical compositions and end-use settings. *Id.* at 20-22.

87. Several parties argue that generators assumed the risk that gas quality standards would change on the FGT system over time, and therefore have no basis to object to broader standards. FPC R.B. at 10. FPC disagrees, and contends that: (i) this proceeding

is not governed by principals of tort law; and (ii) the assumption of risk concept is based upon knowledge of and the reasonable opportunity to avoid a known and specific risk, and here that was not an option. *Id.* FPC explains that there is no basis to support an argument that the generators knew, should have known or could have known facts necessary to mitigate the "risk" that LNG suppliers would build projects that would deliver LNG with physical properties widely varying from historic standards directly into the FGT Market Area. *Id.* at 11.

88. FPC argues that none of the parties supporting broadened gas quality standards offers a workable solution that will alleviate adverse operational impacts caused by the introduction of LNG. FPC I.B. at 27. FPC observes that the LNG Suppliers rely on the +/-5% Wobbe range set forth in GE's fuel specifications as support for their proposal to implement a Wobbe range of +/-4%. *Id.* at 24. FPC asserts that such reliance is problematic because: (i) witnesses Driebe and Klassen agreed that once a GE turbine is tuned it no longer has the capability to burn gas across the full +/-5% range; and (ii) the LNG Suppliers' proposal of +/-4% is beyond the permissible Siemens-Westinghouse specification for certain DLE equipment without auto-tuning. *Id.* at 24-25.

89. FPC asserts it is also problematic to rely on gas heating as suggested by the LNG Suppliers. FPC explains that controlling the MWI will not resolve operational problems associated with varying gas compositions and at present, such control would require manual operation. *Id.* at 25. FPC explains that DLN turbines already use heating at maximum temperatures to enhance efficiency. *Id.* FPC also rejects witness Marsland's suggestion that turbines could be retuned in the event of changing gas streams. *Id.* at 26. FPC argues that existing turbines may face varying gas streams with swings in gas quality on a daily basis, which would require frequent retuning. *Id.* FPC asserts that retuning can take several hours to days, and setting a single retune to 1377 would require additional equipment. *Id.*

90. FPC asserts that some form of mitigation measures will be required if the gas quality standards are broadened. *Id.* at 28. FPC suggests that processing LNG is the most efficient mitigation method. *Id.* at 29. FPC contends that many witnesses confirmed that LNG can be processed to conform to historic parameters, and that this is a viable option since AES has plans to construct processing facilities as part of its Bahamas project. *Id.* While the LNG Suppliers contend that no market exists in the Florida area for liquefied propane gas (LPG) and that processing would drive up the cost of LNG, FPC maintains that many other foreign liquefaction facilities process LNG to remove heavier hydrocarbons or convert the product into LPG. *Id.* (*citing* Ex. FPL-4). Based on the testimony of witnesses Lukens, Driebe and Henry Poellnitz,III, FPC estimates that the costs for construction would be thirty to forty million dollars and cost four million dollars to remove the natural gases capable of movement. *Id.* FPC argues that if LNG is not processed before it enters the FGT market, the nature and cost of mitigation measures are unknown. *Id.*

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

91. FPC argues that in conformance with FERC precedent and the Commission's Certificate Policy Statement governing the construction of new capacity, the project sponsor is responsible for any mitigation costs. *Id.* at 31. FPC mentions that this policy was recently applied in the context of the certification of the Ingleside Energy Project where the Commission required the project proponent to show that it had made efforts to minimize adverse effects the project might have on the applicant's existing customers as part of the public convenience and necessity determination. *Id.* at 32 (*citing Ingleside Energy Center, LLC, et al*., 112 FERC ¶ 61,101 at 19 (2005)). FPC also mentions Commission statements in *Panhandle, supra,* and *Tennessee Gas Pipeline Co.*, 113 FERC ¶ 61,200 (2005), where the Commission established that a proposed interconnection may not diminish service to existing pipeline customers. *Id.* at 32. FPC states that consistent with the criteria established in *Columbia, supra,* the entity introducing the supply into the pipeline is responsible for any one-time mitigation costs. *Id.* at 32. FPC also asserts that as a matter of fairness and logic the LNG project developers should bear the responsibility and costs associated with ensuring that the new supplies are interchangeable with the existing gas stream. *Id.* at 33.

The LDCs

92. The LDCs do not address the issue of how the interchangeability standards on FGT's system should accommodate the needs of DLN turbines for electric power generation. LDCs I.B. at 9. Rather, they submit that this issue is being addressed thoroughly by other parties in this proceeding. *Id.* The LDCs are not "categorically opposed" to the standards presented by FGT in its rebuttal case, or the higher Wobbe limit advocated by the LNG Suppliers and AES. *Id.* Instead, the LDCs advocate that further testing of end-use appliances and distribution equipment is necessary before the gas quality and interchangeability standards are approved for the FGT tariff. *Id.* at 16. The LDCs submit that the purposes of testing of end-use equipment is threefold: (i) the testing would verify whether the existing end-use equipment can operate safely and efficiently when burning gases across the range of specifications proposed by FGT, and would thereby bring to light whether any change would be necessary; (ii) testing would determine if the performance capabilities of existing equipment could accommodate a higher Wobbe limit than FGT proposed; and (iii) testing would determine what field tuning and maintenance of end-use appliances would be necessary. *Id.* at 16.

93. Witness Charles Benson stated that the guidelines presented in the NGC+ White Paper represent an excellent starting point, but that local conditions such as historical supply and types and condition of end-use equipment, along with installation, tuning, maintenance and operating practices should also be considered in establishing gas quality standards. *Id.* at 10 (*citing* Ex. CEB-1). The LDCs also submit that the White Paper recommends gathering and analyzing historical composition data on a region-by-region and market-by-market basis. *Id.* at 12 (*citing* Ex. FGT-6 at 22).

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

94. The LDCs assert that since the proposed Wobbe Number and Btu content limits are above the ranges that the Market Area has experienced historically, they are also above the ranges to which end-use appliances have been tuned. *Id.* at 13. The LDCs disagree with LNG Supplier witness Terry Williams' conclusion that if the appliances are properly tuned to the historic Wobbe average of 1356, they should easily perform at the 1400 level without materially changing operation safety, efficiency or performance. *Id.* (*citing* Ex. LNG-3 at 11/14-16). The LDCs state that his conclusion is based upon experiences in other regions and markets, and does not reflect particularities of the FGT Market Area. *Id.* The LDCs further submit that the record reflects that there are no publicly available test data specific to the characteristics and circumstances of existing end-use appliances for the FGT Market Area. *Id.*

95. The LDCs contend that FGT's current position, that no further appliance testing is necessary, is inconsistent with its prior position. *Id.* at 15. The LDCs point out that in its answer to protests and comments following its July 23, 2004 compliance filing, FGT took a position that further testing of end-use appliances should be undertaken, and further that the Commission should not rely on gas quality specifications that were found appropriate for other locations to develop the specification for its Tariff. *Id.* (*citing* Ex. FPL-28 at 9-11). The LDCs additionally mention that FGT welcomed additional testing and development of data in its direct case filed August 26, 2005. *Id.* at 15 (*citing* Ex. FGT-1). Finally, the LDCs claim that witness Langston admitted in his rebuttal testimony that further testing would be necessary to support an upper Wobbe limit of 1400 or higher. *Id.* at 15 (*citing* FGT-11).

96. The LDCs are concerned with the possible effects of regasified LNG on particular components of the distribution system infrastructure, including the compression couplings. *Id.* at 17. Witness Loftus, a Principal for Environ, presented testimony for the LDCs on this issue. The primary conclusion reached in the Environ-led investigation was that a combination of factors, including aging seals, a change in gas composition and decreasing ground temperatures with the onset of winter, had caused the increased incidence of leaks. *Id.* at 19. Witness Loftus testified that the Long Island Lighting Company (LILCO) experienced an increase in the rate of compression coupling leaks in the winter of 1992-93 when a Canadian supply of natural gas replaced the supply of domestic gas. *Id.* Lab results concluded that the proximate cause of the leaks was the reduction in heavy hydrocarbon concentrations as the transition in gas supplies occurred. *Id.* (*citing* PJL-1 at 7/17-8/4). The LDCs submit that the following three circumstances are present, and therefore require vigilance on the part of the LDCs in Florida: (i) there are LDCs in Florida whose systems will be exposed to undiluted or high concentrations of regasified LNG for the first time; (ii) the total concentration of C_5+ compounds in the domestic pipeline gas on the FGT system in the past five years has been in the range of 1000-1500 ppm, whereas regasified LNG is generally 200 ppm; (iii) the LDC distribution systems in Florida contain compression couplings that are similar to the couplings that

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

manifested an increased incidence of leaks on the Washington Gas System. *Id.* at 20-22. Based on these similarities, witness Loftus found that one or more of the potential causes for an increased incidence leaks are likely to be present, and that under such circumstances testing of representative compression couplings on the LDCs' systems with gases of different compositions would be useful in anticipating the scope of any potential problem, its nature, and the extent of any remediation to address the problem. *Id.* at 23.

97. Many parties dispute the findings of the Environ report and criticize witness Loftus for failing to give sufficient consideration to potential causes of the increased incidence of compression coupling leaks on the Washington Gas system. LDCs R.B. at 11. The LDCs point out that witness Loftus does not say the introduction of LNG "would" cause coupling failures; rather, in his testimony and submitted evidence, he merely demonstrates the similarities between the two systems. LDCs I.B. at 25. Next, the LDCs contend that they do not disagree that there may have been other contributing factors present in the Washington Gas experience that are not present in Florida. *Id.* Nevertheless, the LDCs contend that there are sufficient substantive grounds for testing, and such tests should be completed before failure occurs on the LDCs system. Specifically, the LDCs suggest testing of representative compression couplings from LDC systems in Florida with various species of gas including gas with C_5+ content that approximates the expected levels in regasified LNG. The purposes of the testing would be to determine whether exposure of the compression couplings to LNG is likely to cause an increase in leaks, and if so, to determine the most cost-effective way to prevent or mitigate the problem. *Id.* at 27.

