BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition for increase in rates by Progress Energy Florida.	Docket No. 090079-EI Submitted for filing: March 20, 2009

DIRECT TESTIMONY
OF
STEVEN P. HARRIS

On behalf of Progress Energy Florida

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Docket No. 090079-EI

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Introduction and Summary

Q. Please state your name and business address.

A. My name is Steven P. Harris. My business address is ABS Consulting, Inc. ("ABS Consulting"), 475 14th Street Suite 550, Oakland, California 94612.

Q. Who is your employer and what is your position?

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

Q. Please describe your educational background and business experience.

A. I received Bachelor's and Master's Degrees in engineering from the University of California at Berkeley. I am a licensed civil engineer in the State of California. Over the past 25 years, I have conducted and supervised independent risk and financial studies for public utilities, insurance companies, and other entities both regulated and unregulated. My areas of expertise include natural hazard risk analysis, operational risk analysis, risk profiling and financial analysis, insurance loss analysis, loss prevention and control, business continuity planning and risk transfer.

A significant portion of my consulting experience has involved the performance of multi-hazard risk studies, including earthquake, ice storm and windstorm perils, for electric, water, and telephone utility companies, as well as insurance companies. I have performed or supervised windstorm (tropical storm or hurricane) loss and reserve analyses for utilities including Progress Energy Florida ("PEF" or the "Company"), Tampa Electric Company, Florida Power & Light, Gulf Power Company and others. Additionally, I have performed loss analyses for earthquake hazard for utilities including the Los Angeles Department of Water and Power, the California-Oregon Transmission Project, Big Rivers Electric and Anchorage Municipal Light and Power.

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

Q. What is the purpose of your direct testimony?

A. I will present the results of my Storm Loss and Reserve Performance Analyses of Progress Energy Florida, Inc.'s ("PEF's" or the "Company's") transmission and distribution assets. This study analyzes PEF's potential hurricane risk exposure in order to estimate potential future PEF losses to the Storm Reserve. The study supports the Company's calculation of the necessary annual storm damage accrual amount.

Q. Are you sponsoring any exhibits to your testimony?

A. Yes. I am sponsoring the following exhibit:

- Exhibit ____ (SPH-1), PEF Transmission and Distribution Assets Hurricane Loss and Reserve Performance Analyses, December 2008.

This exhibit is true and accurate.

Q. What were you asked to do for PEF in this proceeding?

A. PEF requested that I analyze the Company's storm loss exposure and reserve performance. I understand that these analyses will be used for estimation of potential future PEF charges to the Reserve and the estimation of the performance of the Reserve. PEF will use this information to determine the appropriate annual accrual to the Company's Storm Reserve. The results of these analyses are contained in my Exhibit Number ____ (SPH-1), entitled PEF Transmission and Distribution Assets Hurricane Loss and Reserve Performance Analyses, December 2008.

Q. Please summarize your testimony.

A. The Storm Loss Analysis was performed to estimate PEF's expected annual damage from hurricanes affecting its transmission and distribution facilities. The study estimated that PEF's expected annual hurricane damage is $20.2 million. The Reserve Performance Analysis was performed to test four levels of possible accruals to the Reserve. The Reserve Performance Analysis then determines the performance of the Reserve based on the expected annual damage results from the Storm Loss Analysis. I tested the Company's current accrual level of $6 million, as well as three higher accruals of $16 million, $25 million, and $35 million.

Based on these analyses, an accrual level of $16 million would result in an expected reserve balance of $152.5 million at the end of five years, with a 10 percent likelihood of a negative reserve balance within five years. I understand that PEF has chosen to request an accrual level of $16 million which will cover the estimated annual loss from hurricanes that can be charged against the Reserve. PEF's choice of an accrual of $16 million represents a balance between costs to PEF's customers and protection from future surcharges due to storm damage that exceeds the reserve level.

I. Storm Loss Analysis

Q. Please explain how you analyzed PEF's expected annual loss from potential hurricanes.

A. I utilized the ABS Consulting USWIND model to calculate PEF's expected annual loss ("EAL") from potential hurricanes. The Florida Commission on

Hurricane Loss Projection Methodology ("FCHLPM"), an independent panel of experts, annually evaluates computer models and actuarial methodologies for projecting hurricane losses in Florida for insurance rating purposes. The USWIND model is one of only four models evaluated and determined acceptable by the FCHLPM for projecting hurricane loss costs.

The analysis estimates all possible hurricane events and estimates the damage done to the assets at risk. This process establishes the magnitude of damage and the probability of its occurrence. Annual damage and loss estimates are developed for asset locations and are then aggregated to create overall portfolio damage and loss amounts. To make a reliable estimate of the EAL to which PEF is exposed from hurricanes, I included the most complete and full damage distribution that could be determined using both actual experience and possible damage from simulated hurricanes. The EAL is based on data from the long term 100-year hurricane hazard record and PEF provided transmission and distribution ("T&D") asset portfolio data on a county-by-county basis.

