

ORIGINAL

BEFORE THE FLORIDA
PUBLIC SERVICE COMMISSION

DOCKET NO. 060008 -EI
FLORIDA POWER & LIGHT COMPANY

IN RE: FLORIDA POWER & LIGHT COMPANY'S PETITION FOR
ISSUANCE OF A STORM RECOVERY FINANCING ORDER

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JANUARY 13, 2006

DIRECT TESTIMONY & EXHIBITS OF:

STEVEN P. HARRIS

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1 **BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

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6

7 **Q. Please state your name and business address.**

8 A. My name is Steven P. Harris. My business address is ABSG Consulting, Inc.
9 (ABS Consulting), 1111 Broadway Street, Oakland, California 94607.

10 **Q. By whom are you employed and what is your position?**

11 A. I am a Vice President with ABS Consulting, an affiliated company of EQECAT,
12 Inc. both of which are subsidiaries of the ABS Group of Companies, Inc.
13 Together these two companies are leading global providers of catastrophic risk
14 management services, including software and consulting, to major insurers,
15 reinsurers, corporations, governments and other financial institutions. In addition,
16 these companies develop and license catastrophic underwriting, pricing, risk
17 management and risk transfer models that are used extensively in the insurance
18 industry. The companies provide the financial, insurance and brokerage
19 communities with a science and technology-based source of independent
20 quantitative risk information. ABS Group acquired EQE International Inc. and
21 EQECAT, Inc. in January 2000.

22 **Q. Please describe your educational background and business experience.**

23 A. I hold Bachelors and Masters degrees in engineering from the University of
24 California at Berkeley. I am a licensed civil engineer in the State of California.

1 Over the past 22 years, I have conducted and supervised independent risk and
2 financial studies for public utilities, insurance companies and other entities, both
3 regulated and unregulated. My areas of expertise include natural hazard risk
4 analysis, operational risk analysis, risk profiling and financial analysis, insurance
5 loss analysis, loss prevention and control, business continuity planning and risk
6 transfer.

7
8 A significant portion of my consulting experience has involved the performance
9 of multi-hazard risk studies, including earthquake, ice storm and windstorm
10 perils, for electric, water and telephone utility companies, as well as insurance
11 companies.

12
13 I have performed or supervised windstorm (tropical storm or hurricane) loss and
14 solvency analyses for utilities including Florida Power & Light Company (FPL or
15 the Company). Additionally, I have performed loss analyses for earthquake
16 hazard for utilities including the Los Angeles Department of Water and Power,
17 the California-Oregon Transmission Project, Big Rivers Electric and Anchorage
18 Municipal Light and Power.

19
20 For energy companies that have assets in a wide array of geographic locations, I
21 have performed or supervised multi-peril analyses for all natural hazards,
22 including earthquakes, windstorms and ice storms.

23

1 **Q. Are you sponsoring an exhibit in this case?**

2 A. Yes. It is comprised of the following documents, which are attached to my direct
3 testimony:

4 Document No. SPH-1 – Storm Loss Analysis

5 Document No. SPH-2 – Solvency Analysis of Reserve Funding Alternatives

6 Document No. SPH-3 – Comparison of FPL T&D Damage from SSI-4 Storms at
7 Landfalls with FPL Primary Recommendation; Initial and 5-year Reserve Balance
8 Levels

9

10 **PURPOSE AND SUMMARY**

11 **Q. What is the purpose of your testimony?**

12 A. The purpose of my testimony is to present the results of ABS Consulting's
13 independent analyses of risk of uninsured loss to FPL's Transmission and
14 Distribution (T&D) system.

15 **Q. Please briefly describe the studies performed for the Company.**

16 A. ABS Consulting performed two studies relative to the Reserve: The Storm Loss
17 Analysis (the Loss Analysis), and The Solvency Analysis of Reserve Funding
18 Alternatives (the Solvency Analysis of Funding Alternatives). The Loss Analysis
19 is a probabilistic storm analysis that uses proprietary software to develop an
20 estimate of the expected annual amount of uninsured windstorm losses to which
21 FPL's T&D system is exposed. The Loss Analysis is the same as was filed in
22 Docket No. 050045-EI. The Solvency Analysis of Funding Alternatives is a
23 dynamic financial simulation analysis that evaluates the performance of the

1 Reserve in terms of the expected balance of the Reserve and the likelihood of
2 insolvency, or deficit balances, over a 5 and 10-year period, given the potential
3 uninsured losses determined from the Loss Analysis. The Solvency Analysis of
4 Funding Alternatives is different from the Solvency Analysis filed in Docket No.
5 050045-EI due to the different funding alternatives being evaluated in this
6 proceeding.

7 **Q. Please summarize the results of your analyses.**

8 A. The Loss Analysis concluded that the total expected annual uninsured cost to
9 FPL's T&D system from all windstorms is estimated to be \$73.7 million. The
10 Solvency Analysis demonstrated that FPL's recommended financing mechanism
11 of issuing bonds to provide a beginning Reserve balance of \$650 million and an
12 expected jurisdictional annual loss of \$73.4 million, would result in an expected
13 Reserve balance of \$351 million at the end of five years. The probability of the
14 Reserve having a deficit balance – or being insolvent - would be 17% in any year
15 of the five-year time interval of the simulation.

16

17

LOSS ANALYSIS

18 **Q. Is the Loss Analysis you are sponsoring the same Loss Analysis that you**
19 **sponsored in Docket No. 050045-EI?**

20 A. Yes, with minor editorial revisions and corrections. The cost data utilized in
21 preparing the Loss Analysis are current through the 2004 storm season.

22

23

1 **Q. Please summarize the Loss Analysis.**

2 A. The Loss Analysis determined the expected magnitude of windstorm losses to
3 FPL's T&D system over periods of one, three and five years. Windstorm losses
4 include costs associated with service restoration and repair of FPL's T&D system
5 as a result of hurricanes, tropical storms and winter storms, including both capital
6 and operations and maintenance (O&M) costs. Also included in the annual
7 expected loss are estimates of the costs of pre-positioning of personnel and
8 equipment (staging) in anticipation of storms that ultimately do not make landfall
9 within FPL's service territory, windstorm insurance policy deductibles
10 attributable to non-T&D assets, potential retrospective assessments associated
11 with FPL's insurance of its nuclear facilities and losses in excess of insurance
12 from FPL nuclear accidents.

13 **Q. Please describe the computer software used to perform the Loss Analysis.**

14 A. USWINDTM is a probabilistic model designed to estimate damage and losses due
15 to the occurrence of hurricanes. EQECAT proprietary computer software
16 USWINDTM is one of only four models evaluated and determined acceptable by
17 the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM)
18 for projecting hurricane loss costs.

19

20 Probabilistic Annual Damage & Loss is computed using the results of over
21 100,000 random variable storms. Annual damage and loss estimates are
22 developed for each individual site and aggregated to overall portfolio damage and
23 loss amounts. USWIND'sTM climatological models are based on the National

1 Oceanic and Atmospheric Administration's (NOAA) National Weather Service
2 (NWS) Technical Reports.

3

4 The version of USWIND™ currently reviewed by the FCHLPM utilizes the
5 FCHLPM's Official Storm Set of November 1, 2003, which includes hurricanes
6 affecting Florida during the period 1900 through 2002.

7 **Q. Does USWIND™ take into account storm frequency and severity?**

8 A. Yes. The analysis is based on storm frequency and severity distributions
9 developed from the entire 103-year historical record. Year-to-year variability in
10 storm frequency and severity distributions has not been included.

11 **Q. Do the storm frequency assumptions include the possibility of having
12 multiple hurricane landfalls within Florida in any given year?**

13 A. Yes. The current version of USWIND™ does include the possibility of having
14 multiple hurricane landfalls within Florida in any given year, including the impact
15 of such landfalls on aggregate losses, consistent with the 2004 and 2005 hurricane
16 seasons.

17 **Q. Did the Loss Analysis take into account the frequency of storms during the
18 2004 and 2005 storm seasons?**

19 A. No. The storm database used by USWIND™ is a combination of historical and
20 random variable storms. NOAA/NWS must update the data set before historical
21 data becomes a part of the storm database used by USWIND™. The version of
22 USWIND™ utilizing the updated data set must, then, be evaluated and approved
23 by the FCHLPM. Information from the 2003 through 2005 hurricane seasons is

1 likely to be incorporated into future versions of USWIND™, consistent with
2 scientific opinion and subject to review by the FCHLPM and its Professional
3 Team.

4 **Q. Do you expect the frequency of storms during 2004 and 2005 will**
5 **significantly impact the frequency estimate?**

6 A. No. There could be a slight increase in the frequency estimate as a result of
7 including data points reflecting the 2004 and 2005 storm seasons in the storm
8 database. Given the size of the storm database, however, the increase is not likely
9 to be large. It is important in this respect to emphasize that the Loss Analysis is
10 based on the lengthy 103-year history, which includes periods of high and low
11 storm activity. Thus, it may not necessarily be indicative of actual experience
12 over the next five years if, in fact, Florida is experiencing a period of high storm
13 activity.

14 **Q. Did the 2004 storm season have any effect on the Loss Analysis?**

15 A. Yes. While the frequency and severity of the 2004 storm season has not yet been
16 incorporated into the USWIND™ model, FPL's costs of storm restoration from
17 the 2004 storm season were incorporated into the Loss Analysis. The 2004 storm
18 restoration costs provided additional data points on the losses associated with
19 specific levels of damage.

20 **Q. Are the costs of the 2005 storm season reflected in the Loss Analysis?**

21 A. No. The data points input into the Loss Analysis completed in March 2005,
22 which is attached to my testimony and incorporated herein, do not include loss

1 cost experience from the 2005 storm season because the final loss costs were not
2 available at the time these analyses were performed.

3 **Q. What were the results of the Loss Analysis?**

4 A. The total expected annual uninsured cost to FPL's system from all windstorms is
5 estimated to be \$73.7 million assuming average frequency of storms based on the
6 103-year history. In addition, FPL's Reserve obligations could arise from such
7 occurrences as nuclear obligations resulting from mutual insurance obligation
8 retrospective assessments or property losses in excess of insurance coverage, but
9 these potential obligations were not factored into the Solvency Analysis of
10 Funding Alternatives.

11 **Q. Did the Loss Analysis include a projection for future inflation or future
12 system growth?**

13 A. No. The Loss Analysis conservatively assumes no future system asset growth or
14 escalation of values for inflation. The Loss Analysis is designed as a snapshot of
15 FPL's current assets as of 2004. The expected annual loss estimate reflects that
16 FPL had a significant increase in asset value at risk since the prior Loss Analysis
17 performed in 2000. FPL estimates that, for the period 2000 to 2004, there was
18 approximately a 15% increase in the replacement value of the Company's
19 transmission and distribution assets. There has been no fundamental change in
20 the potential hazards to FPL's system during this same time period. As discussed
21 below, escalation of values for inflation and customer growth are incorporated
22 into the Solvency Analysis to more accurately reflect their impact on the financial
23 performance of the Reserve over time.

1 **Q. What does this expected annual loss estimate represent?**

2 A. The \$73.7 million expected annual loss estimate represents the average annual
3 cost associated with damage to transmission and distribution assets, insurance
4 deductibles for damage to other assets, and service restoration activities resulting
5 from windstorms over a long period of time.

6 **Q. Is the Loss Analysis performed for FPL the same analysis performed for
7 insurance companies to price an insurance premium?**

8 A. Yes. The natural hazards loss modeling and analysis would be similar for an
9 insurance company, electric utility, or other entity. The expected annual loss is
10 also known as the "Pure Premium," which when insurance is available is the
11 insurance premium level needed to pay just the expected losses. Insurance
12 companies add their expenses and profit margin to the Pure Premium to develop
13 the premium charged to customers.

14 **Q. Should the expected annual loss of \$73.7 million be reduced to remove capital
15 costs?**

16 A. If an insurance approach is followed, no. If capital costs are not charged to the
17 Reserve, then theoretically, the answer is yes. However, capital costs tend to be a
18 small portion of the total storm restoration cost and can vary widely from storm to
19 storm. For example, the capital portion of the cost for the most frequent, but
20 lowest intensity storms, generally have the smallest portion of capital cost. The
21 least frequent, high intensity storms, have a greater portion of capital costs.

22

1 While the effect of this capital cost offset is to reduce the estimate of the expected
2 annual damage, the amount of this reduction is unknown. There are also
3 unknown impacts whose effects would be to increase the expected annual
4 damage. For example, as addressed below, if the next 5 to 10 years are a period
5 of increased storm activity the actual storm losses may be significantly greater
6 than the \$73.7 million estimated annual damage, which is based on the long-term
7 historical average storm experience. Also, as addressed by Mr. Dewhurst, there is
8 a possibility of reductions in windstorm insurance coverage for non-T&D assets.
9 While the impact of these future changes in insurance is unknown, they could
10 mean increased exposure of the Reserve to insurance deductibles.