98. The LDCs assert that there will be costs associated with adoption of the proposed gas quality and interchangeability standards, but those costs are not yet quantified. *Id.* at 28. The LDCs submit that those costs will include testing of end-use appliances and compression couplings, and that such testing may reveal additional costs for preventative measures. *Id.* The LDCs also warn that there may be unforeseen adverse effects requiring changes or remedial measures, and for that reason, the Commission's resolution should allow for the possible need to revisit such matters in the future. *Id.* at 29.

99. Lastly, the LDCs argue that the costs incurred should be borne by the LNG Suppliers and project sponsors, because they are the ones who will initially benefit directly from the introduction of LNG. The LDCs also contend that costs associated with testing and potential remediation measures would not be occurring but for the introduction of regasified LNG. *Id.* at 33.

Commission Trial Staff

100. Staff advocates the adoption of the revised gas quality and interchangeability standards that FGT proposed in its rebuttal testimony, subject to two conditions: (i) that

the effective date of implementation be deferred until May 1, 2007; and (ii) that further testing be required of the effects of the introduction of LNG on end-use equipment in FGT's affected Market Areas. Staff I.B. at 4. Staff maintains that FGT's revised proposal will increase access to LNG supply sources while maintaining system integrity, operational reliability and environmental performance. *Id.* at 4. Staff asserts that FGT has met its burden and demonstrated that its proposal is just and reasonable. Staff R.B. at 5.

101. Staff asserts that it is necessary to defer implementation of its proposed standards until testing of end-use equipment that may be affected by LNG is conducted. Staff I.B. at 13 (*citing* Ex. S-1 at 4/5-8; 9/14-18). Staff observes that further testing is also consistent with the NGC+ Work Group recommendations endorsed by the LNG Suppliers and AES. *Id.* at 14. In addition, Staff mentions that Southern, FGT and many of FGT's customers support further testing for the purpose of filling in data gaps and determining the behavior of industrial gas turbines when subjected to a changing gas composition. *Id.* at 14-15. Staff believes that providing time for testing will reveal whether the adoption of any of the proposed gas quality and interchangeability standards will require equipment modifications or mitigation measures. Finally, Staff contends that deferring implementation recognizes the reality that there is a long lead time between project inception and actually bringing a new source of LNG online. *Id.* at 21.

102. Staff disagrees with the LNG Suppliers' argument that the Interim Guidelines should be implemented without further testing. *Id.* at 15. Staff asserts that LNG Supplier witness Lukens pointed to a "selective quote" from the NGC+ White Paper that ignores other recommendations by the NGC+ Work Group, which recommended further testing to assess the impact of the introduction of NLG supplies in to the FGT market. *Id.* at 15. Instead, Staff asserts that testing of turbines to assess the impact of LNG at the proposed specifications is necessary to ensure the reliability of the electric system in Florida. *Id.* Staff states that witness Lukens' fears that deferring implementation of the specifications could cause LNG deliveries to be delayed is unwarranted. *Id.* at 17. In response, Staff contends that the market participants will not be operating in a vacuum, and that FGT's proposed standards will function as interim guidelines while testing proceeds. *Id.*

103. Staff contends that use of the NGC+ Interim Guidelines for FGT's quality standards, as proposed by AES and the LNG Suppliers, is not just and reasonable. Staff R.B. at 9. Rather, Staff maintains that the method by which the NGC+ Interim Guidelines were derived supports the reasonableness of FGT's proposal. Staff I.B. at 12. Staff explains that in the development of its standards, the NGC+ Work Group considered the fact that the U.S markets have historically experienced lower average Wobbe and Btu levels that other world markets, and thus the average adjustment gas used in the NGC+ Work Group's analysis had an average Wobbe Index of 1345 and average heating value of 1034.5 Btu. *Id.* at 13 (*citing* Ex. FGT-6 at 229 and Ex. FGT-7 at 1). These levels are below the five-year average experienced on the FGT system. Staff

maintains that the revised standards proposed by FGT are just and reasonable in that FGT's standards similarly reflect local characteristics (i.e. - warranty specifications for the GE and Siemens-Westinghouse turbines used in FGT's system). *Id.*

104. Next Staff argues that the narrower standards proposed in FGT's initial *pro forma* filing, as proposed by the Electric Utilities, would unduly restrict LNG supplies from entering the FGT market. *Id.* at 18. However, Staff asserts that these standards may discourage potential LNG suppliers from entering the FGT market. *Id.* Staff similarly argues that the proposals of the Florida Generators and Progress Energy share the same defect as FGT's *pro forma* tariff filing because they fail to address the need for standards broad enough to encourage LNG to be introduced into FGT's market. Staff disagrees with FPC witness Fitzgerald's conclusion that more restrictive standards will not preclude LNG access, as the gas stream will be available if it is processed before it is shipped through the FGT system. *Id.* at 19. Staff highlights testimony offered by LNG Supplier witness Chandra that processing may not be economically feasible without a nearby market for the processed liquids and that processing is not a technically feasible solution since the removal of the C_3+ alone will not sufficiently reduce the Wobbe level. *Id.* at 19 (*citing* Ex. LNG-39 at 6/14-7/11).

105. With regard to the LDCs' claim that the introduction of LNG may cause an increase in leaks on compression couplings in their distribution systems, Staff asserts that further testing is required. Staff alleges that the Environ study is not necessarily relevant to Florida, and consequently, it is impossible at this point to determine what costs might be incurred due to the effects of the introduction of LNG on compression couplings. Staff similarly contends that the record does not contain sufficient evidence to determine whether mitigation costs associated with end-use equipment will be incurred as a result of the introduction of LNG. *Id.* at 19. Rather, Staff remarks that several witnesses have stated that there has been enough testing to show that the appliances can perform within any of the specifications proposed by the parties in this proceeding. *Id.* (*citing* Tr. 146-47; 1574). Staff also mentions the testimony of Florida Generator witness Klassen, FPC witness Fitzgerald, and FPL witness Driebe who all anticipate considerable mitigation costs will be required for turbine modification. However, Staff recognizes, as these witnesses have stated, that due to the modest amount of testing on the actual DLE turbine units, they cannot be sure whether and to what extent the impacts they anticipate will actually occur. *Id.* at 27. With regard to the cost of processing LNG or regasified LNG at the terminal, Staff similarly finds that given the conflicting viewpoints and lack of cost information, it is not possible to determine whether processing or other mitigation options presented will result in the lowest overall cost.

106. Staff disagrees with the LNG Suppliers' witness Marsland's statement that extensive mitigation measures will not be required so long as the quality specifications are within the turbine manufacture's fuel specifications. *Id.* at 28. Staff contends that witness Marsland's determinations and witness Santavicca's computer models are not

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

based on real-world operations and therefore, not useful for the purpose of calculating potential operating costs.

107. Staff advocates the socialization of costs, which would require that all those who will have access to additional gas supplies as well as project developers who will benefit from importation of LNG pay for their benefits. *Id.* at 35. Staff argues that the distribution of costs should reflect the benefits of LNG, and that the processing and mitigation costs be shared among all market participants. *Id.* at 34. As a method of implementation, Staff suggests adoption of a process similar to the one adopted by the commission in *Columbia*, *supra*, where a cost verification committee was established to monitor, verify and screen all LNG conversion costs of Columbia's direct wholesale customers. Staff R.B. at 19.

IV. DISCUSSION

A. Matters In Dispute

108. The participants all agree that we should adopt the broadest standards reasonable in order to encourage the importing of LNG. They differ considerably, however, as to how broad those standards should be.

109. The LNG Suppliers urge the broadest standards, which would give them the greatest leeway in having their product imported at the least cost to them of further processing. They support the immediate adoption, on a final and definitive basis, of the standards that were drafted and endorsed on an interim basis, subject to further revision as testing, experience and local condition warrant, by a technical work group formed by the Natural Gas Council.

110. The Florida generators support the narrowest standards, which would absolve them of the risk of paying for turbine and other equipment upgrades that might be necessary to accommodate this new gas, which has inherently different characteristics than historic domestic gas due to its different points of origin outside this country and the processing necessary to permit the conversion of the gas to liquid and then back to gas. Their proposed standards are bounded by the specifications of the gas used historically on the FGT system, somewhat in contradiction to their professing to recommend broad standards to encourage the importation of LNG.

111. Somewhere in between, but close to the standards promoted by the LNG Suppliers, are the standards proposed by FGT in its rebuttal testimony, and supported by Southern and Commission Staff.

112. The LDCs take no position on which standards should be adopted, but argue, in general, for caution in adopting broad standards, especially on other than an interim basis,

because of leaks in compression joints on pipelines that they claim occurred in the past from the transmission of dry gas such as re-gasified LNG and because of uncertainty about potential adverse effects of that gas on their customers' end-use equipment. They ask for further testing and for socializing among the different groups the costs of the testing and, later, of upgrading equipment and repairing whatever damage might occur to their distribution facilities from the LNG when it is imported.

113. In addition to the standards to be adopted and the matter of who should bear the costs, there is also the question whether the standards should apply only to imported LNG or also to domestic gas, and whether they should apply to only to FGT's Market Area or also to its Western Division.