Q. What factors regarding PEF's T&D assets were considered in the analyses?

A. The location and concentration of PEF's T&D assets is important, as is the probability of storms of different intensities and/or landfall points impacting those assets. Another factor considered in the analysis is how likely the particular assets are to sustain hurricane wind damage. For example, as wind speeds and hurricane sizes increase, the amount of damage to T&D assets increases. The

final factor considered in the storm loss analysis is the cost to repair the T&D assets and restore electrical service.

Q. As a result of the analyses you performed, what is PEF's expected annual loss, or EAL?

A. The EAL from hurricane damage to T&D assets is $20.2 million per year. This represents the average annual cost associated with damage to T&D assets and service restoration from all simulated storms.

Q. Does this mean that each year, PEF can expect $20.2 million in T&D damage from storms?

A. No, the EAL is not expected to occur each and every year. The amount of damage will fluctuate from year to year. The EAL is the average expected hurricane damage for all storm years over a long period of time.

II. Reserve Performance Analysis

Q. Once you determined the appropriate estimate of the potential hurricane damage, what did you do next?

A. I performed a cash flow analysis to determine the impact of the level of funding on the performance of the Storm Reserve. This is called the Reserve Performance Analysis. The Reserve Performance Analysis provides a tool for management and policymakers to determine the performance of the Storm Reserve and to test whether annual accrual amounts meet their objectives. The performance over

time of the Storm Reserve must consider an annual accrual along with a starting balance and an objective target balance within some time frame. With rate stability as a policy objective, the question is what storm reserve balance should PEF seek to achieve and how quickly should it be reached to provide the desired stability in rates? Once a proper storm reserve balance is determined and achieved, an accrual that equals the expected annual damage will maintain this level in the Storm Reserve.

The ABS Consulting Reserve Performance Analysis is a cash balance analysis starting with an initial balance of $133 million in the simulations. An annual accrual is added to the cash balance, and annual storm damage is simulated consistent with the Storm Loss Analysis for each of the five years. Because storm seasons and losses are highly variable, 10,000 five-year simulations were performed to estimate the performance of the Reserve with various accrual levels and to ensure an adequate number of samples of rare storm events.

Q. How are the results from the Storm Loss Analysis used in the Reserve Performance Analysis?

A. Both the likelihood and amount of annual losses determined in the Storm Loss Analysis are used to simulate losses in each of the five years in the Reserve Performance Analysis to determine the likelihood of the Reserve having positive balances. For the Reserve Performance Analysis, only $16.4 million of the $20.2 million EAL is assumed to be an annual obligation of the Reserve. The $16.4

million reflects an estimate of the amount of O&M costs which can be charged against the Storm Reserve pursuant to the storm reserve rule.

Q. Did you consider various annual accrual amounts in your analysis?

A. Yes. For this analysis, I considered four different annual accruals, in the amounts of $6 million, $16 million, $25 million, and $35 million, over the five year period. For each funding case, the initial $133 million reserve balance is considered and I assumed that interest would be credited on positive reserve balances at a rate of 3.45%.

Q. What did the Reserve Performance Analysis show?

A. Generally, the lower the annual accrual amount, the more likely that the reserve balance will be negative within five years. For example, taking the $6 million annual accrual amount, the Reserve has a mean, or expected, balance of $99 million at the end of the five years. There is a 14% chance that the Reserve will be insolvent in one or more years of the five-year simulation. This is because the $6 million annual accrual is below the reduced EAL of $16.4 million. Accordingly, in each passing year, the reserve ending balance has a decreasing likelihood of accumulating surpluses and an increasing likelihood of insufficient funds. Likewise, when considering the $35 million annual accrual funding scenario, there is a lower likelihood (6.5%) that the Reserve will be insolvent within five years. With a $35 million annual accrual, the expected balance at the end of five years is $251 million.

Q. What would be the impact on your analysis if PEF did not credit interest on the reserve account following the termination of the settlement agreement in Docket No. 050078-EI?

A. Without the interest credits, the expected reserve balances at the end of every year would be reduced. Thus for any level of annual accrual, the expected balance at the end of five years would be somewhat lower, and the likelihood of a negative balance would be somewhat greater.

III. Recommended Accrual Amount

Q. Are you making a recommendation for PEF's annual level of accrual and target reserve level?

A. No, my role was not to recommend an annual level of accrual or target reserve level. Rather, I presented probabilities to PEF regarding reserve performance based on various levels of annual accrual. The storm study uses the best available information regarding hurricane probabilities, recognizing that there can be variances in the severity of storm damage in a particular year. The Reserve Performance Analysis provides information as to the adequacy of the reserve funding in various scenarios, so that the Company can make decisions regarding the annual accrual amounts and target reserve level. The Company can use this information to decide the reserve level it thinks will cover storm damage without the need to later request a storm surcharge.