11 **Q. If the Atlantic Basin is experiencing a period of increased frequency and**
12 **intensity in storms, would FPL's expected annual loss over the next five years**
13 **be greater?**

14 A. Likely, yes. There is a growing body of evidence suggesting that the North
15 Atlantic Oscillation (NAO) and the El Niño or Southern Oscillation (ENSO) are
16 important climate variables in modulating hurricane return periods. As discussed
17 above, the damage estimated in the current ABS Consulting study assumes the
18 average hurricane activity over the century. If you accept the opinion that
19 changes in the ENSO and NAO variables indicate that we have entered a more
20 active period for hurricane formation, then FPL may expect to experience higher
21 than average damage to T&D over the next several years.

22

23

1 **Q. Are you suggesting that the annual expected loss to FPL's system is higher**
2 **than \$73.7 million?**

3 A. No, the \$73.7 million expected annual loss is based on the long-term experience
4 and data. However, historically, there have been periods of higher and lower
5 hurricane activity. If we are experiencing a more active period for hurricane
6 formation, the ABS Consulting damage estimates could understate the actual risk
7 in the near term.

8

9 **SOLVENCY ANALYSIS OF RESERVE FUNDING ALTERNATIVES**

10 **Q. Is the Solvency Analysis you are sponsoring the same Solvency Analysis you**
11 **sponsored in Docket No. 050045-EI?**

12 A. No. While the modeling technique used is the same, the analysis inputs and
13 results are different. For purposes of the Solvency Analysis, the primary
14 difference between the inputs and, therefore, the results in this analysis and the
15 one performed in Docket No. 050045-EI is that the issuance of bonds would
16 enable FPL to fund the Reserve at a reasonable level immediately. On the other
17 hand, an annual accrual, such as that requested in Docket No. 050045-EI, would
18 attempt to build the Reserve over time. The beginning balance of the Reserve
19 substantially impacts the solvency of the Reserve over time.

20 **Q. Please summarize the Solvency Analysis of Reserve Funding Alternatives.**

21 A. ABS Consulting performed a dynamic financial simulation analysis of the impact
22 of the estimated windstorm losses on the FPL Reserve for specified contributions
23 to the Reserve. This Solvency Analysis of Reserve Funding Alternatives

1 performed 10,000 simulations of windstorm losses within the FPL service
2 territory, each covering a ten-year period, to determine the effect of the charges
3 for loss on the Reserve. Monte Carlo simulations were used to generate loss
4 samples consistent with the jurisdictional portion of the expected \$73.7 million
5 annual Loss Analysis results. The analysis provides the expected balance of the
6 Reserve in each year of the simulation accounting for the specified initial balance,
7 any accruals to the Reserve, investment income, expenses, and losses using a
8 financial model.

9 **Q. What is a Monte Carlo analysis?**

10 A. Monte Carlo analysis is a technique used to model multiple storm seasons and
11 simulate variable storm losses consistent with the results of the Loss Analysis.
12 Because storm seasons and losses are highly variable, 10,000 ten-year simulations
13 are performed to estimate the performance of the Reserve with various accrual
14 levels.

15 **Q. Are the results of the Loss Analysis incorporated in the Solvency Analysis of
16 Reserve Funding Alternatives?**

17 A. Yes. Both the likelihoods and jurisdictionalized amounts of uninsured annual
18 losses determined in the Loss Analysis are used to simulate losses in each of the
19 ten years in the Solvency Analysis of Reserve Funding Alternatives in order to
20 determine the likelihood of Fund insolvency.

21

22

1 **Q. Why did the Solvency Analysis of Reserve Funding Alternatives include only**
2 **the jurisdictional portion of the expected annual loss?**

3 A. As described in Dr. Morley's testimony, the Storm Reserve will be available only
4 to retail customers. Therefore, Dr. Morley jurisdictionalized the expected annual
5 cost of future storm losses based on a functional analysis of expected costs.
6 Based on Dr. Morley's calculation, the retail share of annual expected future
7 storm costs is estimated at \$73.4 million.

8 **Q. Did the 2004 storm season affect the Solvency Analysis of Reserve Funding**
9 **Alternatives?**

10 A. Yes. The costs of FPL storm restoration activities from the 2004 storm season are
11 reflected in the Storm Loss Analysis and are included in the expected annual
12 losses. These results are inputs to the Solvency Analysis of Reserve Funding
13 Alternatives. Each year of the ten-year Storm Solvency analyses uses these
14 projected losses to simulate the cost of annual storm restoration from the Reserve.
15 These costs reflect past FPL storm restoration experience including the experience
16 from the 2004 season. The costs of the 2005 storm season have not yet been
17 reflected in the Loss Analysis.

18 **Q. What is the purpose of the Solvency Analysis of Reserve Funding**
19 **Alternatives?**

20 A. A solvency analysis provides a tool for management and policymakers to
21 determine the performance of the Reserve and to test whether certain financing
22 mechanisms meet their objectives. The Solvency Analysis of Reserve Funding

1 Alternatives demonstrates the performance of the Reserve given the financing
2 mechanisms proposed by FPL.

3 **Q. How does the Solvency Analysis work?**

4 A. The ABS Consulting Solvency Analysis is a cash balance analysis starting with
5 some initial balance in the Reserve. Any fund contributions and interest on the
6 account balance at the end of the year is calculated and added to the account.
7 Annual storm damage is simulated consistent with the Storm Loss Analysis for
8 each of the ten years. The storms are randomly simulated, but over a long period
9 of time, they are consistent with a jurisdictionalized average of \$73.4 million in
10 2004 damage to FPL's system.

11 **Q. Did your Solvency Analysis consider alternative funding scenarios?**

12 A. Yes. The Solvency Analysis of Reserve Funding Alternatives considered two
13 different funding scenarios, which are outlined below and described in more detail
14 in the testimony of FPL Witness Dewhurst.

15 **Q. Were there assumptions included in the Solvency Analysis of Reserve
16 Funding Alternatives that were constant for the two funding scenarios?**

17 A. Yes. Investment earnings were assumed to grow at a rate of 3.43%, and negative
18 Reserve balances were assumed to be financed with an unlimited line of credit
19 costing 4.21% before tax. Also, the analysis included certain assumptions
20 regarding loss exposures. For each year of the 10 year simulation, the average
21 system damage is increased by 4% (approximately 2% to account for customer
22 growth and approximately 2% to escalate for asset values due to inflation).

23

1 Q. Please briefly describe the primary and alternative scenarios you analyzed.

2 A. First, I considered a scenario in which FPL's Reserve was funded to a beginning
3 balance of \$650 million. For purposes of my analysis, I assume no additional
4 annual contribution to the Reserve other than fund earnings. As discussed in the
5 testimony of FPL Witness Dewhurst, this scenario is FPL's primary
6 recommendation.

7
8 I then considered a scenario in which FPL collected \$650 million through a
9 surcharge over a period of three years. For purposes of my analysis, the assumed
10 starting balance of the Reserve under this scenario was zero. As Mr. Dewhurst
11 discusses in his testimony, this is FPL's alternative recommendation.

12 Q. Please summarize the results of the Solvency Analysis of Reserve Funding
13 Alternatives.

14 A. The Reserve performance can be viewed in terms of the expected balance of the
15 Reserve and the likelihood of insolvency occurring in any year of a five-year
16 period. Based on the simulated loss distributions, there is some likelihood of the
17 Reserve becoming insolvent for each of the two funding proposals analyzed.

18 Q. What were the results of the analysis of the funding scenario in which the
19 issuance of bonds funded FPL's Reserve to a beginning balance of \$650
20 million? (FPL's primary recommendation)

21 A. The Solvency Analysis of Reserve Funding Alternatives demonstrated that FPL's
22 proposed recommendation of issuing bonds to fund to a beginning Reserve
23 balance of \$650 million resulted in an expected Reserve balance at the end of five

1 years of \$351 million and negative \$(110) million at the end of ten years. The
2 probability of insolvency of the Reserve would be 17% in any one year over the
3 five-year simulation time horizons. There is a 6% chance that the Reserve fund
4 balance could be greater than \$750 million at the end of five years.

5 **Q. Please summarize the results of the funding scenario in which FPL would**
6 **collect \$650 million through a three-year surcharge to replenish the Reserve**
7 **(FPL's alternative recommendation).**

8 A. The Solvency Analysis of Reserve Funding Alternatives demonstrated that, with a
9 beginning Reserve balance of zero and the collection of \$650 million in a
10 surcharge to replenish FPL's Reserve over a period of three years, the result
11 would be an expected Reserve Balance of \$301 million at the end of five years
12 and negative \$(153) million at the end of ten years. The probability of insolvency
13 of the Reserve would be 18% in any one year over the five-year simulation time
14 horizon. The likelihood of the Reserve Balance being greater than \$750 million
15 at the end of five years is 0%.

16 **Q. Please compare the results of the analyses of the primary and alternative**
17 **recommendations.**

18 A. Both proposals provide the same level of funding (\$650 million), while using
19 different funding mechanisms and timing. The primary recommendation of
20 issuing bonds provides a \$650 million Reserve balance in the first year. The
21 alternative recommendation of collecting a surcharge provides the same level of
22 funding spread out over three years. Therefore, in year one of the primary
23 recommendation, the Reserve receives a \$650 million infusion of funds. With the

1 alternative recommendation, the Reserve is provided \$208 million through a
2 surcharge, approximately one-third of the \$650 million. As a result, the primary
3 recommendation would have a lower probability of Reserve insolvency than the
4 alternative recommendation during the initial three years due to its higher Reserve
5 balances.

6 **Q. Did you make a recommendation as to which scenario FPL should select?**

7 A. No. My role is not to recommend the methodology for funding the Reserve. My
8 role is to present probabilities to FPL regarding Reserve solvency based on
9 various levels of funding. There are large uncertainties associated with the
10 hurricane hazard and the specific storm outcomes have large variances. There
11 could be hurricane seasons with no loss at all and hurricane seasons with
12 hundreds of millions or even more than a billion dollars in losses. The Solvency
13 Analysis presents information about the likelihood of insolvency that can be used
14 to make decisions about the Reserve.

15 **Q. Is a Reserve balance of \$650 million adequate to cover uninsured storm
16 losses from most but not all storm seasons as suggested by Mr. Dewhurst?**

17 A. Yes. Document No. SPH-3 shows the frequency-weighted average T&D damage
18 from single storms that are rated category 4 on the Saffir-Simpson Intensity (SSI)
19 Scale that could make landfall within 10 nautical miles of the specified mile post
20 in FPL's service territory. Document No. SPH-3 is similar to Figure 6-2 in
21 Document No. SPH-1, which is attached to my direct testimony. Single SSI-4
22 landfalls near Miami, milepost 1480, have a mean (average) T&D damage of

1 approximately \$1,100 million. Single SSI-4 landfalls near West Palm Beach,
2 milepost 1550, have an average T&D damage in excess of \$400 million.

3

4 The primary recommendation has an initial balance of \$650 million in the first
5 year and an expected Reserve balance of about \$350 million at five years. The
6 comparison in Document No. SPH-3 of the SSI-4 Landfall T&D damage with
7 Reserve balances between \$350 million and \$650 million shows that the funding
8 level proposed by FPL would be adequate to cover most but not all single SSI-4
9 storm T&D damage at the mileposts shown over a five-year period. When more
10 than one storm impacts FPL's service territory in a single storm season, the \$350
11 million and \$650 million Reserve balances would provide proportionally less
12 protection than for the single event damage shown in Document No. SPH-3.

13

14 At five years, the \$350 million expected Reserve balance would cover only a
15 portion of SSI-4 T&D damage in Miami-Dade, Broward and Palm Beach
16 Counties, which have the highest asset concentrations in FPL's service area. A
17 \$350 million Reserve balance would be adequate to fund most but not all single
18 SSI-4 storm landfalls.

19 **Q. Do you feel FPL's decision to fund the Reserve to a beginning balance of**
20 **\$650 million is reasonable?**

21 **A.** Based on the current value of FPL's T&D assets, a Reserve balance of \$650
22 million would be adequate to cover uninsured losses for several storm seasons if

1 FPL experiences \$73.4 million in annual retail storm losses. However, based on
2 long-term historical data, there is about a 17% probability (or greater than 1 in 6)
3 that Storm Losses could deplete the Reserve in any of the first five years and FPL
4 would need to return to the Commission to seek a special assessment. Of course,
5 if Florida is facing extremely active hurricane seasons for the next several years,
6 the probability is much higher.

