

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Petition for Determination)	
of Need for Collier-Orange River)	DOCKET NO. 030084-EI
230kV Transmission Line in Collier,)	
Hendry, and Lee Counties, by)	FILED: March 19, 2003
Florida Power & Light Company)	
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DIRECT TESTIMONY

OF

MICHEL P. ARMAND, P.E.

ON BEHALF OF

BARRON COLLIER COMPANIES

DOCUMENT NUMBER-DATE

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FPSC-COMMISSION CLERK

DIRECT TESTIMONY OF MICHEL P. ARMAND, P.E.

**IN RE: PETITION FOR DETERMINATION OF NEED FOR COLLIER-ORANGE
RIVER 230KV TRANSMISSION LINE IN COLLIER, HENDRY, AND LEE
COUNTIES, BY FLORIDA POWER & LIGHT COMPANY, PSC DOCKET NO.
030084-EI**

DIRECT TESTIMONY OF MICHEL P. ARMAND, P.E.

1 Q: Please state your name and business address.

2 A: My name is Michel Armand, and my business address is
3 12370 SW 97 Terrace , Miami, Florida.

4

5 Q: By whom are you employed and in what position?

6 A: I am under contract with Navigant Consulting, Inc. as
7 an Independent Consultant.

8

9 Q: Please describe your duties with Navigant Consulting.

10 A: I am responsible for conducting transmission planning
11 and operations studies for Navigant's clients. These
12 studies cover proposed generating plants and their
13 associated transmission interconnections, actual system
14 performance based on projected seasonal loading
15 conditions, and the determination of potential
16 operating constraints necessary to insure reliable
17 operation of the bulk transmission system.

18

19 **QUALIFICATIONS AND EXPERIENCE**

20 Q: Please summarize your educational background and
21 experience.

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1 A: I graduated from the City College of the City
2 University of New York in June 1968, with the degree of
3 Bachelor of Engineering - Electrical. In June 1971, I
4 graduated from the Bernard Baruch College of the City
5 University of New York with the degree of Master of
6 Business Administration.

7 In 1971, I attended the General Electric
8 Company's one-year course in Advanced Power System
9 Engineering, in Schenectady, New York. In 1978, I
10 attended the one-month Public Utility Executive Program
11 of the Graduate School of Business Administration of
12 the University of Michigan. In 1983, I attended the
13 two-month Executive Program of the Colgate Darden
14 Graduate School of Business Administration of the
15 University of Virginia.

16 Upon graduation, I was employed by the
17 Consolidated Edison Company of New York. I was
18 assigned to the Distribution Engineering, Station
19 Design, and System Planning Departments. My permanent
20 assignment was in the Transmission Planning Section of
21 the System Planning Department.

22 In April 1974, I was employed by Florida Power &
23 Light Company (FPL) in the System Planning Department.
24 In April 1976, I was put in charge of the Reliability
25 and System Security Section, responsible for testing
26 and assessing the dynamic performance of the planned

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1 generation and transmission system, and for making
2 recommendations based on our tests and assessments. In
3 June 1984, I was transferred to the Power Supply
4 Department as Manager of Technical Services responsible
5 for daily analysis of system performance, monitoring
6 the adequacy of performance of transmission protective
7 systems, and coordinating the protection and control
8 settings of FPL's generation, transmission, and
9 distribution systems. In May 1991, I became Director
10 of Protection and Control Systems responsible for the
11 design, engineering, installation, and maintenance of
12 all protections and control systems for the generation,
13 transmission, and distribution systems of FPL. In
14 October 1993, I took early retirement from FPL.

15 From December 1994 to December 1996, I was
16 employed as an Energy Consultant in the Office of the
17 Prime Minister of Haiti. In 1997, I assumed the
18 position of Senior Engagement Manager with Navigant and
19 terminated employment as a full time employee on July
20 2, 2002 .

21 I am a registered professional engineer in the
22 State of Florida, and I am a member of the Institute of
23 Electrical and Electronic Engineers and a member of the
24 Power Engineering Society.

25

26 Q: What is your experience in power plant engineering,

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1 construction, operations, permitting, and licensing?