B. Burden of Proof

114. At the outset, there is a somewhat academic dispute over the burden of proof, which depends on whether FGT's proposed standards should be considered a Section 4 or Section 5 filing. FGT contends that its proposed standards must be judged under Section 4 and that they must be approved if found to be just and reasonable. The Florida Generators contend, to the contrary, that FGT's proposed standards constitute a Section 5 filing in that the Commission has found the original tariff unjust and unreasonable and, under Section 5, has ordered FGT to make a new filing. Under *Sea Robin Pipeline v. FERC*, 795 F.2d 182, 187 (D.C. 1986), the Commission has no power to set its own rates under Section 4, but where it first finds the utility's proposed rates to be unjust and unreasonable, it can set its own rates under Section 5.

115. Under *Southern Natural Gas Co. v. FPC*, 547 F.2d 826, 833 (5th Cir. 1977), however, when the Commission, under Section 5, requires a pipeline to file a new tariff, it is still filed under Section 4, unless the Commission has found the filing to be unjust and unreasonable. But the Commission must have done so on the basis of evidence, not as a summary determination. It has not done so, here. The Commission has not found FGT's proposed standards to be unjust and unreasonable on the merits, and they must still be considered as filed under Section 4.

116. As a theoretical matter, all that this means is that, if FGT's standards are just and reasonable, they must be approved, even if another party's standards are better. As a practical matter, it has no effect on the outcome of this proceeding. Considering the adverse risks or consequences attendant to each of the proposals, only the best proposal could be just and reasonable. And, for the reasons stated below, I determine that to be FGT's proposal.

C. Gas Turbines

1. The Risks to Turbines from Gas of a Different Composition

117. The Florida Generators presented their theoretical concerns about the possible dire effects on their turbines of importing LNG with different compositions than domestic gas through the prefiled testimony of their expert witness Dr. Michael Klassen. Ex. FG-1. For the most part, they are not controversial.

118. Generators with DLE turbines are sensitive to fuel gas quality because fuel quality can have a substantial impact on both exhaust emissions and machine lifetime. DLE turbines use a lean, premixed flame to generate low emissions, particularly low levels of carbon monoxide ("CO") and nitrogen oxides ("NOx"), as compared to older, diffusion flame technology turbines. Advanced DLE combustion systems have restrictive operating fuel quality requirements due to the level of system control required to produce very low emissions. As a result, DLE combustion systems are not capable of handling large changes in gas composition without changing turbine operating parameters, also known as retuning. *Id.* at 3-4.

119. The Wobbe Index is a measure of the heat generated by a given burner with a fixed gas supply pressure and a constant metering orifice. The Wobbe Index is defined as the gross heating value in Btu/scf of a gas stream divided by the square-root of the gas density (or gravity) of that stream. Therefore, if a fuel gas stream has a constant Wobbe Index, regardless of fuel composition, a constant heat release rate will be supplied to any burner using that gas stream at a constant supply pressure. For example, if a gas stream with a higher gas gravity is substituted in a given burner with a fixed fuel supply pressure, few cubic feet of gas will flow across the metering orifice. As a result, in order to assure delivery of the same heat release rate to the burner, the substitute gas stream must have a higher heating value per cubic foot to offset the reduced volumetric flow rate. Conversely, if the substitute gas stream has a lower gravity, more gas volume will flow across the orifice during a given interval, and, hence, the heating value of the substitute stream must be lower to maintain the same Wobbe Index. When a relatively constant Wobbe Index cannot be maintained for the gas supply, the fuel burning unit itself may need to be modified or adjusted to accommodate the change in Wobbe Index of the fuel supply. *Id.* at 4-5.

120. The MWI serves the same function as the Wobbe Index; however, it adds a term to the Wobbe Index to correct for variations in fuel temperature (*Id.* at 5). The participants agree that the variation in fuel temperature is a matter of little concern to the issue of interchangeability of LNG with domestic gas in the operation of gas turbines and none of them ask that the MWI be considered as an interchangeability standard.

121. In the past, the gas turbine industry has used the Wobbe Index to determine the interchangeability of gases. However, this index, as a stand-alone test, is more appropriate for conventional combustors, known as diffusion flame combustors. Newer DLE turbines use a lean, premixed flame to generate low emissions, particularly low levels of CO and NOx. Application of the Wobbe Index for determining fuel interchangeability in lean-premixed combustors is not sufficient without further constraints, especially when these combustors are tightly regulated for pollutant emissions. Since conventional combustors operate in a more stable combustion regime, constant heat release rate (assured by maintaining a constant Wobbe Index and fuel pressure) is a suitable constraint on gas interchangeability. However, DLE machines operate in a less stable combustion regime, so heat release rate (or Wobbe Index) alone is not a sufficient constraint to guarantee consistent operation. Since constant Wobbe Index does not guarantee constant fuel composition, effects of variations in fuel composition on lean, premixed flames are not fully captured by the Wobbe Index. *Id.*

122. The composition of natural gas naturally varies from well-to-well and region-to-region, with region-to-region variations being the larger of the two. Thus, gases from different parts of the world have more variability than the domestic gas supply. However, natural gas suppliers have noted that the gas composition from a given field will change with time, and as a result, no guarantees of exact and unchanging composition can be made. FGT's historical average of the natural gas in the Florida system East Leg has a Wobbe Index of 1356, with a range of from 1346 to 1371. The natural gas supplies from around the world appear to range as much as +/-6% from the historical FGT average. *Id.* at 6; Ex. FGT-7 at 1 of 7.

123. If a generator receives both the historical FGT domestic stream and regasified LNG interchangeably, those gas streams must have fairly consistent gas compositions, not just a fairly constant Wobbe Index, in order to ensure the continued safe and reliable operation of that unit. This is because the natural gas composition directly affects many combustion properties. These properties include heat release rate (the amount of energy released in a given amount of time), burning velocity (the speed with which a flame can propagate through a fuel/air mixture), auto-ignition tendencies, and flame temperature. These properties can directly affect DLE gas turbine operation, as the combustors have been designed for specific tolerances. Significant variations in these properties over a short period of time can directly impact turbine performance, including emissions production, combustion dynamics, and maintenance schedules. Ex. FG-1 at 7.

124. Combustion dynamics can arise during any turbulent combustion process, such as that in gas turbines. If excessive, the resulting pressure oscillations can cause the gas turbine to shut down in order to avoid catastrophic damage. Long term exposure to pressure oscillations will reduce the lifetime of gas turbine hardware. The major components of the combustion system, including the fuel delivery system, the pre-mixer, the combustion chamber, and the initial portion of the turbine, act as an acoustic

chamber, which under the proper conditions can resonate violently. Even at low levels, self-excited combustion oscillations can become large enough to cause excessive wear and component failure. *Id.*

125. The introduction of DLE technology into the gas turbine industry has compounded the problem of combustion dynamics. Combustion dynamics, generally present in the form of pressure fluctuations within the gas turbine combustor, can occur in any combustion device. However, the control or elimination of this problem is generally more straightforward in diffusion combustors. DLE machines are much more susceptible to this problem, and, in many instances, combustor dynamics can limit the performance of a given gas turbine in order to maintain hardware life or meet emissions restrictions. *Id.*

126. The introduction of gas turbines using lean, premixed technology has served to lower the emissions from gas turbines by a factor of 8 to 10 as compared to conventional, diffusion flame combustors. Following this trend, the organizations that regulate pollutant emissions have tightened restrictions on gas turbines. Operators of gas turbines are typically required to meet strict limits on NOx and CO emissions. Furthermore, regulators frequently prohibit the appearance of visible plumes from exhaust stacks. Fuel composition plays a role in the production of NOx and CO in gas turbines. NOx generation is highly temperature dependent, and the production rate is non-linear with temperature changes. Hence, small increases in temperature can lead to large increases in NOx. A change in fuel composition can cause the flame temperature of the fuel to change, which in turn can affect the NOx output. *Id.* at 12.

127. Since NOx is the combination of NO_2 and NO, formation of NO_2 must also be considered. High concentrations of NO_2 in exhaust plumes of typical power-producing gas turbines will create a visible plume (*i.e.*, "brown" or "yellow" plume). The U.S. EPA characterizes NO_2 as a reddish-brown, highly reactive gas. A visible plume can cause environmental compliance problems and is also undesirable from a public relations point of view. *Id.* 12-13.

128. The presence of higher (C_2, C_3, C_4 …) hydrocarbons found in unprocessed natural gas and some LNG imports increases the tendency for NO_2 conversion by up to several orders of magnitude as compared to methane. Hence, when unburned hydrocarbons (*i.e.*, fuel) bypass the combustion zone (which happens in all gas turbines in minute amounts), the presence of higher hydrocarbons found in unprocessed domestic natural gas and LNG will increase the propensity for the conversion of NO to NO_2. *Id.* at 13.

129. What is important for this proceeding is not the LNG itself. As Dr. Klassen stated (Tr. 411), "The problem is the changing in fuel composition. Gas turbines can burn a wide range of fuels. They can burn LNG without any problem. It's the changing in fuel composition that's the issue here."

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

130. In other words, the DLN combustors may well be able to burn fuel with compositions beyond the limits of all of the recommended specifications. But because they have burned domestic fuel within a certain range of composition, for which they have been designed and tuned, and may continue to do so while alternately burning LNG of a different composition, they must be capable of switching back and forth, as well as burning blends of the two in differing proportions.

131. Dr. Klassen made no independent determination based on his own expertise as to the absolute limits or variability within those limits of a Wobbe range that could be accommodated by the DLN combustors that currently utilize gas delivered by FGT. Even if he had, it would have little value. Although his area of expertise was combustion science and engineering, he was not an expert on turbines. He had no experience with operating turbines, had not worked for a company that operated them, or ever tuned a turbine himself. Tr. 289. He was familiar with only two power plants in Florida. Tr. 329. And knew of only one turbine world-wide, in Korea, which had experienced any one of the numerous concerns, summarized above, that he testified could occur to DLN turbines from the utilization of different composition gas. Tr. 409-11.