7

8

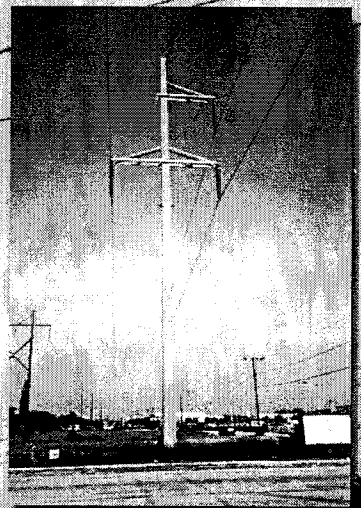
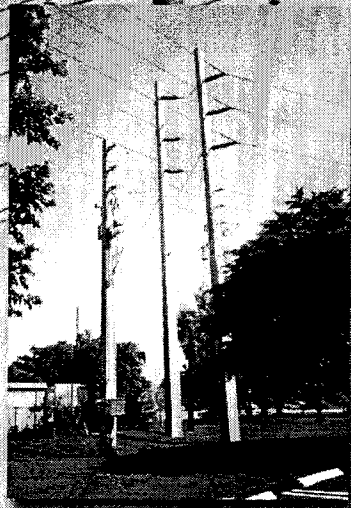
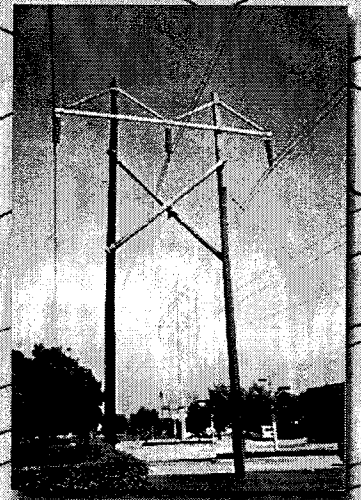
CONCLUSION

9 Q. Does this conclude your direct testimony?

10 A. Yes.

Florida Power & Light

Storm Loss Analysis



ABS Consulting



March
2005



FPL

Storm Risk Profile

The following is a summary description of analyses performed by ABS Consulting related to the Florida Power and Light Company's (FPL) storm loss, and is intended to be used solely by FPL and the Florida Public Service Commission for estimation of potential future FPL losses to the Reserve resulting from storms and the estimation of the performance of the Reserve.

OWNER	Florida Power & Light	
ASSETS	Transmission and Distribution (T & D) System consisting of : Transmission towers, and conductors; Distribution poles, transformers, conductors, and other assets	
LOCATION	All T & D assets located within the State of Florida	
ASSET VALUE	Normal replacement value is approximately \$ 11.8 billion, of which approximately 20% is transmission and 80% is distribution	
LOSS PERIL	Hurricane Windstorm (SSI 1 to 5), Tropical and Winter Storms, and Storm Staging Costs	
EXPECTED ANNUAL DAMAGE	\$73.7million	
1% AGGREGATE DAMAGE EXCEEDANCE VALUE	\$1,000 million (one year)	
AGGREGATE DAMAGE EXCEEDANCE PROBABILITIES	One Year	Five Years
\$100 million	17.0%	69.7%
\$350 million	5.5%	34.2%
\$500 million	3.5%	23.6%

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1. Storm Loss Analysis

FPL's transmission and distribution (T & D) systems are exposed to, and in the past have sustained, damage from hurricanes, tropical storms, and winter storms. The exposure of these assets to storm damage is described and potential losses are quantified in this report. Loss analyses were performed by ABS Consulting, using an advanced computer model simulation program USWIND™ developed by EQECAT, an ABS Group Company. All storm loss results which are presented here have been calculated using USWIND™ and the FPL T & D asset portfolio.

These exposures are analyzed from a probabilistic approach, which considers the full range of potential storm characteristics and corresponding losses. Probabilistic analyses identify the probability of damage exceeding a specific dollar amount. USWIND™ is a probabilistic model designed to estimate damage and losses due to the occurrence of hurricanes. EQECAT proprietary computer software USWIND is one of only four models evaluated and determined acceptable by the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) for projecting hurricane loss costs (Reference 1).

Probabilistic Annual Damage & Loss is computed using the results of over 100,000 random variable storms. Annual damage and loss estimates are developed for each individual site and aggregated to overall portfolio damage and loss amounts. Damage is defined as the cost associated with repair and/or replacement of T & D assets necessary to promptly restore service in a post-storm environment. This cost is typically larger than the costs associated with scheduled repair and replacement programs.

Factors considered in the analyses include the location of FPL's overhead and underground T & D assets, the probability of storms of different intensities and/or landfall points impacting those assets, the vulnerability of those assets to storm damage, and the costs to repair assets and restore electrical service.

Storm Loss Analysis

FPL's non-T&D assets consist of fossil and nuclear power plants, buildings, substations and other miscellaneous assets and are also exposed to storm perils. These assets are covered by insurance policies with deductible retentions. The deductible exposures for these portfolios of assets were modeled to determine their loss expectancies and impacts on the Reserve.

Loss Estimation Methodology

The basic components of the hurricane risk analysis include:

- **Assets at risk:** define and locate
- **Storm hazard:** apply probabilistic storm model for the region
- **Asset vulnerabilities:** severity (wind speed) versus damage
- **Portfolio Analysis:** probabilistic analysis -damage/ loss

These analysis components are summarized herein.

2. Assets at Risk

2.1 Transmission and Distribution Assets

FPL's T & D System assets consist of:

- Transmission towers, and conductors,
- Distribution poles, transformers,
- Conductors, lighting and
- Other miscellaneous assets.

The total normal replacement value of these assets is approximately \$11.8 billion, 20% of which is transmission and 80% distribution. Normal replacement value is the cost of replacing the assets under normal non-catastrophe conditions.

FPL's Transmission and Distribution assets are distributed unevenly across their Florida service territory, encompassing a large portion of the State. Table 2-1 shows the distribution values within Florida for the counties that make up 94% of the total, indicating a concentration of values in the southern portion of the state. Figure 2-1 shows a map of FPL's transmission structures while Figure 2-2 shows a map of the distribution values indicating a similar concentration of values in south Florida Counties.

2. Assets at Risk

Table 2-1

DISTRIBUTION VALUES BY COUNTY, LARGEST COUNTIES

Distribution by County	Replacement Value
Dade	\$2,571,355,369
Palm Beach	\$1,627,626,595
Broward	\$1,588,151,250
Brevard	\$554,772,795
Lee	\$390,724,727
Sarasota	\$381,156,986
Volusia	\$352,470,588
St Lucie	\$282,420,873
Collier	\$261,422,693
Manatee	\$256,677,775
Charlotte	\$202,936,403
Martin	\$198,410,239
Indian River	\$131,685,818
St Johns	\$130,553,895
All others	\$599,828,521
Total	\$9,530,194,528

Table 2-2

Transmission Asset Replacement Value

	Replacement Value
Transmission Assets	\$2,309,324,855

2. Assets at Risk

2.2 Non-T&D Assets at Risk

FPL's non-T&D assets consist of fossil and nuclear power plants, buildings, substations and other miscellaneous assets. The total normal replacement value of these assets is approximately \$20 billion. Normal replacement value is the cost of replacing the assets under normal non-catastrophe conditions. Table 2-3 below, shows the percentage distribution between power plants, buildings and substations values.

**Table 2-3
 FPL Non T&D Asset Values**

	\$(Thousands)	%
Fossil Power Plants	\$10,161,702	50%
Substations	\$ 3,490,377	17%
Buildings and misc. assets	\$1,087,986	5%
Nuclear Power Plants	\$5,717,253	28%
TOTAL	\$20,457,318	100%

FPL's assets are distributed unevenly across their service territory, encompassing a large portion of the state of Florida. These assets are geo-located located in the USWIND™ Storm model by latitude and longitude to capture the spatial distribution and concentration of these assets at risk.

The FPL non-T&D portfolio is insured for storm losses under three insurance policies, with three per-occurrence deductibles. The deductible amounts represent self-insured retentions by FPL and are modeled as exposures to the Reserve. Two policies apply to Turkey Point and St. Lucie nuclear plant assets and have deductibles of \$1 million each. The third policy applies to the balance of insured property, buildings, fossil power plants and substations with an aggregate per-occurrence deductible of \$25 million.