2 A: As Supervisor of Reliability and System

3 Security, responsible for modeling the dynamic

4 response of the system to disturbances, I was

5 involved with the Power Plant Engineering

6 Department in specifying the electrical

7 parameters of new generators such as power

8 factor, short circuit ratio, high initial

9 response exciter, power system stabilizer,

10 generator step-up and auxiliary transformers,

11 tap ratio coordination, and switchyard

12 connections. I also initiated studies to add

13 power system stabilizers and modify relay

14 protection schemes for existing high capacity

15 generating units (600 MW and above) on the FPL

16 system.

17 I was heavily involved in the licensing of FPL's

18 St. Lucie Unit No. 2, a nuclear unit. In this

19 activity, I participated in the Final Safety Analysis

20 Report for the unit's operating license and testified

21 at the evidentiary hearing in Miami, in November 1979,

22 on the issue of grid reliability.

23

24 Q: What is your experience in generation planning,

25 transmission planning, transmission design, and load

26 flow studies?

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1 A: In my professional work, the size and
2 location of generation was always a given.
3 My responsibility was the integration of the
4 generators in the transmission grid for
5 optimum delivery of the power under all
6 postulated transmission outages.

7 I have extensive professional experience in
8 transmission planning. At Consolidated Edison of New
9 York, I was responsible for transmission planning for
10 the borough of Manhattan, representing at that time
11 about 45 percent of ConEd's total system demand. At
12 FPL, I was responsible for transmission planning in
13 Dade and Broward Counties, representing, at that time,
14 about 60 percent of FPL's total system demand. While
15 not involved in the physical design of transmission
16 lines, studies initiated and conducted by me resulted
17 in the partial transposition of the 500 kV transmission
18 corridor on the East Coast of Florida. The deleterious
19 effects of unbalanced, negative sequence currents on
20 the generators along the corridor were considerably
21 reduced.

22 Load flow and transient stability studies were
23 the principal tools used to assess the seasonal,
24 yearly, and long-range performance of the Florida Grid.
25 Such studies were conducted by me and by my section
26 internally for FPL, and in participation with the

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1 Florida Electric Power Coordinating Group (FCG). Such
2 tools were also used to update the Florida under-
3 frequency load shedding program and to establish the
4 various remedial action systems on FPL's system to
5 mitigate loss of heavily loaded transmission corridors.

6

7 **Q: Have you previously testified before regulatory**
8 **authorities or courts?**

9 **A:** I have testified before the Atomic Safety and Licensing
10 Appeal Board of the U.S. Nuclear Regulatory Commission,
11 in an evidentiary hearing on the alleged inadequacy of
12 electric power systems for St. Lucie Unit No. 2. The
13 operating license was granted after it was clearly
14 demonstrated that the planned transmission grid would
15 provide adequate and reliable off-site power in an
16 emergency. I have also testified before the Florida
17 Public Service Commission regarding transmission issues
18 in Docket No. 981042-EM, the need determination
19 proceeding for the Duke New Smyrna Beach Power Plant,
20 and in Docket No. 001748-EC, the need determination for
21 the Osprey Energy Center.

22

23 **Q: Are you a registered professional engineer?**

24 **A:** Yes. I am a registered professional engineer in the
25 State of Florida.

26

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1 **SUMMARY AND PURPOSE OF TESTIMONY**

2 **Q: What is the purpose of your testimony?**

3 **A: I am testifying on behalf of Barron Collier Companies,**
4 **who have petitioned to intervene in this proceeding. I**
5 **have been engaged to give my professional opinion**
6 **regarding FPL's assertions that they need the alternate**
7 **right of way ("ROW"), despite its potentially**
8 **significant additional cost, because of concerns**
9 **regarding terrorist sabotage.**

10

11 **Q: Was this line required as part of the 10-year site plan**
12 **published by FPL in 2002?**

13 **A: Review of the 2002 10-year site plan does not contain**
14 **reference to this new line. I find it extremely**
15 **unusual that a major transmission line of this**
16 **magnitude would not have been identified in FPL's**
17 **previous ten-year site plans. Reliability needs of**
18 **this magnitude do not simply appear overnight.**

19

20 **Q: Is not loss of a common corridor an acceptable planning**
21 **criterion?**

22 **A: Loss of a common corridor is an acceptable planning**
23 **criterion which allows for some loss of load so long as**
24 **it does not result in a cascading outage and widespread**
25 **system disturbance.**

26

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1 Q: Is this a new planning criterion for FPL?