132. Moreover, he was unable to quantify any of the adjectives he used in his prefiled testimony to characterize changes in gas composition that may or may not constitute a danger to turbine operation, such as “large changes,” “abrupt swing” or “relatively constant Wobbe index.” Tr. 292-99. As a result, he was unable to offer any range of permissible variation in gas composition to accommodate LNG, except to fall back upon the historical range of domestic gas. His testimony has little practical value in our task of setting the appropriate standards, other than to caution us as to possible dangers in setting them too broad.

2. The NGC+ Working Group’s Interim Guidelines

133. Under the auspices of the Natural Gas Council, and at the initiative of the FERC, industry representatives formed a technical work group to address the interchangeability issues associated with LNG imports (the “NGC+ Work Group”). Ex. FGT-6 at 3. The NGC+ Working Group participants represented a broad range of the United States’ natural gas industry, including representatives of LNG suppliers, pipelines, utilities, LDCs, power generation (including GE and Siemens-Westinghouse), feedstock interests, appliance manufacturers, a researcher, a state official, and a gas processing representative. *Id.* at 34-35.

134. This work group set out to define acceptable ranges of natural gas characteristics that were safe, reliable, and environmentally compliant, and ultimately issued the NGC+ Interim Guidelines, in early 2005. Significantly, the guidelines were designated “interim” because the NGC+ Work Group recommended that these guidelines should

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

apply "until additional research and/or experience clearly demonstrates that supplies above the caps do not negatively impact end users." *Id.* at 26.

135. The NGC+ Interim Guidelines, therefore, were intentionally conservative and were inherently intended to be expanded with additional information. However, the report also recognized that there were gaps in the data that the group had relied on and the three-year transition period could be used to fill the technical gaps based on scientific testing and analysis so that more definitive guidelines could be established. *Id.* at 23-26.

136. The main focus of the group was on what is universally agreed to be the principal interchangeability standard, the Wobbe Index, based on the heating value and specific gravity of a gas. The NGC+ Work Group then adopted its Interim Guidelines, which allow for a range of plus or minus 4% Wobbe Number variation from the local historical gas or, alternatively from established adjustment or target gas, subject to a maximum Wobbe Index of 1400. The NGC+ Interim Guidelines also limit the heating value to a maximum of 1110 Btu/scf and impose compositional maximums of 1.5 mole percent for butanes-plus and 4 mole percent for total inerts. *Id.* at 27.

137. The interim guidelines were developed using 1992 "average" (for the U.S.) gas, characterized by a Wobbe Number of 1345 and heating value of 1035 Btu/scf. *Id.* at 26.

138. The report recognized that the complete management of interchangeability required both a minimum and maximum limit for Wobbe Numbers, with the minimum Wobbe Number's having equal importance, but it focused only on the maximum number. *Id.* at 21. It also recognized that the Wobbe Number itself is not sufficient for interchangeability (*id.* at 8, 18, 19-20) and that there was a need to define the compositional limits of the gas (*id.* at 22). In particular, it recognized that there was a need to determine the compositional limits of the following constituents: the non-methane hydrocarbons -- ethane, propane, butane(s), pentane(s) and hexanes+; and the inerts -- nitrogen and carbon dioxide. *Id.* at 23. But it did not set them itself.

139. Application of the NGC+ Interim Guidelines to FGT's five-year historic average Wobbe Index of 1356 results in a Wobbe Index range of 1302 to 1400. The following table identifies the specific gas quality specifications that would result if FGT adopted tariff specifications based on the NGC+ Interim Guidelines.

Gas Quality Standards Resulting from Application of the NGC+ Interim Guidelines to the FGT System		
	Minimum	**Maximum**
Wobbe Index	1302	1400
Heating Value	-	1110
C_{4+}	-	1.5 Mole %
Total Inerts	-	4.0 mole %

3. The Recommended Wobbe Number

140. The NGC+ Interim Guidelines are a good point of reference, in that they were drafted by a prestigious and knowledgeable group that was widely representative of the industry. But they are somewhat deficient for use as limits on the LNG entering FGT's pipeline: the NGC+ group exhibited considerable uncertainty in their reliability, recommending them only on an interim basis; they lack certain limits that the NGC+ group recognized were needed – including a minimum Wobbe Number and hydrocarbon constituent limitations; and, they would exceed manufacturers' specifications for certain turbines now in use by Florida generators, raising safety and warranty concerns or the possibility of expensive upgrades.

141. A more complete and reliable set of standards would be one based on the turbine manufacturers' specifications or on actual testing of the turbines themselves. The manufacturers' specifications are designed to be broad enough to enhance their turbines' marketability over competing products, but reliable enough for the manufacturers to base warranties on. While the NGC+ group may have ignored the limitations of a small number of turbines which would require an upgrade to allow them to meet the NGC+ group's proposed standards, we need not also ignore them unless we would be missing a large source of LNG falling between the manufacturers' specifications and those proposed by the NGC+ group. There is no evidence of that in this proceeding.

142. Actual testing, of course, with gas of varying specifications can give us an even more definitive range of safety.

143. FPL has 130 gas-fired combustion turbines in Florida, of which 32 are DLN. All of these DLN turbines are GE, and FPL has the ability to tune them from a central location. Tr. 666-68. FPC owns 30 gas-fired combustion turbines of which six are DLN types manufactured by Siemens-Westinghouse. Ex. PE-4 at 6. They are routinely tuned once a year. Tr. 980; Ex. LNG-51 at 215. There are a total of nine Siemens-Westinghouse DLN turbines in Florida (Ex. LNG-51), and presumably the three not owned by FPC are also routinely tuned once a year, or close to it.

144. It is clear that GE DLN turbines are well able to cope with variations in gas between the maximum and minimum Wobbe numbers that both the NGC+ group and

FGT propose. The GE specifications, as shown in Ex. FGT-4 at 5, show the absolute limits of the MWI to be a maximum of 54 and minimum of 40. At a gas inlet temperature of 85° F, the maximum MWI translates to a Wobbe Number of 1400. Tr. 800-02; Ex. LNG-72. The allowable range of the MWI from the midpoint point of 47 would be +/-15%, and somewhat more if the temperature were varied.

145. Once the design point is set within those limits, the GE specifications indicate a "Range Within Limits" of +/-5%, within which variations in Wobbe Number of up to 5% in either direction are permitted once the turbines have been tuned, without consulting with GE. This is clearly established in the specifications, which also permit wider variations under certain conditions, after consultation with GE. Ex. FGT-4 at 5 and 7, n. 8.

146. Obviously, that range of variability would be limited once either the minimum or maximum absolute limit were approached so as not to exceed it, but there should be no problem with the GE DLN turbines' meeting either the NGC+ proposed standards or the FGT proposed standards even without resetting the current tuning points. These, presumably, are close to FGT's historic mean of 1356, within the range of 1338 and 1371. *See*, Ex. FGT-7 at 1.

147. Even if the adjustment gas to which the turbines are now tuned had been at the low of 1338, an addition of 5% would result in an allowable maximum Wobbe of 1404, exceeding both the NGC+ maximum of 1400 and the FGT maximum of 1396. If the adjustment gas to which the turbines were tuned had been at the high of 1371, a reduction of 5% would result in a Wobbe Number of 1302, well below FGT's proposed minimum of 1340 (the NGC+ group did not set a minimum, although it recognize the necessity for it, as discussed above).

148. While the Siemens-Westinghouse DLN turbines in Florida could operate safely within the full range of both sets of standards, they would have to be retuned to a new midpoint to meet environmental emission limits under FGT's proposed standards, where they would push up against the margins. They could not operate with fuel that varied from the NGC+ maximum to the FGT minimum or historic lows and still meet the Siemens-Westinghouse emissions specifications. According to the table at Ex. FGT-5, p. 8, the Siemens-Westinghouse DLN turbines can operate safely within a range of +/-4% in Gas Index (a variation of Wobbe Number) without retuning, but could only operate within the narrower range of +/-2%, without retuning, to be able to comply with environmental emission standards.

149. So, according to the Siemens-Westinghouse specifications, if the turbines had been set for the historic mean of 1356, they could operate safely with gas at or below a Wobbe Number of 1410. Even if they had been tuned with adjustment gas at the historic

low for the east leg of FGT's system of 1346, they could operate safely with gas at or below a Wobbe of 1400.

150. But, to comply with environmental emissions standards, active tuning would be required in Siemens-Westinghouse turbines for variations in Gas Index of more than +/- 2%. *Id.* Consequently, Siemens-Westinghouse DLN turbines would fall just short of meeting both the NGC+ maximum of 1400 and FGT's proposed minimum of 1340. However, if the Siemens-Westinghouse DLN turbines were re-centered to a calibration gas which has a Wobbe Number of 1368, their claimed variability of +/- 2%, according to their specifications, would substantially meet (within less than a Wobbe point on either end) the FGT limits of 1396 maximum and 1340 minimum.

151. In his prefiled direct testimony, FPC's expert witness Fitzgerald agreed that the Siemens-Westinghouse DLN turbines could meet the FGT standards within its +/- 2% variability range, but would require "minor mitigation measures." Ex. PE-1 at 12-14. While he put the cost at up to $1.5 million per turbine, it is clear that he included expensive equipment only necessary to re-center the *design* of the turbines (*id.*; Tr. 992-96), which is unnecessary, as discussed below. Without re-centering the design, he agreed that the cost of the minor mitigation measures could be as low as "a couple of hundred thousand dollars" for the retuning of each turbine. Tr. 995. If all that were needed is a simple retuning, which is routinely done on the Siemens-Westinghouse turbines once a year, he testified that this cost has been estimated at $100,000. Tr. 980. In the context of this proceeding, this is a nominal cost and, considering that there will be routine retunings done before any LNG could possibly flow, not necessarily even an *added* cost.