2. *Assets at Risk*

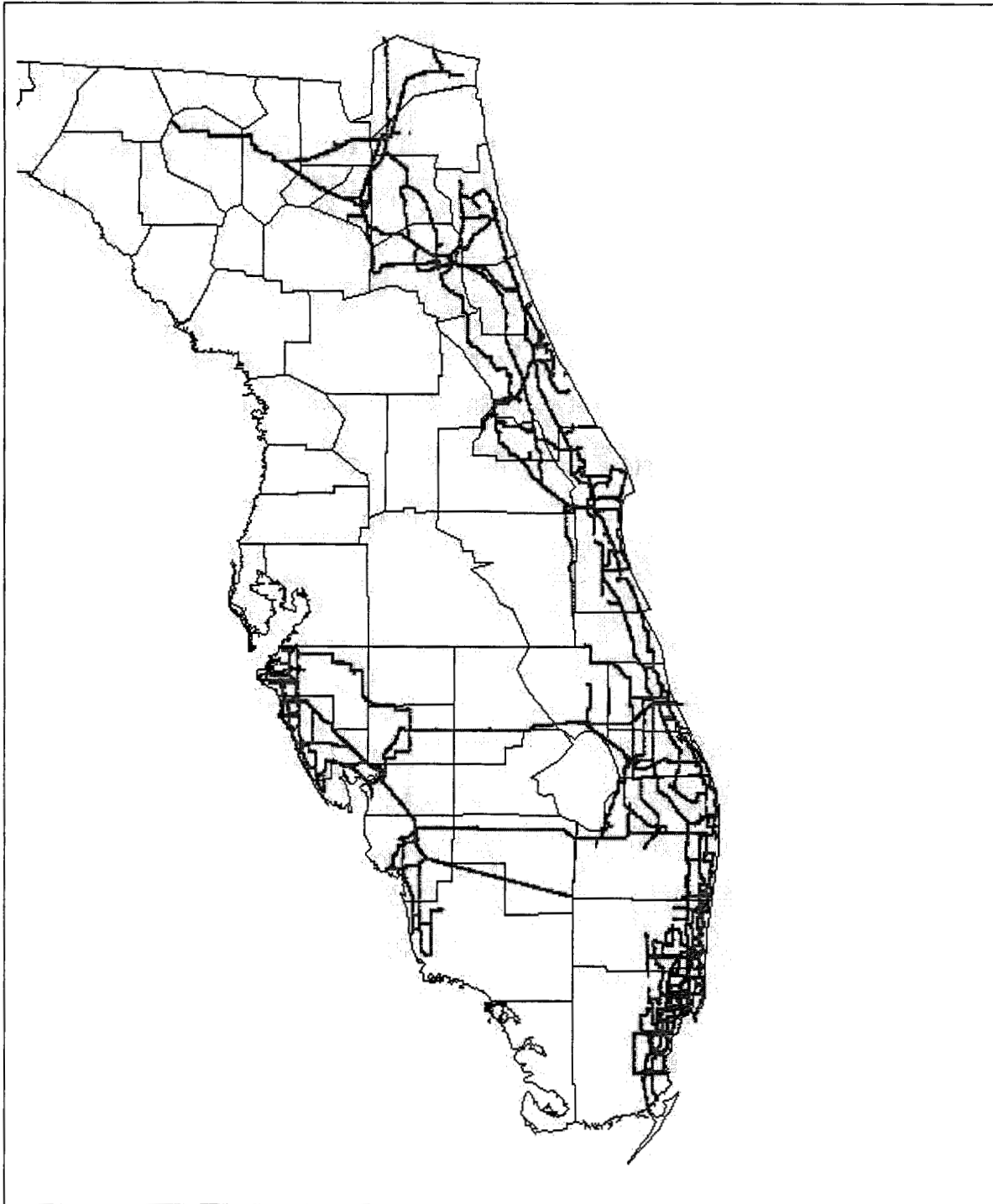


Figure 2-1: FPL Transmission Structures

2. Assets at Risk

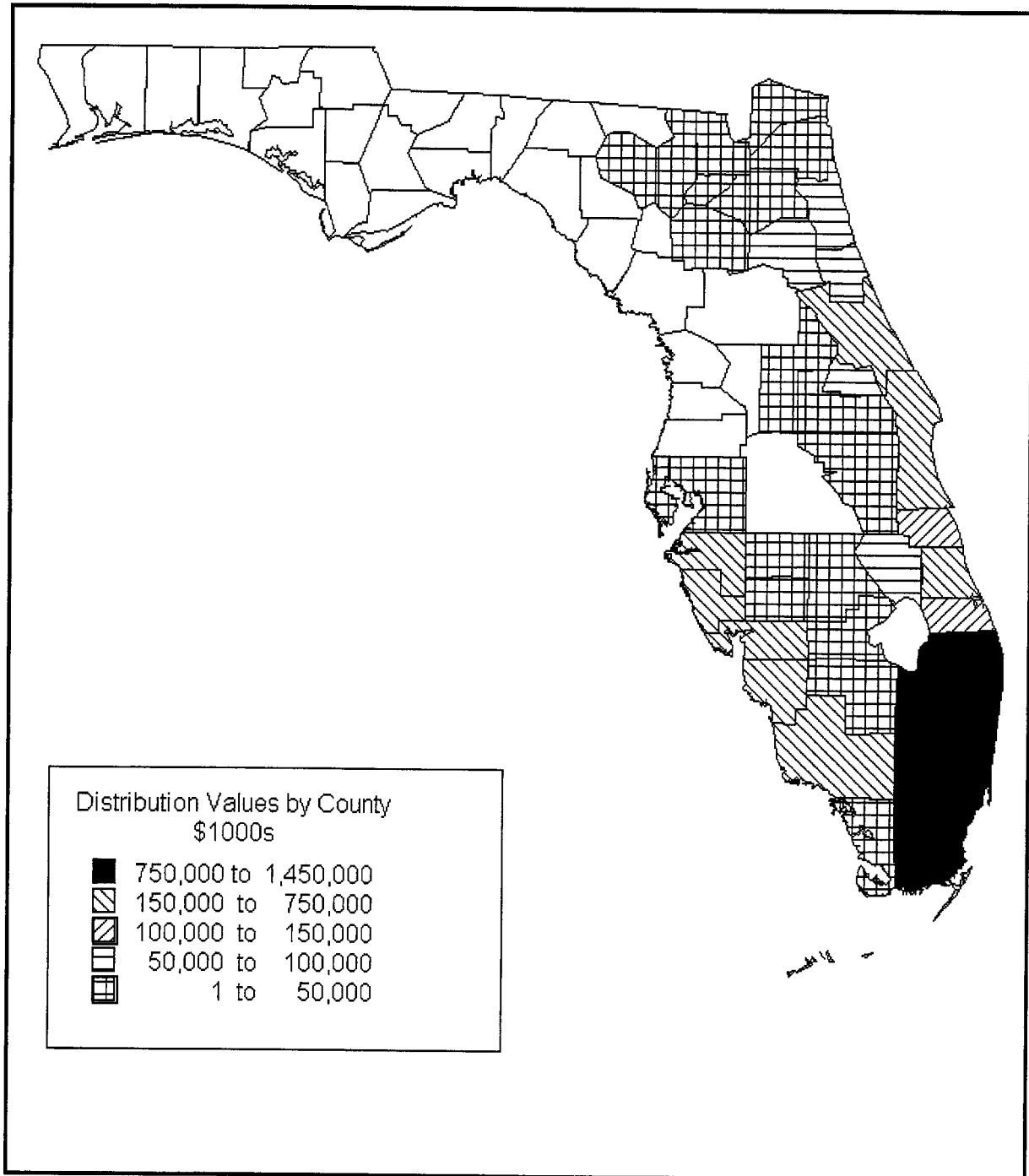


Figure 2-2: FPL Distribution Values

3. Windstorm Hazard in Florida

3.1 Hurricane Hazard

The historical record for hurricanes on the Gulf and Atlantic coasts of the United States consists of approximately 100 years for which reasonably accurate information is available. For example, since 1900, there have been 62 hurricanes SSI 1 or greater (see Table 3-1 for description of the Saffir-Simpson Intensity (SSI) scale) which have made landfall in the state of Florida. Going back further, written descriptions of storms are available, but it becomes increasingly difficult to estimate actual storm intensities and track locations in a reliable manner consistent with the later data. For this reason all hypothetical storms used in this analysis, as well as their corresponding frequencies, have been based only on hurricanes that have occurred since 1900.

Since the historical record is too sparse to simply extrapolate future hurricane landfall probabilities, a series of hypothetical storms was generated in the USWIND™ probabilistic storm data base, essentially “filling in” the gaps in the historical data. This provides an estimate of future potential storm locations (landfall), track, severity and frequency consistent with the observed historical data.

EQECAT developed its hurricane model (Reference 1), using the National Oceanic and Atmospheric Administration (NOAA) model as the base, to determine individual risk wind speeds. The NOAA model was designed to model only a few specific types of storms. While the eye of the hurricane follows the selected track, the EQECAT model uses up to a dozen different storm parameters to estimate wind speeds at all distances away from the eye. The version of USWIND currently certified by the Florida Commission on Hurricane Loss Projection Methodology is based in part on the FCHLPM’s Official Storm Set of November 1, 2003, which includes hurricanes affecting Florida during the period 1900 through 2002.

The hurricane intensities used for the analyses conform to basic NOAA information regarding hurricane intensity recurrence relationships corresponding to locations along the coast. Much of FPL’s service territory includes the coastal area where many of these hurricanes have made landfall.

3 *Windstorm Hazard in Florida*

Table 3-1

**THE SAFFIR-SIMPSON INTENSITY SCALE
 (NOTE THAT WINDSPEEDS GIVEN ARE 1-MINUTE SUSTAINED)**

Saffir-Simpson Intensity (SSI)	Central Pressure (mb)	Maximum Sustained Winds (mph)	Storm-Surge Height (ft)	Damage
1	≥ 980	74-95	4-5	Damage mainly to trees, shrubbery, and unanchored mobile homes
2	965-979	96-110	6-8	Some trees blown down; major damage to exposed mobile homes; some damage to roofs of buildings
3	945-964	111-130	9-12	Foliage removed from trees; large trees blown down; mobile homes destroyed; some structural damage to small buildings
4	920-944	131-155	13-18	All signs blown down; extensive damage to roofs, windows, and doors; complete destruction of mobile homes; flooding inland as far as 6 mi.; major damage to lower floors of structures near shore
5	< 920	> 155	> 18	Severe damage to windows and doors; extensive damage to roofs of homes and industrial buildings; small buildings overturned and blown away; major damage to lower floors of all structures less than 15 ft. above sea level within 500m of shore

3.2 Tropical Storm Hazard

In addition to storms strong enough to be classified as hurricanes, Florida is exposed to the threat of tropical storms (one-minute sustained wind speeds between 39 and 74 mph). The frequency of tropical storms in Florida is approximately equal to that of hurricanes (note that the wind speed range associated with hurricanes is much wider, i.e. 74 mph to well over 155 mph).

EQECAT's tropical storm model was developed using methods very similar to those used to develop the hurricane model, generating a series of hypothetical storms representing the full range of tropical storms in terms of landfall location and track, severity, and frequency consistent with the observed historical data.

3 Windstorm Hazard in Florida

3.3 Winter Storm Hazard

On average, about 15 mid-latitude storms a year bring high winds to Florida, mainly during the winter. Most of these storms have winds only in the 40 to 50 mph gust range and thus have little effect. The more severe events, however, can cause losses on the same scale as a tropical storm or weak hurricane.

In assessing this hazard, historical windstorm data for the past 45 years was obtained from the National Climatic Data Center (NCDC). This data included gust wind speed observations for over 600 storms, at a network of over 300 stations. Several different aspects of the data were examined in order to construct a model for storm sizes, shapes, locations, and wind fields. The resulting winter storm hazard model provides a way to characterize the wind fields for the full range of possible winter storms, including location, severity, and frequency information.

4. Asset Vulnerabilities

Aerial transmission and distribution lines and structures have suffered damage in past hurricanes, tropical storms and winter storms. Damage patterns tend to be most severe in coastal areas due to a combination of wind and storm surge. Underground distribution lines in coastal regions have also been subject to storm damage. Damage to inland aerial lifelines tends to be less severe with greater contributions to damage from wind-borne debris. The types of wind-borne debris can include tree and tree limbs, and roofing materials as well as structure debris at higher wind speeds.

FPL aerial transmission and distribution structures are designed to sustain design-level hurricane winds. These design criteria specify design wind speeds for both transmission and distribution structures. Design criteria for transmission structures are microzoned, or segmented, into geographic areas that correspond to the expected wind hazard for the area. Distribution poles, on the other hand, are assumed to have one design standard for the entire service territory.

Vulnerability of T & D assets are based upon wind speeds and FPL provided damage data from hurricanes since 1992. Other vulnerabilities were developed using FPL-provided data on hurricane, tropical storm, and winter storm damage data, FPL design standards, and engineering judgments of the relative performance of the structures and material types.

Vulnerabilities of non-T&D assets are modeled using standard classes of commercial buildings and specialized utility infrastructure vulnerabilities in USWIND™.

5. Summary of Portfolio Analyses

ABS analyzed the FPL portfolio of T & D assets and other non-T&D assets subject to a suite of probabilistic storms using the proprietary computer program, USWIND™. The probabilistic storm analyses provide non-exceedance probabilities over a range of loss levels while the scenario landfall storm series provides a damage distribution for selected storms at landfalls within the areas of FPL's highest asset concentrations.

5.1 Storm Probabilistic Analysis

The probabilistic loss analysis is performed using USWIND™. The hurricane hazard uses the USWIND™ probabilistic database which models the coastline in 10 mile segments and models more than 1,500 hypothetical storms for each segment. The net result is a stochastic storm database of more than 500,000 events that represents possible hurricanes affecting the eastern United States, along both the Gulf and the Atlantic coasts. Each hurricane in the database has been defined by associating a central pressure with a unique storm track. In addition, each hurricane is assigned an annual frequency of occurrence, which depends on the storm track location and the storm intensity as measured by central pressure.

Tropical and Winter storms are modeled, (Reference 2), using a set of approximately 250,000 and 150,000 additional events, representing the full range of potential storms affecting the Gulf and Atlantic coasts of the United States. As in the stochastic hurricane database, each tropical storm in the database has been defined by associating a central pressure with a unique storm track. In addition, each tropical storm is assigned an annual frequency of occurrence, which depends on the storm track location and the storm intensity as measured by central pressure. Loss expectancies from tropical and winter storms are based on the results from Reference 2 adjusted for current asset valuation of distribution assets at risk.

For each location in the portfolio, the wind speed is calculated, and based on the type of asset, the degree of damage is estimated. The result for each asset location is an

5. Summary of Portfolio Analysis

estimate of the mean damage and associated uncertainty. Total portfolio damage, defined as expected (mean) damage, is the sum of the individual property's damage. Uncertainty of an individual asset's damage is calculated to determine the total portfolio damage uncertainty, taking into account correlation between assets. Knowledge of the total portfolio damage probabilistic distribution permits estimation of total portfolio damage with varying probability levels.

5.2 Other Reserve Exposures

In addition to transmission and distribution storm losses and non-T&D deductible exposures discussed above, Florida Power and Light Company's Reserve may be called upon for payment of uninsured losses resulting from other causes. These include

- Storm staging costs
- Retrospective insurance assessment from industry nuclear accidents and
- Losses in excess of insurance coverage from nuclear accidents at FPL plants.

Staging Costs for Non-Landfalling Storms

FPL monitors hurricane forecasts and arranges for the pre-positioning of personnel and equipment, "staging", in anticipation of post hurricane storm restoration activities. These decisions are made in advance of hurricane landfall. On occasion, these staging decisions are taken and actual hurricane landfall occurs outside FPL's service territory. The central issue with staging costs is the probability that hurricane forecasts (where and at what intensity) may differ from actual hurricane landfalls.

A model for staging costs was developed in 2000 using staging cost and decision information provided by FPL. The input parameters to the model are: forecasted landfall location (milepost), forecasted intensity (wind speed), actual landfall location (milepost), and actual intensity (wind speed). Staging costs are only calculated for situations in which the forecasted landfall is within FPL's service territory, and the actual landfall is not within FPL's service territory. For these situations, the staging costs are determined on the basis of the forecasted landfall location and intensity, based on staging cost information provided by FPL. For all other situations, the staging cost is assumed to be zero.

5. Summary of Portfolio Analysis

The expected annual storm staging cost estimates are based on the 2000 results and have been updated to reflect FPL recent hurricane experience and costs associated with these staging decisions. The expected annual staging cost were estimated to be \$3.5 million per year.

Nuclear Exposures

FPL Reserve exposures due to property damage and third party liabilities could arise from two sources:

- Nuclear accidents at FPL's four nuclear units located at Turkey Point and at St. Lucie and
- Nuclear accidents at plants in nuclear mutual insurance pools

Reserve obligations could result from these exposures as a result of mutual insurance obligation retrospective assessments ("Retros") or as a result of low probability events and losses in excess of insurance coverage. Potential financial exposures to the Reserve were developed in Reference 2 using nuclear industry studies that provide the frequency and severity of nuclear accidents. Estimates of the frequency and the expected annual losses from these events are very low in comparison with storm related exposures. These exposures are included in estimates of the Expected Annual Losses below, but have not been included in the Solvency Analysis of Reserve Funding Alternatives (Reference 3) due to their extremely low likelihoods.

Given the annual frequency and the portfolio loss for each asset class and peril, a probabilistic database of losses is developed. By manipulating this database, various loss non-exceedance distributions are generated. The expected annual exposures to FPL's Reserve from these sources are shown below:

5. Summary of Portfolio Analysis

Table 5-1
 Expected Annual Losses to Reserve

Expected Annual Losses	\$ (Millions)	Comments
Transmission & Distribution Assets - Hurricane Peril and Tropical Storms	63.2	SSI 1 through 5 Sustained wind speeds of 39-74 Mph
Distribution Assets - Winter Storms	1.2	Gust wind speeds of 40-50 Mph
Storm Staging Costs	3.5	FPL Pre-storm mobilization
Non T&D Assets - Hurricane and Tropical Storm Peril	5.8	Losses arising from payment of deductibles on insurance policies
Retrospective Assessments from industry nuclear accidents ¹	0.5	Property and third-party liability assessments from mutual insurers
Losses in excess of insurance from FPL nuclear accidents ¹	0.5	Property losses to FPL nuclear plants in excess of insurance
Totals	\$74.7	

Note 1: These losses are not included in the Solvency Analysis of Reserve Funding Alternatives (Reference 3).