2 A: Obviously it is, since FPL seems to imply that no loss
3 of load will result from a corridor outage.

4

5 Q: Please summarize your testimony.

6 A: FPL's assertions that they need to use the alternate
7 ROW are at best misplaced. Behind my residence in
8 South Florida, I can see an FPL transmission line
9 corridor that contains four 230kV transmission lines.
10 FPL should know that other parts of their bulk power
11 supply system are much more vulnerable to sabotage and
12 other risks than collocated transmission lines. I do
13 not believe that this risk or any of the other factors
14 claimed by FPL justify the additional cost - between
15 \$6 million and \$24 million in installed costs,
16 according to FPL's figures - of FPL's proposed route
17 over the cost of siting the new line using an existing
18 transmission line corridor.

19

20 Q: Does this conclude your direct testimony?

21 A: Yes, it does.

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CAREER SUMMARY

Extensive executive management experience in the planning and operation of Bulk Electric Power System, specifically in the areas of reliability and system security. Expertise in the areas of load flow, short circuit, transient and dynamic stability studies to assess the performance of the High Voltage electrical system. Expertise in the areas of Distribution Planning, Emergency Load Management (both automatic and dynamically controlled), Demand Side Management, and Static Transmission System Reliability Analysis.

PROFESSIONAL EXPERIENCE

NAVIGANT CONSULTING, INC. Sacramento, CA and Orlando, FL 12/97 to 7/02

For the last five years, he has been working as a Senior Executive Consultant in the area of High Voltage Transmission Planning, Merchant Power interconnection study and Electric Industry restructuring. He has consulted with the Transmission Agency of Northern California, the Bonneville Power Administration and the California ISO in assessing the Operating Transfer Capabilities (OTC) for winter, spring and summer seasons across the California Oregon Interconnection (COI). He has performed numerous transmission system impact assessment studies for merchant power projects in Texas, California, and Florida. He has testified in two need determination proceedings before the Florida Public Service Commission.

PRIME MINISTER OFFICE, Port-au-Prince , HAITI 12/94 to 12/96

Spent two (2) years in Haiti as Energy Consultant in the Office of The Prime Minister, State Enterprises Democratization Unit. Formulated a set of policy options for the revitalization of the State-owned electric power company. Negotiated the installation of 20 Mw of emergency power and the addition of another 35 Mw of generating capacity. Reviewed the document for privatization, which was presented to parliament, modified , and approved. Coordinated the energy sector intervention of various International Lending Institutions: The World Bank , The Inter-American Development Bank , The Canadian International Development Agency , The French Fund for International Development.

FLORIDA POWER & LIGHT COMPANY, Juno Beach , FL 3/74 to 10/93

DIRECTOR, PROTECTION AND CONTROL SYSTEMS, 5/91 to 10/93

Reporting to Vice President -Power Delivery and responsible for the reliable performance of all protection and control equipment required for distribution substations , transmission facilities , and generating units protection. Responsibilities include the design, engineering, installation, and maintenance of these systems.

Achievements include: (1) the reduction of maintenance expenses by 39% over a two year period by the application of statistically derived " Quality of service standards " instead of the traditional maintenance interval standard, and (2) the reorganization and streamlining of the decision/responsibility process.

MANAGER, POWER SUPPLY TECHNICAL SERVICES 7/84 to 5/91

Reporting to the Director of Power Supply and responsible for the provision of engineering services to the Power System Operations group of the Power Supply Department. These services included winter and summer studies assessing the performance of the Florida System under various double contingency scenarios and delayed clearing faults that could result in separation of Peninsular Florida from the North American Interconnected System. Responsibility

included the preparation of the Manual Load Shedding schedule and the assignment of new feeders to achieve greater fairness in the allocation process. Also responsible for the Underfrequency Load Shedding program in coordination with the other utilities under the umbrella of the Florida Electric Power Coordinating Group (FCG). Was a member of the Operating Committee of the FCG and an Alternate Member of the Southeastern Electric Reliability Council (SERC) Operating Committee for Florida.