152. Subsequently, at hearing, Fitzgerald changed his endorsement of a Wobbe range of +/-2% with minor mitigation measures, to the historic range of domestic gas on FGT's system, of +/-1% around the historic mean of 1356. But he based this change on hearsay evidence that was not reliable or even credible and that purports to contradict clear and unambiguous evidence entered in the proceeding. In that the hearsay evidence is given no weight in the decision, as discussed below, his testimony is viewed as supporting a Wobbe range of +/-2% from a midpoint set with compositional gas.

153. The first pieces of this unreliable hearsay evidence are two secret documents, Exs. FG-3 and FPL-29, that I will discuss only in general terms because of their protective status. It cannot be emphasized too strongly that these are not the typical protected documents in a FERC proceeding, which are usually ordinary business documents produced in litigation at the instigation of an opponent for use in the opponent's case. Here, it is the proponent using documents that were specifically created for its use in this proceeding to serve its own interests, while it attempts to shield them from full exposure. In this type of situation, we must be more critical of the need for secrecy, although not to the extent of exposing matters that would truly be harmful to the

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

legitimate interests of the affected entities. The proponents of this type of evidence should not be put to the choice of harming their litigating position or their legitimate interests. But nothing like that is apparent here, and we should not be forced to accept dubious matters on face value based on a questionable need for secrecy.

154. The documents' only purported value would appear to be in any conflict they might have with the manufacturer's specifications, discussed above, or to clarify ambiguities in those specifications. Whether they actually conflict is debatable, in that, unlike the specifications themselves, they are ambiguous on their faces. But if they do conflict, I accept the manufacturer's specifications on which the turbines' warranties are based as the authoritative documents. Moreover, those specifications seem clear and unambiguous.

155. The secret documents are suspect to begin with in that they are self-serving both for the authors (if they do not become public) and for the recipients, and appear not to be contractually binding, as are the documents they are purported to contradict or clarify. Moreover, one is a letter to an attorney, not to a plant operator, and neither of the documents is under cover of a technical information letter, as one would expect of documents purporting to change, clarify or condition technical specifications. *See*, Tr. 804. The letter to the attorney is internally inconsistent in ways I cannot discuss without violating their protective status, and clearly is not a document that can stand on its own without further explanation by its author. Consequently, I give zero weight to the secret documents and any testimony based thereon.

156. In addition, the proponents of these documents are somewhat audacious in suggesting that I accept secret documents and testimony, which I cannot publicly discuss or reference, that consist of no more than purported modifications of specifications that are the basis for contractual warranties, as the basis for setting public standards they desire. This could lead to the bizarre prospect that a decision could issue based entirely on reasons that are kept secret from the public. If those secret documents cannot stand the light of day, neither can any standards that might be based on them.

157. Those who prepared these documents should have been presented as witnesses to answer to their substance, the ambiguities contained therein, the basis for any purported departures from contractually-bound specifications, their efficacy, and their motivation for preparing them for use in the current litigation, this latter circumstance being undisputed. Although the documents are hearsay and not of the type that would ordinarily be relied upon by experts so as to be inadmissible in a court of law, I do not rule them out on mere evidentiary grounds. I find them unfairly presented, suspect, ambiguous, of doubtful efficacy, and unreliable, and could not in fairness base any findings on them.

158. Furthermore, it is difficult to accept the proposition that a leading turbine manufacturer would market its products under false specifications which could lead to terrible things happening to their turbines and the environment if their customers relied on them. It is not the FERC's obligation to further any such deception by putting its imprimatur on secret standards that are at variance with the published ones on which customers rely, and I would refuse to do so, even if I believed that this deceptive practice actually exists.

159. I speak only in general terms about these documents because that is all that is needed to justify their being disregarded, in order not to violate their protections. I do not intend to add any secret addendums to my decision for the sake of added, but unnecessary, specificity.

160. The other questionable hearsay relied on by Mr. Fitzgerald, was first alluded to in general terms in his rebuttal testimony with regard to the GE turbines. In direct contradiction with his direct testimony (Ex. PE-1 at 8) that FPC's fleet of electric generators was designed, manufactured and tuned to burn the natural gas available from the pipeline at the time of commissioning, he subsequently asserted in his rebuttal testimony (Ex. PE-4 at 7) that the GE turbines were "initially designed and tuned for a modified Wobbe Index that is actually lower than currently experienced with domestic natural gas in the FGT market."

161. At hearing, he then extended this blatant contradiction of his direct testimony from merely the GE turbines to the Siemens-Westinghouse turbines, to which he attributed a design Wobbe number of "about 1335, if I recall properly." Tr. 941. The historic range in FGT's market area was 1346 to 1371, with a mean of 1356. He then reaffirmed his changed testimony on the GE turbines, contending again that they were designed for a lower Wobbe number than the historic gas and giving, as a hypothetical, a design Wobbe number of 1310. Tr. 945-47. He attributed the Siemens-Westinghouse number to a verbal communication from a Bruce Risen of Siemens-Westinghouse (Tr. 941-2), and the lower-than-historic-gas Wobbe for GE turbines to a verbal communication from Colin Wilkes of GE (Tr. 947).

162. Neither Risen nor Wilkes offered evidence concerning this matter in prefiled testimony or at hearing, and we cannot confirm their alleged oral communications to Fitzgerald or determine the basis on which turbines may have been designed for gas at a lower than expected Wobbe number. We do know that Fitzgerald's prefiled rebuttal testimony as to the tunings' being below the historic gas was incorrect, in that it was completely at variance with Fitzgerald's repeated explanations of how the turbines were tuned, to wit, with whatever gas was available from the pipeline on the day of tuning (Tr. 945, 947, 985-87). Obviously, with historic gas at a mean of 1356, a high of 1371 and a low of 1346 (or 1338 in the western leg of FGT's system), the GE turbines could not have been tuned to 1310, nor the Siemens-Westinghouse turbines to 1335, even if

Fitzgerald, Risen or Wilkes were prescient enough to know the Wobbe number of the pipeline gas that was flowing at the time each turbine was tuned.

163. Nor does it sound plausible that manufacturers would supply turbines designed to operate on gas with Wobbe levels far below what they would be routinely be fed as fuel, when they could eliminate any conceivable margin of error, with its concomitant risk to both vendor and purchaser, by ensuring that the design were comfortably at the historic mean. The alleged Wobbe design number of 1335 for the Siemens-Westinghouse turbines would be 36 Wobbe points below the historic maximum of 1371, which then would be plus 2.7%. The hypothetical Wobbe of 1310 for the GE turbines would be 61 points below that 1371 historic maximum, which then would be plus 4.7%. To accept these assertions, we would require an explanation that would justify this alleged practice by persons with first-hand knowledge of the facts.

164. For example, what if Wilkes and Risen had been called to the stand and said that they had been misunderstood by Fitzgerald or that the design was centered only a *few* Wobbe points below the 1356 mean or that they had merely been speculating and had no actual knowledge of the design? All of this is possible. The alleged statements to Fitzgerald are not only hearsay, but unreliable hearsay, and are not sufficient basis for deviating from the prefiled direct testimony that put the design and tuning of the turbines squarely within the historic range.

165. In sum, while it is justifiable to forgo the full Wobbe range tentatively recommended by the prominent NGC+ committee for the certainty of the specifications under manufacturers' warranty and to avoid voiding those warrantees, it would not be reasonable to limit the specifications further to accommodate dubious secret documents and other unreliable hearsay.

166. Moreover, in a proceeding in which there may be profound safety and environmental consequences, or at least expensive corrective measures, to the owners and manufacturers of the DLN turbines from the standards that we adopt, it strains credulity that a turbine owner would prefile its direct testimony with an unequivocal statement that its turbines were designed and tuned to historic gas, and then expect to rely on subsequent vague, undocumented and largely unquantified (in the case of the GE turbines) testimony based on hearsay, to the contrary. In the unlikely event that the subsequent testimony, however imprecise, is the more accurate one, this would not be the first case or issue lost by poor trial preparation, and in this case, deservedly so. FPC and the other Florida Generators should have taken greater pains to protect their interests.

167. Although I do not accept Fitzgerald's assertions, his testimony on this score is not without major significance. It is of substantial value in a manner clearly not intended by his sponsor. Fitzgerald was the only witness presented by the generators that truly had an expertise in gas turbines, with years of hands-on experience, and was capable of

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

quantifying their safe operating parameters. It is significant that he was able to accept, without reservation, his own hypothetical (Tr. 947) that GE could install turbines with the design centered on 1310, to operate where the historic maximum was 1371, a variance of +4.7%. Similarly, he accepted (on the basis of hearsay evidence that we do not accept, at Tr. 941) that the Siemens-Westinghouse turbines at Hines were centered on a design of 1335, for which the historic high of 1371 would have been +2.7%. And, if the generators' sole hands-on turbine expert believes that the turbines of both GE and Siemens-Westinghouse can be tuned to more than 2% from the design point and operate consistently outside of the 2% range from the design, who are we to disagree?

168. With regard to the GE DLN turbines, all of the proposed standards are well within the +/-5% variability range from the design point, as per GE's specifications. Ex. FGT-4 at 5. With regard to Siemens-Westinghouse, Fitzgerald merely confirms what is apparent from its specifications shown on the chart at Ex. FGT-5 at 8, that any limitation of a range of less than a 4% difference either way relates only to tuning and not design. The turbines here in issue would not have to have their design re-centered from their current 1356 (approximately, depending on the adjustment gas used) even if we were to adopt the highest Wobbe maximum proposed here, of 1400. Based on the specification chart, the combustors could safely burn gas up to 1410 Wobbe number without their design's being re-centered, although they might have to be retuned.