5. Summary of Portfolio Analysis

5.3 Aggregate Damage Exceedance for One, Three, and Five years

Aggregate damage exceedance calculations are developed by keeping a running total of damage from **all possible storm events** in a given time period. At the end of each time period, the aggregate damage for all storm events, T & D losses, insurance deductibles paid on non-T & D assets as well as storm staging costs, is determined by probabilistically summing the damage distribution from each event, taking into account the event frequency. The process considers the probability of having zero events, one event, two events, etc. during the time period.

A series of probabilistic analyses were performed, using the vulnerability curves derived for FPL assets and the computer program USWIND™. A summary of the analysis is presented in Table 5-2 which shows the aggregate damage (i.e. deductible is "0") exceedance probability for three time periods: one, three and five years for damage layers between zero and over one billion dollars.

For each damage layer shown, the probability of damage exceeding a specified value is shown. For example, the probability of damage exceeding \$500 million in one year is 3.5%, while it is 12.6% and 23.6% for a three and five-year period. The analysis calculates the probability of damage from all storms and aggregates the total, resulting in increasing exceedance probabilities for the three and five year periods when compared to the one-year value.

Table 5-2 also shows, for each damage layer, the contribution of that layer to the expected annual damage of \$73.7 million, which is the annual damage calculated from all storms with varying severity and frequency and staging costs. The expected annual damage represents the damage to T & D and other assets on an annual basis over a long period of time.

For the example given above, the contribution to the \$73.7 million expected annual damage in the \$300 to \$350 million layer is \$3.7 million for the one-year period. For the 3-year and 5-year periods, the contribution to the expected damage over the period is provided for each layer.

These Aggregate Damage Exceedance results are inputs to the Solvency Analysis of Reserve Funding Alternatives (Reference 3).

5. Summary of Portfolio Analysis

Table 5-2

**FLORIDA POWER & LIGHT
AGGREGATE DAMAGE EXCEEDANCE PROBABILITIES
AND EXPECTED ANNUAL DAMAGE BY LAYER**

Damage Layer (\$millions)	1 year		3 year		5 year	
	Exceedance Probability	Expected Annual Damage (\$000)	Exceedance Probability	Expected Annual Damage (\$000)	Exceedance Probability	Expected Annual Damage (\$000)
0	58.4%	\$4,888	92.7%	\$1,947	98.4%	\$720
50	24.9%	\$5,612	62.1%	\$3,596	82.9%	\$1,972
100	17.0%	\$4,992	47.4%	\$3,620	69.7%	\$2,391
150	13.0%	\$4,817	38.6%	\$4,120	60.0%	\$2,814
200	10.2%	\$4,640	31.5%	\$3,988	52.0%	\$3,157
250	8.1%	\$3,943	26.2%	\$3,718	44.9%	\$3,334
300	6.7%	\$3,667	22.1%	\$3,493	38.9%	\$3,032
350	5.5%	\$2,941	18.9%	\$2,954	34.2%	\$3,202
400	4.7%	\$2,848	16.5%	\$3,249	29.9%	\$2,770
450	4.1%	\$2,618	14.2%	\$2,476	26.7%	\$2,890
500	3.5%	\$2,476	12.6%	\$2,949	23.6%	\$2,787
550	3.0%	\$2,179	10.9%	\$2,135	21.0%	\$2,453
600	2.7%	\$2,311	9.8%	\$2,395	18.8%	\$2,271
650	2.3%	\$1,487	8.7%	\$2,197	17.0%	\$2,693
700	2.1%	\$1,899	7.7%	\$2,122	15.0%	\$2,025
750	1.8%	\$1,720	6.8%	\$1,910	13.6%	\$2,019
800	1.6%	\$1,403	6.1%	\$1,896	12.3%	\$2,122
850	1.4%	\$532	5.4%	\$1,340	11.0%	\$1,434
900	1.4%	\$1,566	4.9%	\$1,261	10.2%	\$1,959
950	1.2%	\$1,656	4.5%	\$1,496	9.1%	\$1,816
1,000	1.0%	\$1,852	4.1%	\$2,517	8.2%	\$3,020
All Else	0.8%	\$13,666	3.3%	\$18,330	6.8%	\$22,831
Total		\$73,712		\$73,712		\$73,712

6. Hurricane Landfall Analyses for SSI Ranges

In order to provide further insight into FPL's risk profile, the full set of stochastic hurricane events were analyzed by landfall for five storm intensities, SSI 1 through 5. The storm series landfall locations begin in the areas of highest asset concentration, storm frequency and severity in south Florida. The landfall locations are at mile posts 1430 through 1770. Figure 6-1 illustrates the landfall locations. These mile posts extend north from Dade County at approximately 10 mile intervals.

The full set of stochastic storms within each SSI category was analyzed on FPL's T&D portfolio. For each milepost and SSI category, the frequency-weighted average damage was computed from all stochastic storms making landfall within 10 nautical miles of a given milepost and within that SSI category. Figures 6-2 through 6-6 provide these results graphically.

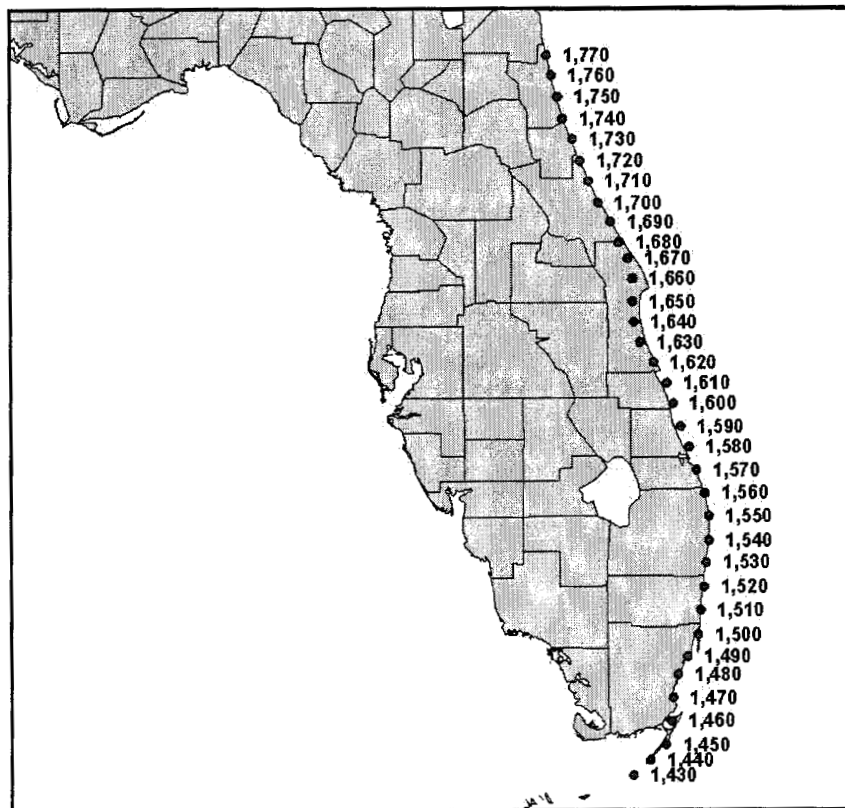


Figure 6-1: Storm Landfall Mile Posts

6. Landfall Analyses for SSI Ranges

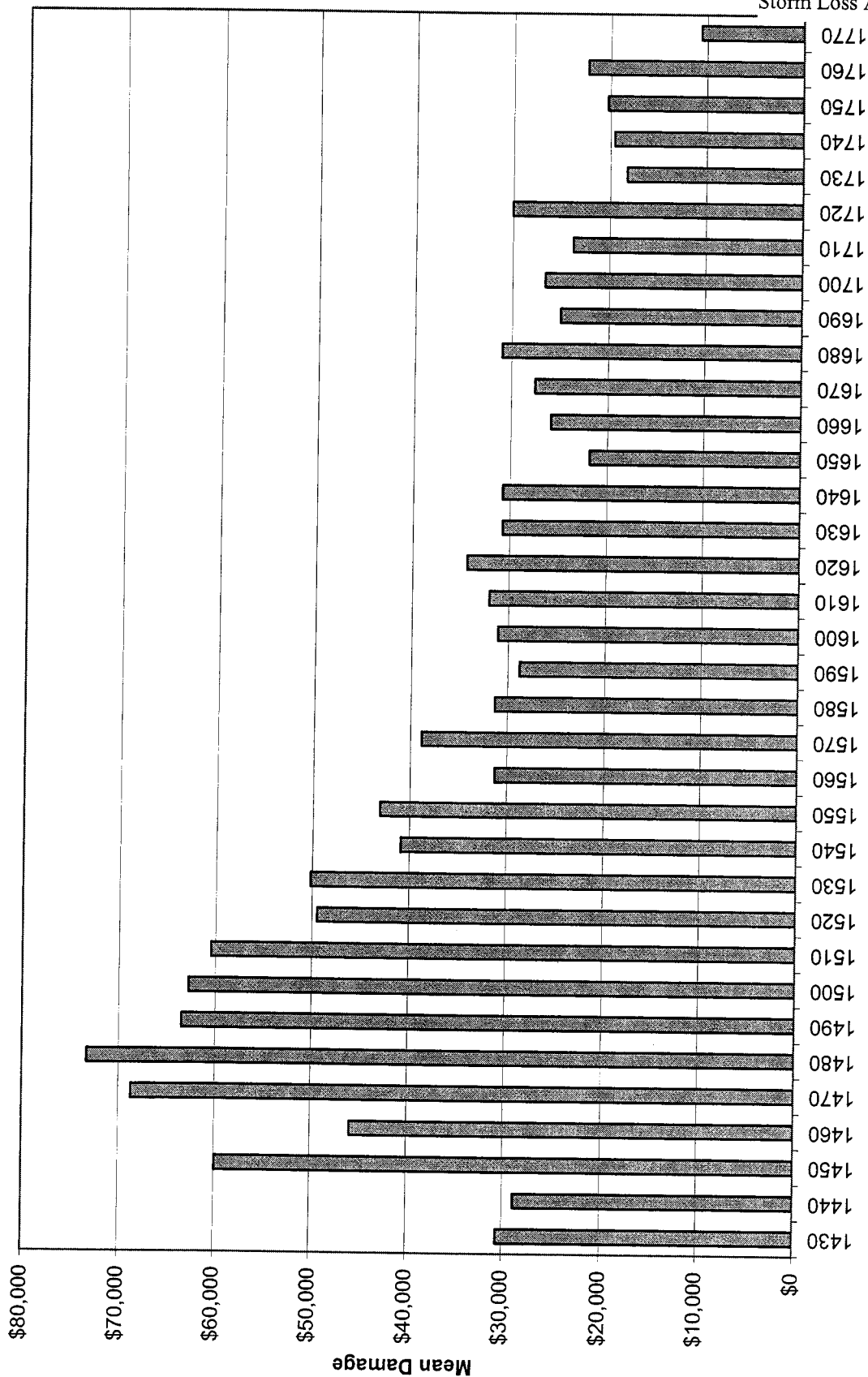


Figure 6-2: Frequency Weighted Average Transmission & Distribution Damage from SSI 1 Landfalls