Achievements include the transformation of Technical Services from a low achiever, demotivated engineering group into a highly trained and well-respected center of engineering excellence. Members of the group became in high demand in System Planning, Nuclear Engineering and System Operations Department. Also, as part of our effort to improve customer service reliability I conducted the first statistical analysis of both Transmission and Distribution systems outages. The result was a drastic reduction in the frequency and duration of outages and the establishment of FPL's Transmission Reliability DataBase, as a statistical tool for tracking and continuous improvement.

In February 1991, I was put in charge of the entire Power Supply Department while the Vice President and Director were engaged in very high level consultations dealing with a drastic re-engineering project affecting the entire Corporation. In that position, I was responsible for the daily operation of the System Control Center, the coordination of generator clearance and outages with the Power Generation group and the granting of transmission and substation clearances for new construction and maintenance work. In that capacity, I acted as Duty Officer during specific week ends for the entire Power Delivery Group including Nuclear. During this transition period, I worked 21 days straight without time off managing the Power Supply Department as well as staffing the brand new Department of Protection and Control System that I was promoted to manage as Director.

JOB ROTATION PROGRAM 6/83 to 6/84

This Professional Development Program is tailored to provide broadening experience to qualified and nominated middle management employee. My rotation assignment provided exposure to: a) The Marketing Function at FPL including Load Management, Energy Conservation, and an evaluation of the Effectiveness of various conservation measures; b) The strategic Planning Function covering the changing business environment for U.S. utilities and an assessment of FP&L System Losses; and c) The Finance Function and its role in raising capital and in rate cases before the Florida Public Service Commission.

SUPERVISOR, RELIABILITY AND SYSTEM SECURITY 4/76 to 6/83

Reported to Director of System Planning and responsible for performing load flow, short circuit, and dynamic stability studies to assess the performance of the planned electrical system against specific criteria of the Florida Electric Power Coordinating Group (FCG) as a member region of the Southeastern Electric Reliability Council (SERC) of the National Electric Reliability Council (NERC).

Achievements were: a) The certification before the U.S. Nuclear Regulatory Commission (NRC) that the Florida Grid could support the addition of two (2) 870 Mwe Nuclear Generating Units at St Lucie power station; b) The technical analysis of the dynamic performance of the 500Kv Transmission Grid in Florida; and c) The technical analysis of the ability of the Florida Utilities to import up to 3600 Mw of economical, coal-fired energy from the Southern Company System; d) The development of the Breaker Duty Program, whereby all FPL transmission breakers (69 to 500 kV) are systematically evaluated using manufacturer's data for each breaker, the position of the breaker on the system and the various fault currents to which the breaker may be subjected. This program eliminated any possible human error in evaluating each breaker for the next 10 years of the System planning process. Was a member of the System Planning Committee of the FCG.

SENIOR ENGINEER - SYSTEM PLANNING 3/74 to 3/76

Responsible for the development of the FPL transmission system in the Greater Miami area. This involved coordination with Generation Planning for the delivery of power, the Distribution Planning for the future location of distribution substations and Power Supply for the investigation of supply problems resulting from maintenance or forced outages conditions.

CONSOLIDATED EDISON COMPANY OF NEW YORK 9/65 to 3/74

Held several positions of increasing responsibility in the *Distribution Engineering Department* , the *Electrical Engineering Department*, and the *System Planning Department*. He started as a *Senior Engineering Technician* in the *Distribution Engineering Department* and left in 1974 as a *Senior Engineer* in the *System Planning Department*.

EDUCATION

MBA, Engineering Management	City University of New York	1971
BEE, Electrical Engineering	City University of New York	1968

PROFESSIONAL DEVELOPMENT

The Executive Program, University of Virginia-Darden School of Management	1983
Public Utility Executive Program University of Michigan	1978
Power System Engineering Course General Electric, Co.	1972
Registered Professional Engineer, Florida	1977
Member of IEEE Power Engineering Society	