169. The significance of the design's now being centered within the range of historic gas is that any retuning that might be necessary would be minor and could be accomplished during the routine retuning that is done periodically. The minor cost of that retuning, even if an additional cost, would be a small price for the turbine owners to pay for being able to continue to utilize the small minority of DLN turbines on FGT's system, those manufactured by Siemens-Westinghouse, that might have to operate at the margins of their capabilities to accommodate the LNG gas within FGT's proposed specifications.

170. To the extent needed, the turbine owners undoubtedly could also count on Siemens-Westinghouse for assistance. Aside from the fact that Siemens-Westinghouse has warranted the ability of its turbines to operate within this range, if it cannot accommodate its customers by minimizing their costs of adapting to the changing world of energy, where domestic gas is increasingly mixed with LNG, it will lose market share to those who manufacture turbines that can already accommodate the mix. According to the evidence, Siemens-Westinghouse already has the technology to adapt the turbines to a wider range of variability than its listed specifications. Although GE turbines do not have that capability, their range of variability, according to their specifications, is already wide enough to easily accommodate FGT's (and even the NGC+ group's) proposed Wobbe limits, while the Siemens-Westinghouse turbines' variability even without auto-tuning is at FGT's proposed limits.

171. Accordingly, I find that, because the evidence indicates that FGT's proposed Wobbe Number limits of 1340 minimum and 1396 maximum will permit the safe operation of the turbines on its system, will do so without their violating environmental emissions standards (if the Siemens-Westinghouse turbines are retuned to the midpoint, at minimal cost to the turbine owners), and will not void their manufacturers warranties, while at the same time permitting the importation of a substantial amount of LNG, they are just and reasonable limits.

172. I find that the higher Wobbe limit of 1400, proposed by the LNG Suppliers, as recommended on an interim basis by the NGC+ group, could pose a risk to the safety and environment by the Siemens-Westinghouse turbines and might void their warranties as to emissions releases, unless they were upgraded at substantial cost, without substantially increasing the availability of LNG supplies. Consequently, I find the proposed maximum Wobbe limit of 1400 to be unjust and unreasonable.

173. I find that the narrower Wobbe limits, of approximately +/-1% from the historic mean of 1356, proposed by the Florida Generators, are overly restrictive in that they would preclude the importation of substantial amounts of LNG available on the world market that could otherwise be imported without jeopardizing safety and the environment or voiding manufacturers' warranties. Consequently, I find these proposed limits to be unjust and unreasonable.

174. In addition to accepting the Wobbe Number limits proposed by FGT, I also accept the heating value limits (as slightly modified) and compositional limits for constituents of the LNG it proposes, for the reasons it gives, which I will now summarize. As mentioned above, the NGC+ group recognized the necessity for imposing limits, but declined to do so itself. Ex. FGT-6 at 22-23.

4. Wobbe Rate of Change

175. FGT proposes a Wobbe rate of change of 2% or less per six minutes for the LNG being imported into the system. As FGT explains it, this rate of change addresses the ability of turbines to adjust to changing Wobbe levels in the gas stream, as discussed in the NGC+ White Paper. FGT I.B. at 41. It was also the limit supported by Peoples in filing in another proceeding as appropriate for end-use equipment. *Id.*; Ex. FGT-10 at 10.

176. It must be recognized, however, that this provision does not fully accomplish its purpose. While it would preclude a supplier from changing its LNG at a faster rate than this limit, it would not protect customers against a faster rate of change resulting from the quick blending of the LNG with domestic gas or its quick replacement of that gas (or vice-versa). *See*, discussion at Tr. 127-31. No participant has suggested a provision that is practical and can fully accomplish this goal. This, of course, does not detract from the

justness and reasonableness of the provision that FGT has proposed, which I determine it to be.

5. Heating values

177. FGT proposes limits of HHV (Btu/scf) at 60° F, 14.73 psia, of 1025 to 1110. The upper value of 1110 is the one recommended by the NGC+ group and has been verified by testing on appliances as conservative. Ex. FGT-6 at 26, 27, 213. The Florida Generators propose, instead, a limit of 1075 Btu/scf, based on historical data and the absence of any showing that an existing source of supply with a heating value between 1075 and 1110 would be excluded. Florida Generators I.B. at 68-70. That, of course, does not preclude the possibility of some future source's surfacing within that range of heating values. If it does not, no harm would be caused by extending the limit as FGT proposes. If it does, the testing that FGT relies on assures that the imported LNG can be utilized safely. Where there are actual test results, one way or the other, they are the most reliable determinant. For that reason, FGT's proposed limitation is determined to be just and reasonable.

178. FGT's proposed lower limit is 1025 Btu/scf for LNG delivered into the Market Area and is based on the low values for historic gas in the Market Area. Exs. FGT-1 at 11; FGT-7. As FGT explains it, natural gas with a lower Btu level has a lower heating value and, as a result, will have the detrimental effect of reducing the amount of pipeline capacity available to its customers if it replaces gas with a higher heating value. FGT I.B. at 22. The standards being proposed are in the context of a new interconnection, with AES Ocean Express, and, in any event, would permit the importation of gas from a new source. A condition of allowing a new interconnection is that it not diminish service to existing customers. *Panhandle Eastern Pipeline Co.*, 91 FERC 61,037 (2000). There is no justification for allowing the importation of LNG to diminish that service, either, even if a new interconnection were not involved. FGT's proposed lower limit for the Market Area is just and reasonable for that reason.

179. However, in that FGT has proposed these standards only for the Market Area, it did not consider the historic gas in the Western Division. While the historic low was 1026 in the Market Area, it was 1022 in the Western Division. Because I am applying the standards to FGT's entire system, as discussed below, they should also contain a lower limit for the Western Division. In accordance with FGT's rationale, I am setting 1022 as the lower limit for the Western Division, a minimal adjustment.

6. Constituent limitations

180. For the most part, the limits FGT proposes for the constituents of LNG are not objected to on an individual basis. I find them all just and reasonable on the bases presented by FGT, which I will summarize, as follows.

181. *a. Methane Number: equal to or greater than 80*

FGT bases this on internal combustion engine warranty requirements. FGT I.B. at 44; Ex. FPL-19, FGT Data Response 2.19. It is not specifically opposed. It is determined to be just and reasonable.

182. *b. C_1 (methane): equal or greater than 85 mole percent*

FGT bases this on the GE fuel specifications. FGT I.B. at 44; Ex. FGT-4 at 5. It is not specifically opposed. It is determined to be just and reasonable.

183. *c. C_2 (ethane): equal or less than 10 mole percent*

FGT bases this on its review of turbine fuel specifications. FGT I.B. at 44. It is not specifically opposed. It is determined to be just and reasonable.

184. *d. C_3 (propane): equal or less than 2.75 mole percent*

The Siemens-Westinghouse fuel specifications state a limit of 2.5 mole percent. Ex. FGT-5 at 19. Subsequent to the adoption of that specification, however, Siemens-Westinghouse conducted a test in which it concluded that a relaxed limit of 2.75 mole percent was sufficient. Tr. 132. FGT relies upon the test results. FGT I.B. at 44-45. Its proposed specification is not opposed. Moreover, where the manufacturer is satisfied that its turbines can operate safely and within environmental standards with limits beyond its published specifications, there is no reason to limit the fuel to the more restrictive specifications. The specification is determined to be just and reasonable.

185. *e. C_{4+} (butanes+): equal or less than 1.2 mole percent*

The Siemens-Westinghouse fuel specifications state a limit of 1.0 mole percent. Ex. FGT-5 at 19. However, because of the same test that examined propane, Siemens-Westinghouse concluded that a relaxed limit of 1.2 for butanes was sufficient. Tr. 134; FGT I.B. at 46. This proposed specification is not opposed and is supported by Peoples (Ex. FGT-13 at 7). For the same reasons as with regard to propane, above, it is determined to be just and reasonable.

186. *f. C_{5+} (pentanes+): equal or less than 0.12 mole percent*

In the opinion of FGT, based on its operating experience, and its expert Langston, this is the limit needed to avoid liquid hydrocarbon fallout. Ex. FGT-1 at 10; Tr. 61. No party opposes this level and Peoples supports it (Ex. FGT-13 at 7). It is determined to be just and reasonable.

187. *g. Combined CO_2 + N_2: equal or less than 3 percent by volume*

This merely continues the existing standard for gas in FGT's existing tariff (Ex. FGT-12 at 6) and applies it to LNG. No party opposes it. It is determined to be just and reasonable.

188 *h. CO_2: equal or less than 1 percent and no injected CO_2 as a dilutant*

In order to lower the Wobbe Number of LNG for interchangeability reasons, the inert gases nitrogen (N_2), oxygen (O_2) or carbon dioxide (CO_2) may be injected. Nitrogen appears not to have an adverse effect on pipelines, while oxygen and carbon dioxide have a corrosive effect when combined with water. The NGC+ White Paper refers to carbon dioxide as an "aggressive corrosive agent" when combined with water and a key contributor to major pipeline safety accidents. Ex. FGT-6 at 70.

189. While all of the LNG suppliers in this proceeding, except Ocean Express, intend to inject nitrogen as a dilutant and do not oppose this standard, Ocean Express apparently intends to inject carbon dioxide and does oppose it. Obviously, the unnecessary presence of carbon dioxide is a safety hazard that easily could and should be avoided by the limitations that FGT proposes. The specifications are determined to be just and reasonable and Ocean Express's proposal to eliminate them is unjust and unreasonable.

190. *i. O_2: equal or less than 0.25 percent by volume*

This continues the existing standard in FGT's tariff (Ex. FGT-12 at 6) and is unopposed. It is determined to be just and reasonable.

191. *j. Hydrogen sulfide: equal or less than 0.25 grains per 100 cubic feet of gas*

This continues the existing standard in FGT's tariff (*id.*) and is unopposed. It is determined to be just and reasonable.