6. Landfall Analyses for SSI Ranges

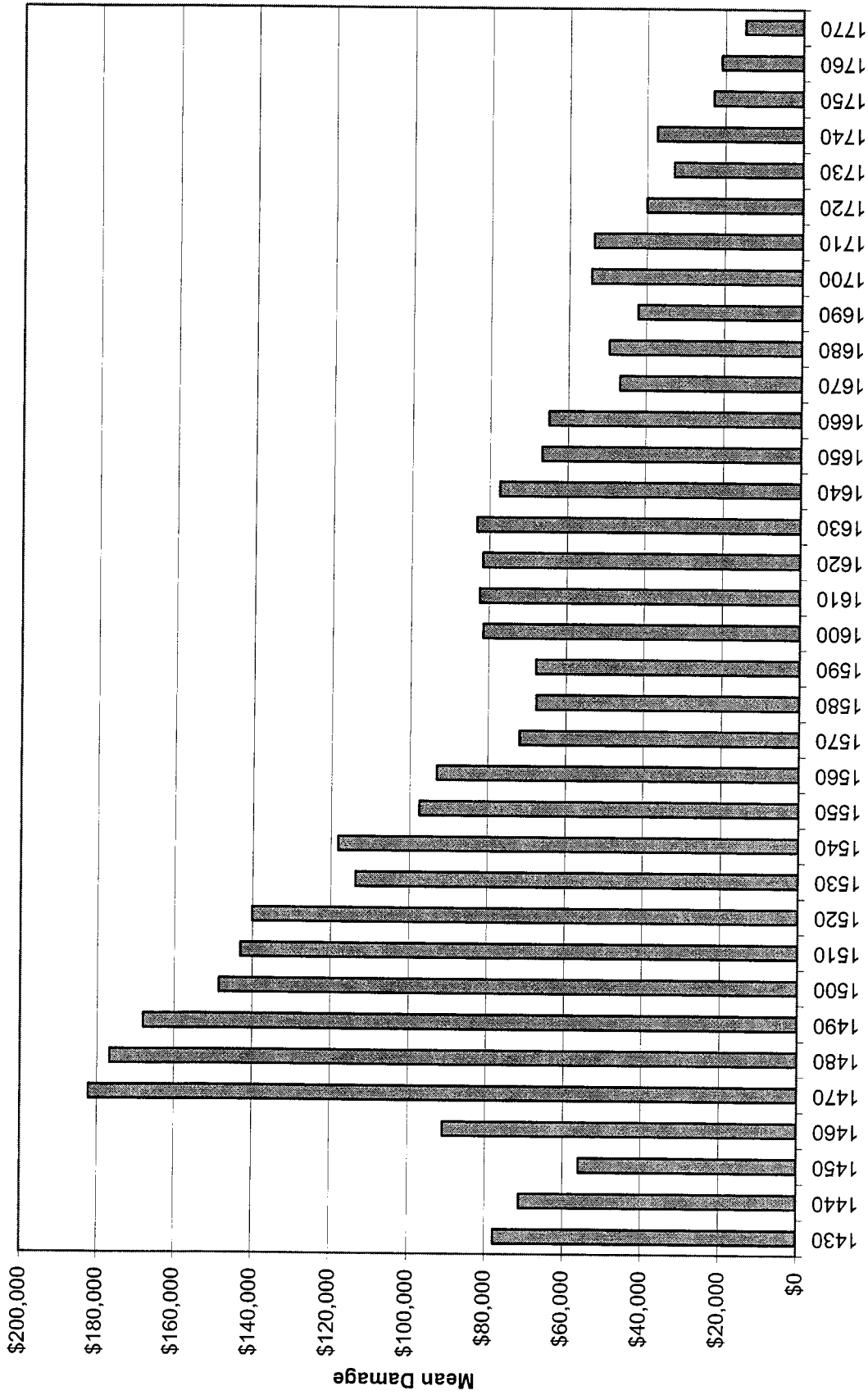


Figure 6-3: Frequency Weighted Transmission & Distribution Damage from SSI 2 Landfalls

6. Landfall Analyses for SSI Ranges

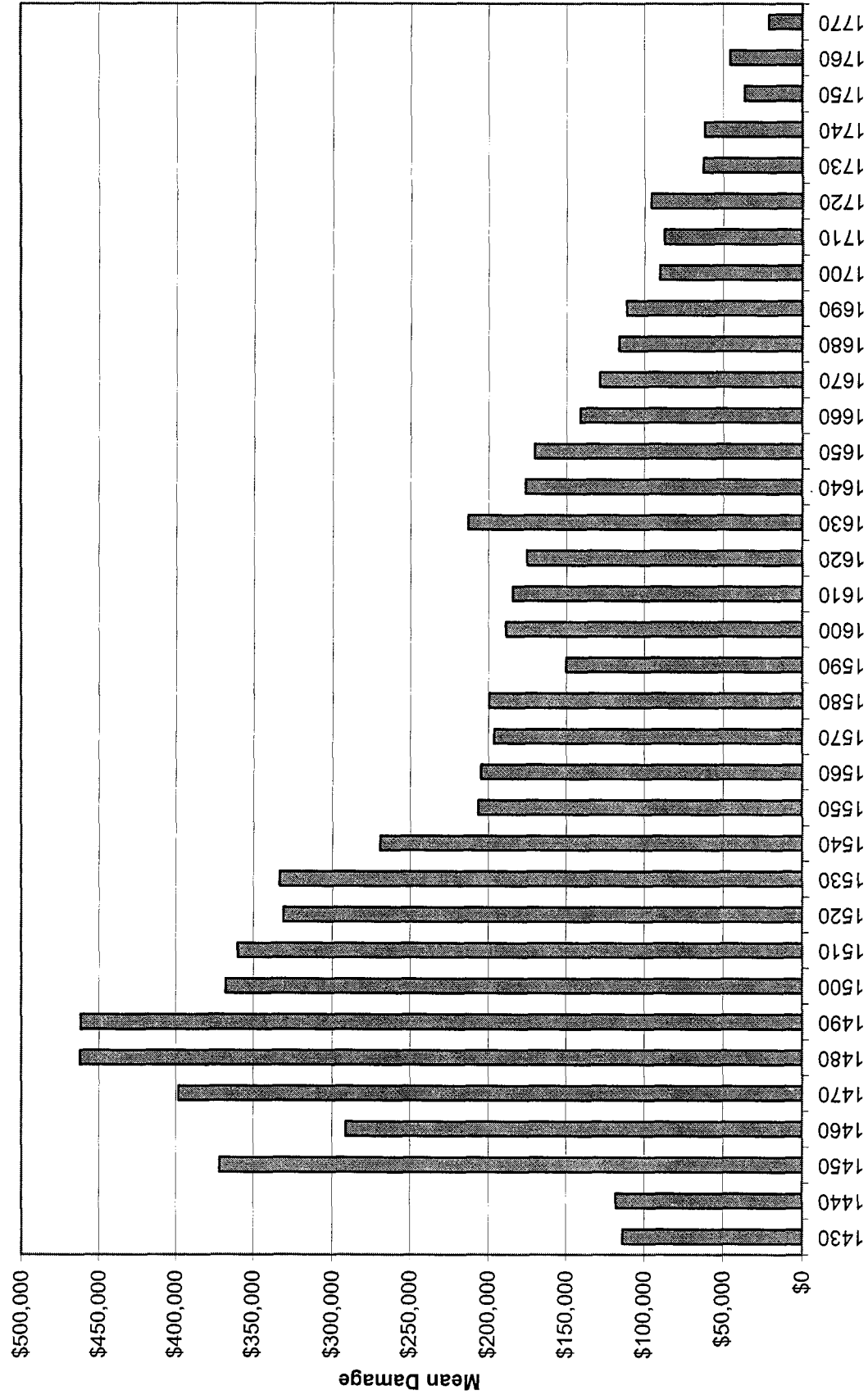


Figure 6-4: Frequency Weighted Transmission & Distribution Damage from SSI 3 Landfalls

6. Landfall Analyses for SSI Ranges

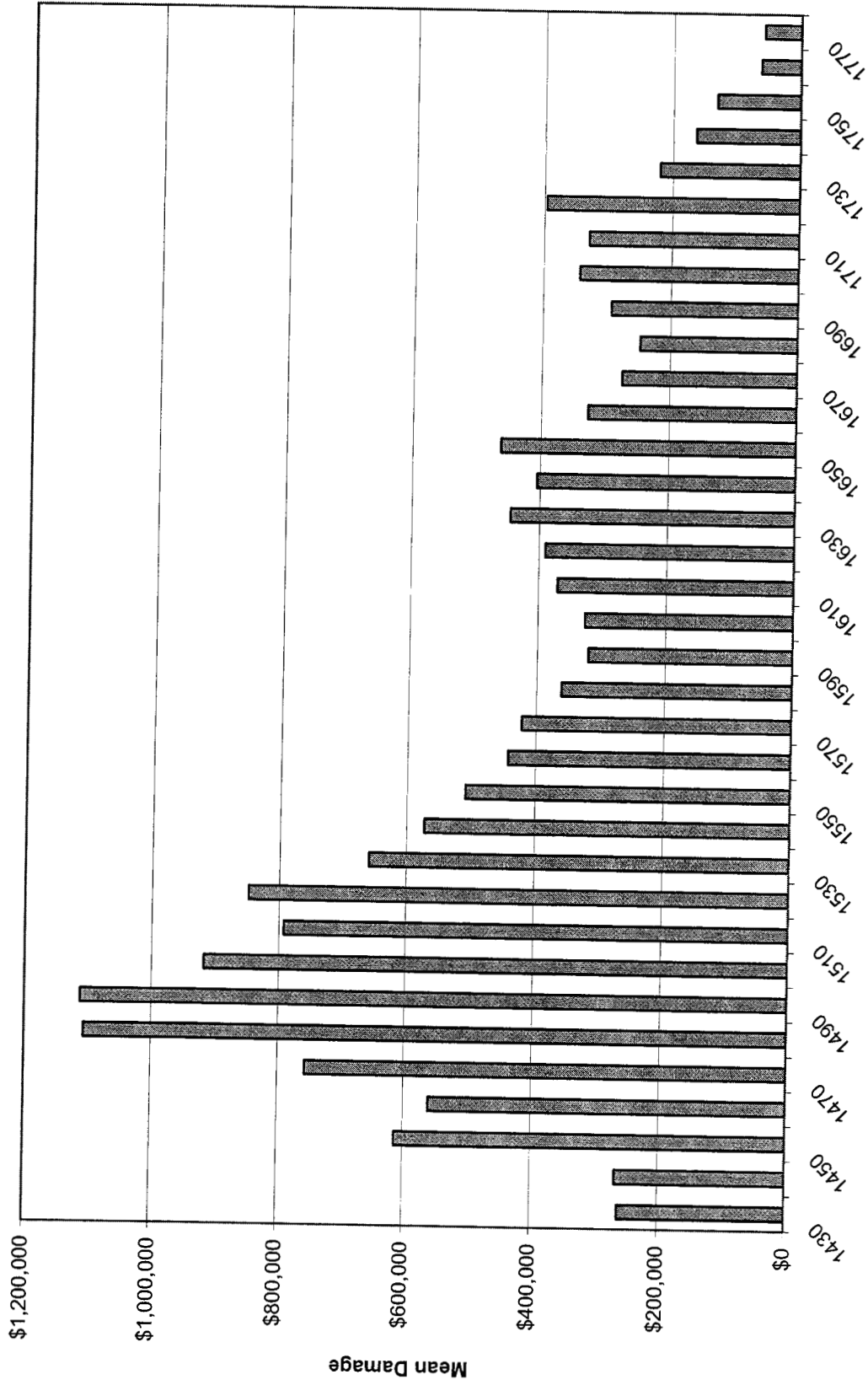


Figure 6-5: Frequency Weighted Transmission & Distribution Damage from SSI 4 Landfalls

6. Landfall Analyses for SSI Ranges

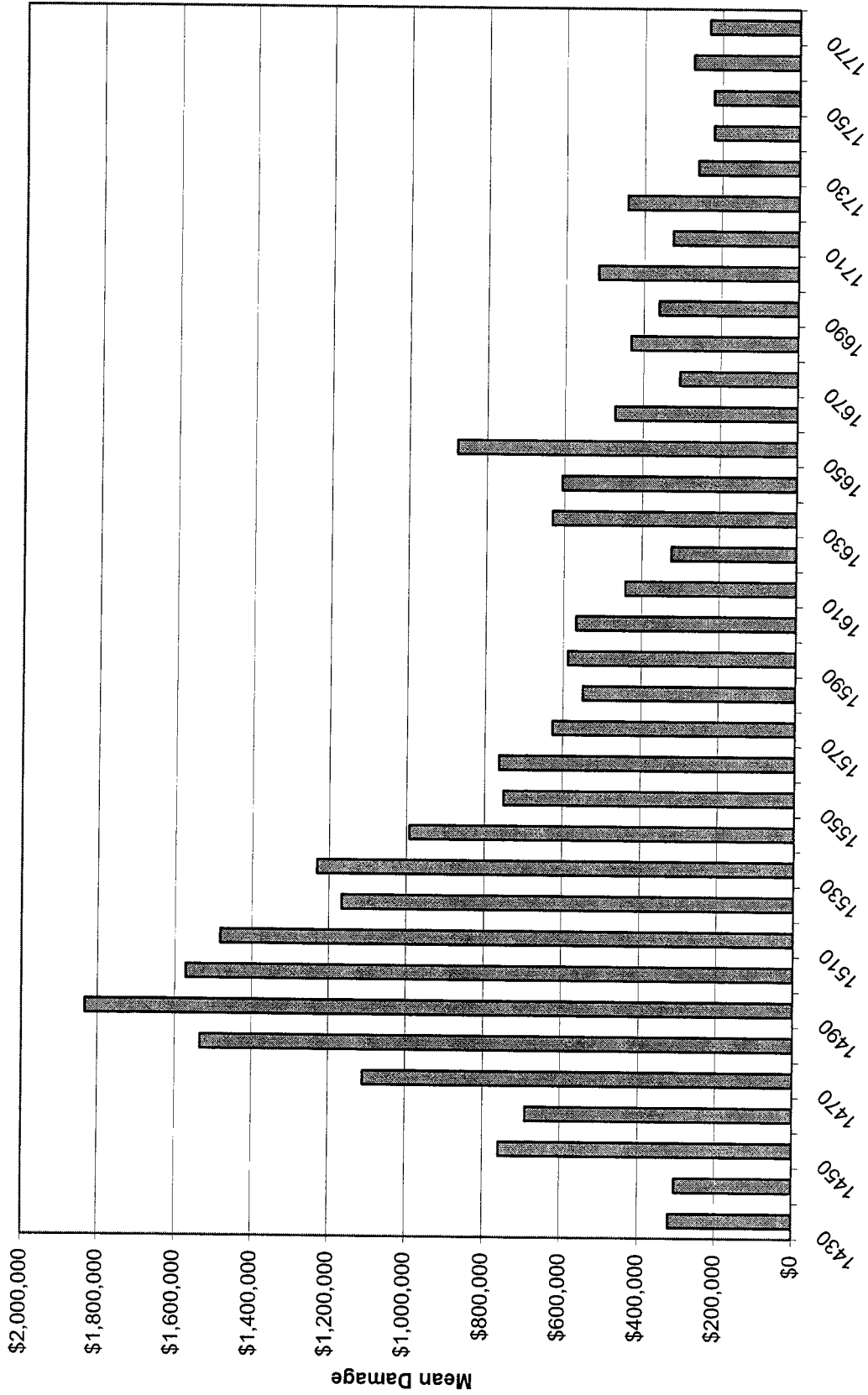


Figure 6-6: Frequency Weighted Transmission & Distribution Damage from SSI 5 Landfalls

7. References

1. "Florida Commission on Hurricane Loss Projection Methodology", EQECAT, an ABS Group Company, February 2004.
2. "Florida Power & Light, Transmission and Distribution Assets, Hurricane Risk Profile Memorandum", EQE International, May 2000.
3. "Florida Power & Light, Solvency Analysis of Reserve Funding Alternatives", ABS Consulting, December 2005.



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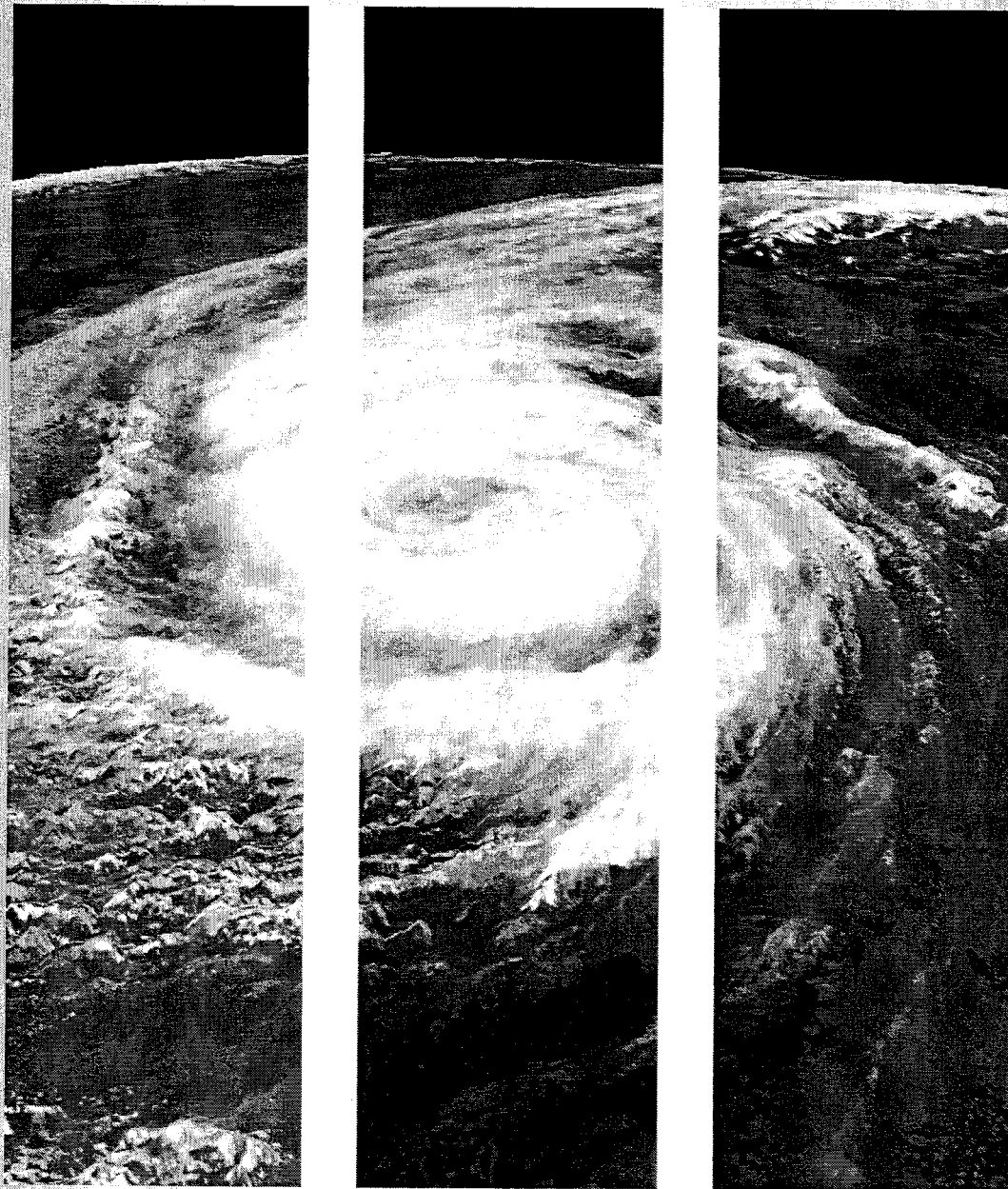
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Florida Power & Light



Hurricane Wilma 2005

Solvency Analysis of Reserve Funding Alternatives

ABS Consulting



December
2005



FPL

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1. Solvency Analysis of Funding Alternatives

A probabilistic analysis of storm losses was performed for Florida Power & Light (FPL) to determine their potential impact on the Reserve. The analysis included Transmission and Distribution (T & D) losses, insurance deductibles paid on non-T & D assets as well as storm staging costs. The total expected annual uninsured costs from hurricanes, tropical and winter storms, insurance deductibles and storm staging costs is estimated to be \$73.7 million as described in the Storm Loss Analysis Report (Reference 1) and summarized in the "Storm Risk Profile" on page i.

The expected annual loss estimate represents the average annual cost associated with repair of hurricane damage and service restoration over a long period of time. The expected annual loss is also known as the "Pure Premium," which is the insurance premium level needed to pay just the expected losses. Insurance companies add their expense cost and profit margin to the Pure Premium to develop the premium charged to customers.

1.1 Analysis

The analysis provides an estimate of the Reserve assets in each year of the simulation, accounting for the Reserve funding mechanism, investment income, expenses, and losses using a dynamic financial model. The Reserve Solvency Analysis consisted of performing 10,000 iterations of hurricane loss simulations within the FPL service territory, each covering a ten-year period, to determine the effect of the charges for losses to the FPL Reserve. Monte Carlo simulations were used to generate loss samples for the analysis.

The storm losses were probabilistically generated using EQECAT's USWIND™ hurricane Model (Reference 1). The USWIND™ probabilistic loss analysis calculated the losses to FP&L for a comprehensive set of hypothetically possible storms. The basis for such an analysis was the USWIND™ probabilistic database, which is a finely

1. Reserve Solvency Analysis Funding Alternatives

segmented set of hypothetical storms affecting the Gulf and Atlantic coasts of the United States.

The hypothetical hurricane and tropical storm database was developed by dividing the United States Gulf and Atlantic coastline into 10-mile segments and modeling more than 1,500 hypothetical hurricanes and approximately 750 hypothetical tropical storms for each segment. The net result is a stochastic storm database more than 750,000 hurricane and tropical storm events. In addition, each stochastic event is assigned an annual frequency of occurrence based on the storm track location and the storm intensity as measured by central pressure. A database of approximately 500,000 stochastic winter storm events was developed by a different process, through a simulation based on an analysis of historical winter storm wind fields.

Based on the annual frequency and the loss estimate for each stochastic event, a probabilistic database of losses was developed. From this database, various loss-exceedance distributions was statistically generated. For this analysis, an annual aggregate loss distribution was generated by combining all of the losses to FPL's Transmission and Distribution (T & D) assets, as well as insurance deductibles for non T & D assets and anticipated staging costs, calculated on the basis of the stochastic event sets described above. The expected annual loss calculated was \$73.7 million. A jurisdictional allocation of losses of \$73.4 million was utilized in the solvency analysis.

The Reserve Solvency Analysis consisted of performing Monte Carlo simulations to generate loss samples consistent with the loss-exceedance distribution. Each loss sample has an equal likelihood of occurrence, and the annual probability of nonexceedance for the samples ranged from 0 to 0.9999. Since the annual aggregate loss distribution was used, the possibility that more than one storm in a given year may affect the Reserve was included in the analysis.

The next step was to use a "Random Walk" technique to generate 10,000 sequences of five years' duration each. In each random walk, a sequence of five loss samples was selected from the loss distribution, resulting in one hypothetical set of occurrences, or random walk, for the five-year period. This process is repeated 10,000 times to generate the 10,000 Random Walks of five years' duration each for the analysis. The sampling was done in such a manner that each year has a unique and statistically independent set

1. Reserve Solvency Analysis Funding Alternatives

of loss points, yet for each of the five years all the 10,000 damage points are equally likely.

1.2 Analysis Cases and Results

Two funding alternative cases were analyzed.

	RESERVE BOND ALTERNATIVE	RESERVE SURCHARGE ALTERNATIVE
Initial Reserve Balance	\$650 million	\$0
Accruals	None	Year 1: \$ 208.1 million Year 2: \$ \$216.4 million Year 3: \$ 225.5 million Total = \$ 650 million
Negative Balances	No recovery of negative reserve balances	No recovery of negative reserve balances

1.2.1 Analysis Assumptions

Both of the analysis Cases performed included the following assumptions

- Storm losses are assumed to increase by 4% per year to account for added system assets and increased values of existing assets.
- Investment earnings were assumed to grow at a rate of 3.43%.

In years when storm losses exceed the Reserve balance, the Reserve becomes insolvent and has a negative balance. All analyses assumed that for years where the

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Reserve balances becomes negative due to storm losses, no recovery of negative Reserve balances occurs. When deficits occur they are covered by borrowing funds (at a rate of 4.21% per year) and the accruals (in the cases and years when they occur) are the only sources to pay down this debt.

1.3 Analysis Results

Results for the two cases are shown in Figures 1-1 and 1-2. The results show the mean (expected) Reserve balance as well as the 5th and 95th percentiles. The results from these simulation results are also shown in Table 1-1 and Table 1-2. Table 1-1 includes the mean (expected) values of the Reserve balance at the end of five and ten years, probabilities of insolvency during the five and ten year periods and the probability of the Reserve balance exceeding \$750 million at the end of five years. Table 1-2 includes the mean (expected) values of the Reserve balance for each of the ten years of the simulation.

For the first case, the PRIMARY RESERVE BOND ALTERNATIVE (Figure 1-1), the expected (mean) Reserve balance at five years is \$351 million and at ten years is negative (\$110) million. The Reserve has about a 17% probability of having a balance less than zero in any year of the five-year time interval of the simulation about a 43% probability of having a balance less than zero in any year of the ten-year time interval. The Reserve has about a 6% probability of having a balance greater than \$750 million at the end of the five-year time interval of the simulation.

For second case, the RESERVE SURCHARGE ALTERNATIVE (Figure 1-2), the expected (mean) Reserve balance at five years is \$301 million and at ten years is negative (\$153) million. The Reserve has about a 18% probability of having a balance less than zero in any year of the five-year time interval of the simulation about a 46% probability of having a balance less than zero in any year of the ten-year time interval. The probability of the Reserve having a balance greater than \$750 million the end of the five-year time interval of the simulation is nil.