192. *k. Total sulfur: equal or less than 2 grains per 100 cubic feet of gas*

This limit was derived from the GE fuel specifications (Ex. FGT-4 at 15-17) and the Siemens-Westinghouse fuel specifications (Ex. FGT-5 at 12) needed to comply with environmental emissions limits. The 2 grains limits is a reduction of the existing 10 grains limit that would still apply to domestic gas and which FGT would like to continue to apply to LNG imported into the Western Division. No party specifically opposes the 2-grains limit. It is determined to be just and reasonable, notwithstanding that it is difficult to decipher the precise connection between the fuel specifications and the limit that FGT arrived at.

193. *l. Water Vapor: equal or less than 7 pounds per 1,000 Mcf of gas*

This is the existing standard in FGT's tariff. No participant opposes it. It is determined to be just and reasonable.

194. *m. Temperature Standards*

i. Maximum temperature: equal or less than 120° F.

This is the existing standard in FGT's tariff. No participant opposes it. It is determined to be just and reasonable.

ii. Minimum temperature: gives FGT the right to determine the minimum on a case-by-case basis

This provision gives FGT the right to determine the minimum on considering the operating conditions, such as gas flow and the ability to blend gas streams, pressure drop, and the impact on the transporter's or customers' facilities, from concerns such as excessively cold gas or hydrocarbon fallout. FGT is given the right to make a case-by-case determination because of the unique facts involved with each interconnection. Ex. FGT-1 at 4-7. This case-by-case authority was the basis for settlement concerning the Ocean Express interconnection with FGT in this docket (110 FERC ¶ 61,148) and the Calypso interconnection with FGT, in another docket (110 FERC ¶ 61,157), both settlements being approved on February 14, 2005. Ex. FGT-1 at 8.

195. No participant objects to this provision. It is determined to be just and reasonable.

D. <u>Application to Domestic Gas</u>

196. BG argues that the standards adopted for LNG imported to the Market Area should not differ from the standards for domestic gas. BG I.B. at 25-28. Those standards, perhaps, should be the same even though it is possible that certain of the dangers present with regasified LNG, such as hydrocarbon liquid dropout, may not be as prevalent with domestic gas. And it is also likely that LNG suppliers, by virtue of the processing that they must already do on their gas, may have more control over its composition.

197. Our main focus here, however, has been on safety and environmental matters relating to this new type of gas, and the LNG suppliers have been well represented to present their positions. Not so the domestic suppliers, who have not been given fair notice that their continued supply of gas might be in jeopardy by our applying new standards to their gas. FGT's proposed tariff maintains the old standards for domestic

gas. It may be that the domestic gas suppliers could, and already do, comply with the standards proposed for LNG, which, after all, were presented with an eye on historic domestic gas, and that they would have no objection to the wholesale application of the new standards. We just do not know, and it would be unfair to deprive domestic gas suppliers of their full day in court by deciding this issue in a forum where they are not adequately represented. For that reason, the standards proposed here should apply only to LNG, as proposed by FGT, with the domestic gas standards' remaining unchanged.

E. Application to Western Division

198. FGT proposes that the standards adopted here apply only to its eastern leg, referred to as the Market Area, and is supported by Commission Staff. No objections were raised by the LDCs or the LNG Suppliers. Ocean Express, BG, Southern and the Florida Generators would apply them also to the Western Division.

199. As I read the Commission's orders, it seeks the widest application of the standards. The September 7, 2004 Order in this docket, at 108 FERC ¶ 61,221 P20, makes it clear that the Commission viewed the proposed standards as having system-wide application. *See, also*, *Southern Natural Gas*, 113 FERC at P 41, in which the Commission assumes that the standards adopted here would apply to LNG flowing through the other interconnects on FGT's system.

200. FGT's basis for distinguishing the two legs of its system is its alleged ability to blend all of the LNG imported to its Western Division with domestic gas before it reaches its customers. When LNG is imported to the Market Area, it may go directly to customers because of their proximity to the import terminal. FGT's evidence, however, is not convincing that *all* of the LNG delivered to the Western Division can be successfully blended to meet the standards we adopt here. Consequently, those standards should also apply to the Western Division.

201. However, FGT may include a provision in its tariff permitting it to import LNG to its Western Division that does not meet those standards to the extent that it can insure that such gas, through blending, processing, or otherwise, will meet those standards when delivered to any and all customers or distribution facilities, unless each customer or LDC who is protected by a standard specifically waives that standard.

F. FPL's Right to Capacity for Low Btu Gas

202. FPL argues that it has a contractual right that extends to the year 2015, to capacity on FGT for low Btu gas; that it relied on that agreement when it bought its DLE turbines, with an investment of billions of dollars; and, that the LNG, which would put those turbines in jeopardy if introduced into the system, is definitely not low BTU gas. FPL I.B. at 12-15.

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

203. FPL asserts that the commitment was part of an overall agreement for the expansion of the FGT system. Paragraph 4 of the agreement, which is dated November 27, 1989, provides, as follows:

> During the primary or extended term of any service provided by FGT under the FTS-1 Service Agreement, FPL shall have the right and FGT shall have the obligation, subject to all necessary regulatory authorizations, to utilize the capacity reserved thereunder for transportation of low BTU gas downstream of FGT's Compressor Station No. 16. The capacity utilized for this purpose shall be limited by the need for FGT to maintain an acceptable gas quality in its pipeline and adequate service to its customers, as determined by FGT in its sole discretion. FGT will use due diligence to obtain all necessary regulatory authorizations for transportation under this Paragraph 4 if requested by FPL.

204. From this bare-bones excerpt from an agreement, we know very little. While FPL suggests that it was designed to protect the DLN turbines from high Btu content gas, this appears questionable, as the agreement was entered into in 1989, perhaps before the introduction of LNG or other high Btu content gas into FGT's Market Area was contemplated.

205. And, what gas was even considered as being low Btu gas is a matter of speculation. Did it refer to gas already being delivered to the Market Area, in the range of 1,026 to 1068, or to a lower Btu gas that FPL had intended as a source for its gas operations that it did not ever utilize and which may no longer be available? The latter construction appears reasonable, in that FGT was viewed as possibly having to seek additional regulatory authorizations for the transportation of this gas, as stated. But if so, why should a right to the transportation of a particular gas that has never been utilized and is now abandoned require the exclusion of LNG, which was not even considered at the time? It is even possible that the agreement intended to allow gas of even a higher content Btu than we would now allow under FGT's proposal, but not any higher.

206. Moreover, the agreement, itself, gives FGT the sole discretion to limit FPL's right to this capacity to maintain adequate service to its customers. Can that be interpreted as permitting FGT to deliver LNG to its customers as maintaining adequate service, in its discretion, even if the contemplated "low" Btu gas were also available?

207. Furthermore, we do not even know how much of the pipeline's capacity was reserved for this low Btu gas. If it is not the bulk of the capacity, can we let that agreement interfere with service to all of FGT's other customers?

20060411-3054 Issued by FERC OSEC 04/11/2006 in Docket#: RP04-249-001

208. We simply do not know enough about the purpose, meaning and application of the provision to give it critical importance in deciding this proceeding. We do not know because FPL has not offered evidence to explain its purpose, meaning and prior use, if any. If FPL had intended to rely on it as the crux of its case, it should have been more forthcoming. There is insufficient evidence to assign the provision much importance. And, finally, we are setting the standards so that they do not harm FPL's turbines, which it claims is the purpose for the contractual provision, rendering that provision immaterial to our decision. For those reasons, that provision does not preclude us from adopting FGT's revised standards.

G. Interim vs. Final Standards

209. Many of the participants urge that the standards chosen here be adopted on an interim basis, as were the NGC+ Guidelines, because of their uncertainty as a protection against all possible risk. But the consequences of delay in finality must be weighed against its benefits, taking into account the magnitude of uncertainty as the record now exists and the chances of resolving it within the foreseeable future. The major drawback to delaying finality is the disincentive it offers to LNG Suppliers who must invest billions of dollars in importing and processing facilities, and would face the possibility of having to forfeit their investments if the interim standards are substantially tightened. We must examine all areas of uncertainty to determine whether and to what extent they might justify delay.

210. The three problem areas discussed at hearing were the DLN gas turbines, compression joints on LDCs' distribution pipelines, and end-use appliances other than turbines. As discussed, above, there was extensive evidence and discussion concerning the DLN gas turbines, which are found to be compatible with FGT's revised standards.

211. The LDCs also made much ado about the possible leakage of compression joints on distribution facilities from the introduction of regasified LNG to pipelines. The theory is that the LNG, which is a drier gas than unprocessed natural gas because it contains a lower C_{5+} content (less pentanes and hexanes), can shrink the elastomer seal of the compression joint when it desorbs the previously adsorbed high hydrocarbons, leading to a reduction in sealing force. Ex. PJL-1 at 6.

212. The LDCs brought in evidence of two instances in which the introduction of dry gas may have caused leakage to compression joints. One involved the introduction of dry Canadian natural gas from the Iroquois Gas Transmission System into the Long Island Lighting Company (LILCO) system in February 1992, and the other concerned the introduction of unblended regasified LNG into the Washington Gas Light Company (WGL) system in the fall of 2003.

213. The LDCs entered into this record a prudence report of the New York Public Service Commission regarding the LILCO leakage which identified the leaking couplings as those manufactured by Norton-McMurray ("NORMAC" couplings) and recommended that they be eliminated from the pipeline. Ex. PJL-3. While the report appeared to ascribe the leakage to the combination of the defective design of the couplings and the introduction of drier gas into the system, it reported that, when LILCO began injecting heavy hydrocarbons into the system over an eight-day period, the leakage was not changed and, consequently, the injections were then stopped. *Id.* at 7. This suggests that the "dryness" of the gas may not have been a causation of the leakage. Moreover, the report noted that the dry Canadian gas had been introduced into numerous upstate utility systems at the same time, where it had had no operational effect, and that only LILCO was experiencing the problem. *Id.* at 12, 16. Some of those systems were identified by name. *Id.* at 14, 15. In addition, the report noted, as of March 1992, that LILCO's leakage problem was decreasing with warm weather (*Id.*), suggesting limited relevance to the instant situation in Florida, where no cold weather exists.