1. Reserve Solvency Analysis Funding Alternatives

Table 1-1:
 Reserve Funding Alternatives:
 Results

	RESERVE BOND ALTERNATIVE	RESERVE SURCHARGE ALTERNATIVE
Initial Reserve Balance (\$ millions)	\$650	\$0
Accruals over 3 years	\$0	\$650
Mean (Expected) Reserve Balance at 5 years (\$ millions)	\$351	\$301
Probability of Reserve Insolvency within 5 years	17%	18%
Mean (Expected) Reserve Balance at 10 years (\$ millions)	(\$110)	(\$153)
Probability of Reserve Insolvency within 10 years	43%	46%
Probability of Reserve Balance in excess of \$750 million in 5 years	6%	0%

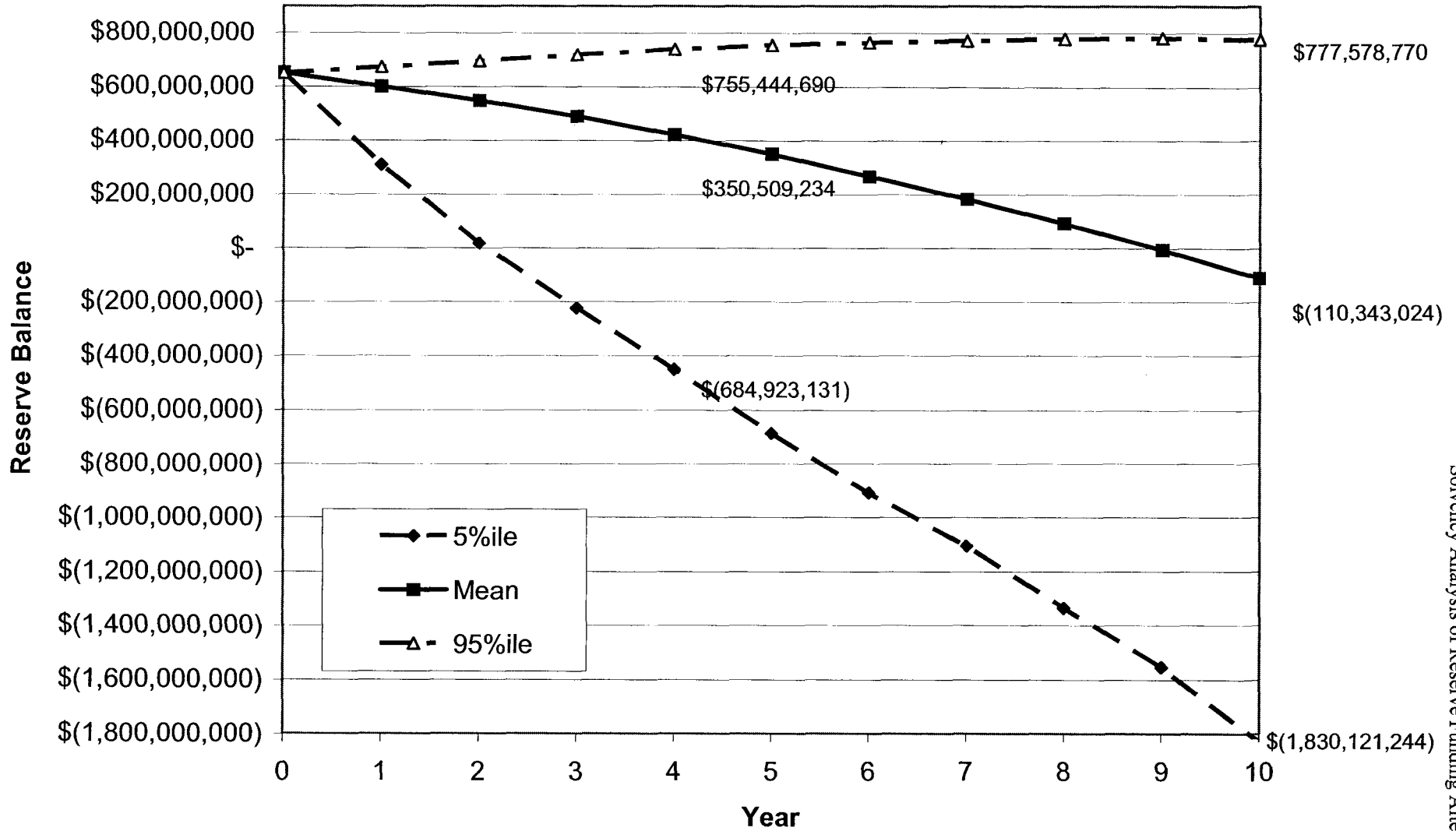
1. Reserve Solvency Analysis Funding Alternatives

Table 1-2:
Reserve Funding Alternatives:
Annual Mean Reserve Balances (\$-millions)

END OF YEAR	RESERVE BOND ALTERNATIVE	RESERVE SURCHARGE ALTERNATIVE
1	\$600.8	\$137.6
2	\$548.3	\$281.7
3	\$489.3	\$438.7
4	\$421.9	\$371.7
5	\$350.5	\$300.7
6	\$266.4	\$224.2
7	\$183.1	\$141.2
8	\$92.2	\$50.4
9	(\$4.9)	(\$50.1)
10	(\$110.3)	(\$153.4)

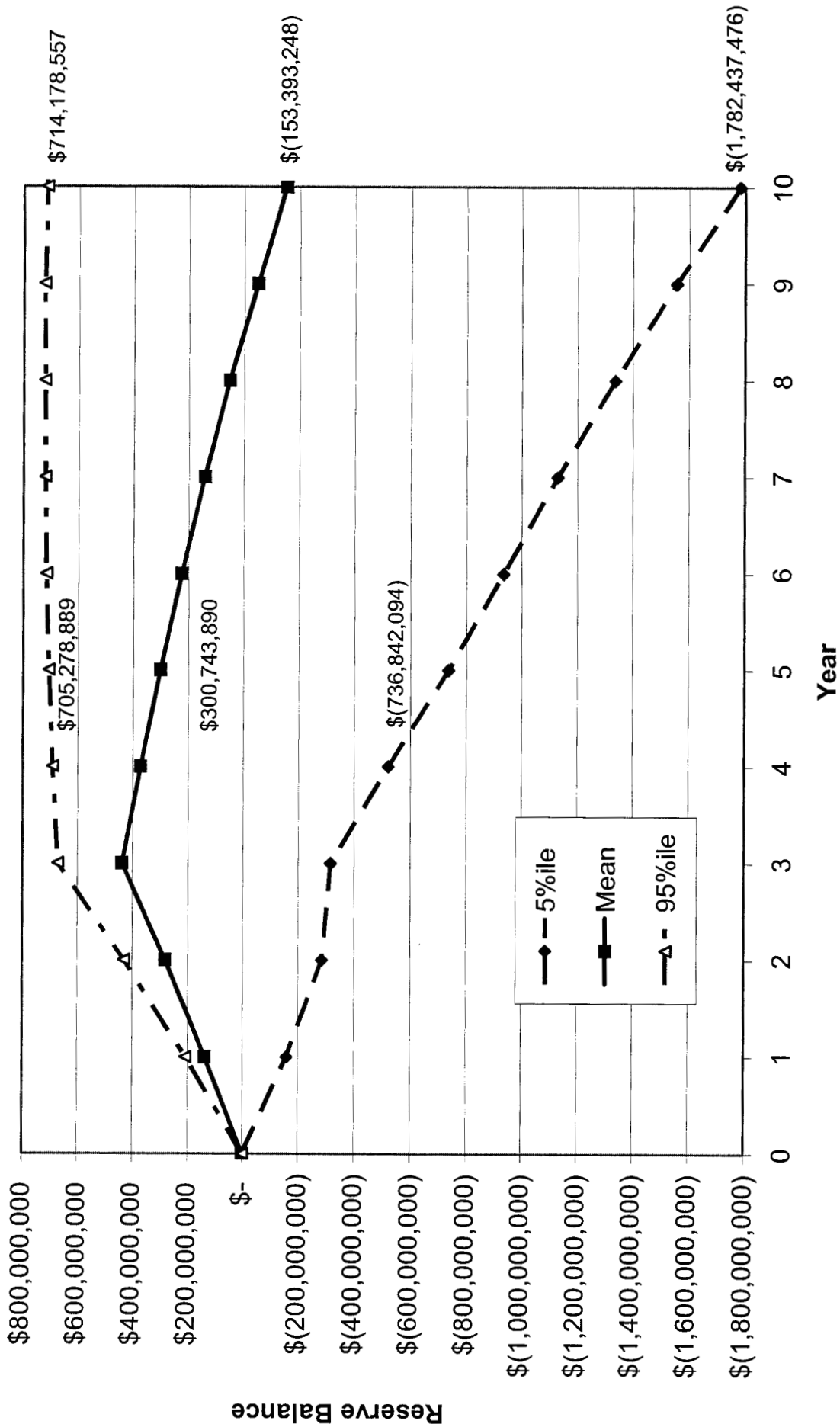
1. Reserve Solvency Analysis Funding Alternatives

Figure 1-1: Reserve Solvency Analyses Results
\$650 million Initial Balance, no accruals, no recovery of negative Reserve balances



1. Reserve Solvency Analysis Funding Alternatives

Figure 1-2: Reserve Solvency Analyses
 \$0 million Initial Balance, \$650 million in accruals over 3 years, no recovery of negative Reserve balances



2. References

1. "Florida Power & Light, Storm Loss Analysis", ABS Consulting, March 2005.



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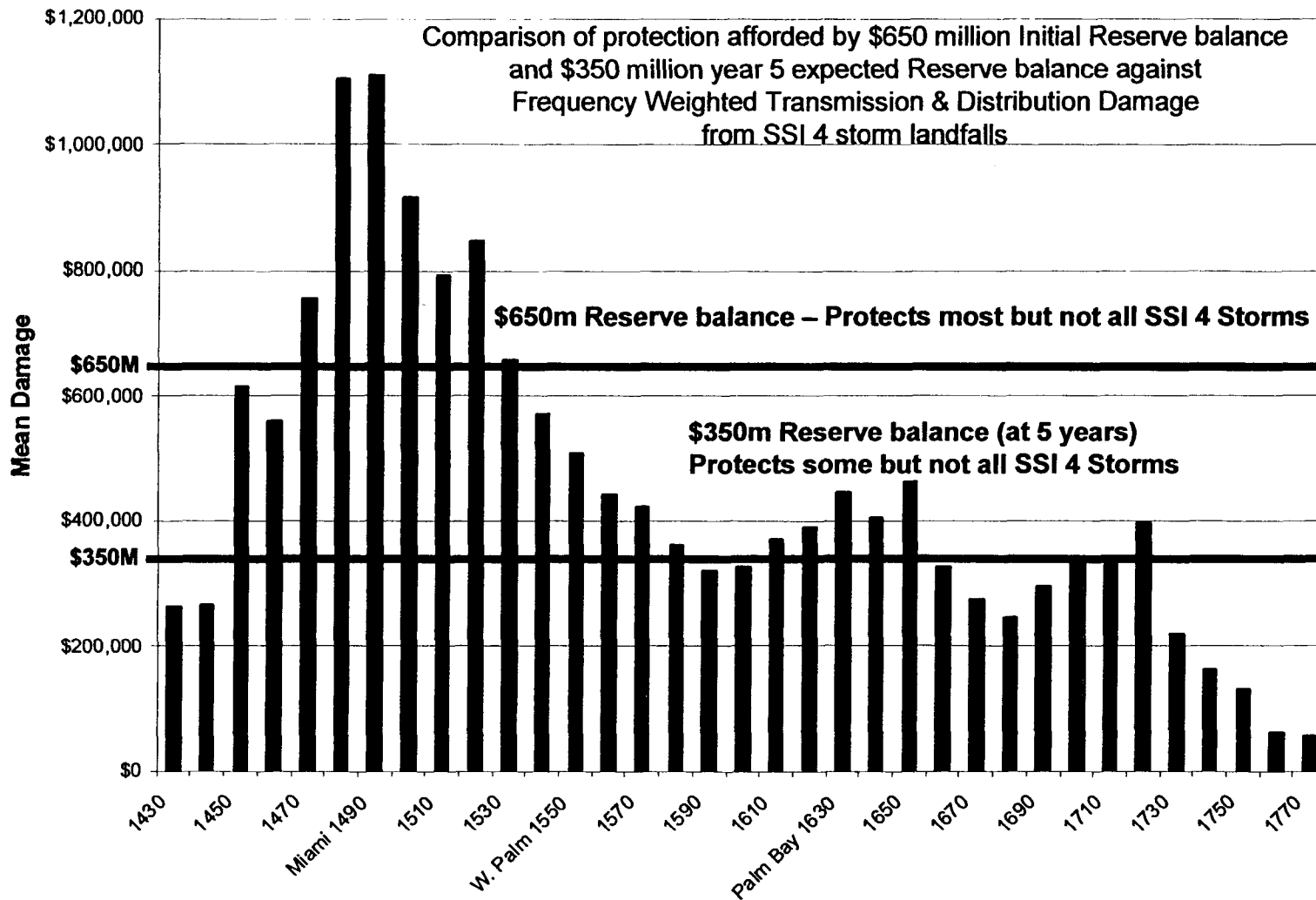
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SPH-3:
 Comparison of FPL T&D Damage from SSI-4 Storms at Landfalls with
 FPL Primary Recommendation; Initial and 5-year Reserve Balance Levels

Docket No. _____
 S.P. Harris, Exhibit No. _____
 Document No. SPH-3, Page 1 of 1
 Comparison of FPL T&D Damage from SSI-4 Storms
 at Landfalls with FPL Primary Recommendation;
 Initial and 5-year Reserve Balance Levels