214. With regard to the leakage on the WGL system, WGL commissioned its own report, the ENVIRON report, which was presented by the LDCs' expert, Dr. Peter J. Loftus. Ex. PJL-2. To the extent, however, that it may have assigned major blame for the leakage on the introduction of regasified LNG to the WGL system, it was entirely discredited.

215. It was not, and did not purport to be, an independent report by an independent expert, although it appeared to be styled as such. Unlike an independent report, it carried a DISCLAIMER to the effect that the report was only valid to the extent that the information provided to ENVIRON was accurate and complete. Ex. LNG-83 at 3. That information was selected by WGL, not the expert. The result was predetermined by WGL and dictated to the expert in a series of e-mails. Information at variance with the predetermined result was selected out by WGL or otherwise disregarded. Tr. 1231, 1238, 1280.

216. So were almost all factors other than a change in gas composition (the dictated result) that may have contributed to the leaks being investigated. Significant other factors were a mammoth defect in the joints themselves (Tr. 1095-1102, 1201-07), the improper application of hot coal tar to the joints that radically reduced their holding power (Tr. 1140-45, 1378-80), a drastic increase in pressure that may have been introduced into the system at the same time as the introduction of the LNG (1145-54, 1285-86, 1317-22), a wide swing in seasonal temperatures (Tr.1156, 1161-64, 1381-83), and an unusually wet season that raised the water table considerably and may have disturbed the pipeline (Tr.1121-22, 1387-88). For a detailed catalogue of all the defects in the report, *see*, Southern I.B. at 43-62. It is not necessary to repeat, and elaborate on, those defects, which were numerous and fundamental. In addition, the expert took no notice of

numerous other pipelines in which LNG had been introduced that had experienced no increases in leakage. Tr. 1272-73.

217. The report and the expert testimony were of little value other than to suggest that increased leakage occurring on systems in which LNG or other dry natural gas is introduced is a comparatively infrequent phenomenon and that, probably, it is attributable to factors other than the mere change in gas composition, including, at least, the presence of defective seals and large swings in seasonal temperatures.

218. The latter condition does not exist in Florida. If the former does, the LDCs should replace the defective seals on their own initiative and at their own cost, even in the absence of importing dry LNG. And, had there been instances other than those involving LILCO and WPL in which significant leakage of compression joints had occurred in conjunction with the introduction of LNG or other dry gas into pipelines, they would undoubtedly have been discovered by WPL, the other LDCs or their expert witness, and been made part of their presentation in this proceeding. Obviously none were discovered. Consequently, we can be satisfied that the evidence with regard to the possibility of leakage of compression joints on LDCs in Florida does not support the need for further testing or delay in implementing final standards. Nor, as fully discussed above, did the evidence with regard to DLN turbines.

219. It is only with regard to end-use equipment other than gas turbines that we do not have a complete record. What we do have, however, is undisputed testimony based on specific examples from the public record that there are pipeline systems in this country that have experienced wide ranges in Wobbe Index, beyond the range of FGT's proposal, with no adverse effects on gas appliances. Ex. LNG-3 at 11-13. On that basis, it is extremely unlikely that appliances now being fed from the FGT system could not handle gas with a range of Wobbe Index and change in constituents no wider than proposed by FGT.

220. What is missing from the record is evidence that the actual gas appliances now being fed from the FGT system can operate satisfactorily, *without being re-centered or otherwise adjusted*, to that particular range. We cannot know that without testing or actual operating experience.

221. There is no ideal solution to our dilemma. To withhold finality to standards that are unlikely to be changed, merely because of the possibility that appliances would have to be adjusted, when that course of action might bring continued development of the LNG facilities to a halt, does not seem reasonable. This is especially the case in that the bulk of the natural gas in the FGT system is used to fuel gas turbines, which have been demonstrated to be compatible with the proposed standards, and there is no evidence that any adjustment of other appliances would be necessary, extensive or expensive. The burden of coming forward with such evidence should have been on those opposing a

broadening of standards, as indeed the parties understood with regard to gas turbines and compression joint leakage.

222. Accordingly, FGT's revised standards are hereby adopted as final, with the following limitation: if, at any time before the Commission renders its final decision, any participants can find further evidence, not available at the time of hearing, through testing or otherwise, that casts doubt on the findings or conclusions of this Initial Decision, the participant(s) may request that the Commission consider this evidence in making its determination.

H. The Allocation of Costs

223. Most of the participants other than the LNG Suppliers argue for some sort of socialization of the costs of testing, remediation and repair that may be necessary to accommodate the introduction of LNG into FGT's system, although an allocation of costs was not an issue mentioned in the Commission Orders. They submit that it would be unfair to have only the other parties and their customers bear the costs, when the LNG Suppliers are those who would benefit the most from the importing of the LNG, to the tune of billions of dollars in profits.

224. At this juncture, however, all of those prospective costs are highly speculative with regard to need, amount or cause, with the exception of those that may be incurred for testing on end-use appliances, for which some need has been established. But even for the latter, no specific testing program has been established, and it is not for the presiding judge or the five-member Commission to propose or supervise one and monitor its costs.

225. Allocating in advance prospective costs, the amount of which is undetermined even as to a broad order of magnitude, and which may be unnecessary or the contractual responsibility of others, is a prescription for unnecessary or inflated costs and endless bickering. This is especially the case with costs for improvements that may have multiple benefits, including some that are not related to the introduction of LNG to the system. The prospective costs are simply too indefinite to be considered in this proceeding. To the extent that a participant may incur a cost which it attributes to the actual importation of LNG under this decision, it may make an appropriate filing, presumably under Section 5 of the NGA, to recover that cost. This decision makes no determination with regard to any such prospective filing as to its propriety or on its merits and, certainly, cannot be used as a bar to any such future claim, which is not now ripe for adjudication.

V. FINDINGS AND CONCLUSIONS

226. For the reasons stated above, I make the following findings and conclusions:

(a) Gas turbines with conventional combustors, which comprise the majority of gas turbines on the FGT system, should have no problem complying with the Wobbe Number standards proposed by any of the participants for regasified LNG.

(b) Only the DLE turbines may encounter problems but, according to the manufacturers' specifications, not with safety. The DLE turbines in the Market Area have been designed and tuned to domestic gas delivered historically, with a Wobbe Number mean of 1356, low of 1346 and high of 1371.

(c) No probative evidence has been adduced to indicate that the GE turbines cannot operate safely and within environmental emissions standards with a variability in Wobbe Number of +/-5% from any tuning point within the range of historic gas. Nor has any been adduced that would indicate that the Siemens-Westinghouse DLE turbines cannot operate safely with a variability in Wobbe Number of +/-4% from their tuning points and within environmental emissions requirements with a variability of +/-2% from their tuning points.

(d) According to their specifications, the Siemens-Westinghouse DLE turbines could not comply with environmental requirements if they were to receive gas with as wide a Wobbe range as proposed by the LNG Suppliers. They could, however, comply with the environmental requirements if they received gas within the Wobbe range proposed by FGT in its rebuttal testimony, but only if they were retuned to the midpoint of that range. They could be retuned to that midpoint without great expense and as part of the routine maintenance that is usually done annually because their design points do not require re-centering.

(e) According to their manufacturer's specifications, the GE DLE turbines could receive gas within the Wobbe ranges proposed by any of the participants without voiding their manufacturer's warranties. According to their manufacturer's specifications, the Siemens-Westinghouse DLE turbines might void their warranties as to emissions, if they received gas with a Wobbe range as wide as proposed by the LNG Suppliers, but they would not if they received gas within the Wobbe range proposed by FGT in its rebuttal testimony, if they were retuned to the appropriate midpoint.

(f) In order to operate safely and within the environmental requirements, the FGT system must operate with regasified LNG that is within the constituent limitations proposed by FGT in its rebuttal testimony.

(g) The standards proposed by the Florida Generators would unnecessarily restrict the importation of LNG that poses no risk to safety or the environment.

(h) No probative evidence has been presented that would indicate that there is a substantial risk of leakage on Florida distribution systems from transporting regasified LNG or a substantial risk to end-use appliances from that gas if it is limited to the standards proposed by FGT in its rebuttal testimony.

(i) The standards for LNG proposed by FGT in its rebuttal testimony are just and reasonable.

(j) The standards proposed by the LNG Suppliers are not just and reasonable.

(k) The standards proposed by the Florida Generators are not just and reasonable.

(l) The standards proposed by FGT should be applied only to imported LNG and should not be extended to domestic gas under this decision.

(m) The standards proposed by FGT should be applied both to its Market Area and Western Division, modified and limited for the Western Division, as described in the DISCUSSION, above.

(n) The standards being adopted are intended to be final, not interim, standards, although the participants may present further evidence not available at the time of hearing, including evidence from testing, to the Commission for its consideration in reviewing this decision before the Commission makes its determination.

(o) No determination is made on the allocation of costs attributable to the importation of the LNG considered in this decision.

(p) All findings and conclusions made in the DISCUSSION, above, are incorporated in these FINDINGS AND CONCLUSIONS even if not specifically made here.

(q) All contentions made by the participants that are not specifically addressed or decided are rejected or determined to be immaterial.

VI. ORDER

227. For the reasons stated above, the standards proposed by FGT in its rebuttal testimony are hereby adopted for its entire system, with slight modification for the

Western Division, as discussed above. The participants, however, may test end-use equipment, individually or collectively, and request that the Commission consider the results of the testing in reviewing this decision.

Herbert Grossman
Presiding Administrative Law Judge