Q. Please explain why a $16 million annual accrual is reasonable for PEF.

A. A $16 million annual accrual will result in an expected balance of $152.5 million after five years. According to the Storm Loss Analysis, specifically Table 3-1 in my Exhibit No. ___ (SPH-1), there is a 2.7 percent chance every year that the aggregate damage to the T&D assets will exceed $150 million. In other words, with a $16 million accrual, the resulting reserve level of $152 million would be sufficient to cover storm damage of approximately a one in 35 year storm season. Thus, a $16 million annual accrual results in a storm reserve balance that will be adequate to cover losses during most, but not all, storm seasons. This result is also illustrated by the Hurricane Landfall Analyses for SSI Ranges.

Q. What are the Hurricane Landfall Analyses for SSI Ranges?

A. The Hurricane Landfall Analyses for Saffir-Simpson Hurricane Scale (SSI or Category) ranges is a separate technique that is used to further analyze PEF's storm damage risk profile by examining the potential impact on PEF of single hurricanes. Storms are grouped using Category intensities ranging from a least intensive storm rating of SSI-1 up to SSI-4. The analysis calculates the frequency-weighted average T&D damage from simulated storms grouped by their Category of intensity within a specified 10 mile stretch of coastline along PEF's territory where they made landfall. This analysis can be found in part 4 of Exhibit No. (SPH-1).

Q. Please explain the results of the Hurricane Landfall Analyses in terms of the appropriateness of the recommended $16 million accrual.

A. The analysis for SSI-1 landfalls shows that the highest frequency-weighted average T&D damage to PEF's territory is less than $50 million. This means that, with a $16 million annual accrual, the Storm Reserve at the end of five years would be expected to cover the average damage resulting from any single SSI-1 storm, for all the landfalls shown. For single SSI-2 storms, the Storm Reserve at the end of five years would also be expected to cover the average damage resulting from any single hurricane for all the landfalls shown, because the damage would be less than $150 million. However, for single SSI-3 and SSI-4 storms, the Storm Reserve of $152.5 million would only cover some but not all of the average damage, depending on the landfall location. As the storms increase in intensity, the storm reserve balance that results from a $16 million accrual would cover a smaller portion of the expected damage.

Q. Did your analysis include any historic hurricanes that affected PEF's service territory?

A. Yes, the most significant historic hurricane to affect PEF's territory was analyzed. This Category 3 hurricane made landfall in Pinellas County in 1921. If a similar hurricane were to make landfall today, there would be estimated damages of $250 million to the current system. This is demonstrated on the graph in Figure 4-4 of Exhibit No. ___ (SPH-1).

Q. What do these results show about the reasonableness of PEF's recommended annual accrual?

A. The $16 million accrual, with the resulting mean storm reserve balance of $152.5 million, appears to be reasonable to achieve a target storm reserve balance of $150 million at the end of five years. The target storm reserve balance would be large enough to cover most storm damage from lower-intensity storms, but not so high as to cover all damage from the higher-intensity storms which have a lower chance of affecting PEF's service territory. Accordingly, a $16 million accrual will help maintain the storm reserve balance at the desired level and allow the Company to keep up with the estimated average storm loss over the long term.

Q. Does this conclude your direct testimony?

A. Yes.

Progress Energy

Progress Energy Florida

Transmission and Distribution Assets

Hurricane Loss and Reserve Performance Analyses

December 2008

ABS Consulting
An ABS Group Company

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Risk Profile

The following is a summary description of analyses performed by ABS Consulting of Progress Energy Florida ("PEF") storm loss exposure and reserve performance. This report is intended to be used solely by PEF and the Florida Public Service Commission for estimation of potential future PEF losses to the Reserve and the estimation of the performance of the reserve.

OWNER	**Progress Energy Florida**	
ASSETS	Transmission and Distribution (T & D) System: Transmission towers, and conductors; Distribution poles, transformers, conductors, lighting and other miscellaneous assets; Non-recovered property insurance policy deductibles.	
LOCATION	All T & D assets located within the State of Florida,	
ASSET VALUE	Normal replacement value is approximately $ 9.5 billion, of which approximately 45% is transmission and 55% is distribution	
LOSS PERILS	Hurricane Windstorm (SSI 1 to 5), Tropical Storms	
	Hurricane Hazard (one year)	
EXPECTED ANNUAL LOSS (T&D and deductibles	$20.2 million	
1% AGGREGATE DAMAGE EXCEEDANCE VALUE	$310 million	
Reserve Analysis Cases $133 m initial balance	**Expected balance at 5 years**	**Probability of negative balance within 5 years**
$6 million Annual Accrual	$98.5 million	14.2%
$16 million Annual Accrual	$152.5 million	10.0%
$25 million Annual Accrual	$196.3 million	8.8%
$35 million Annual Accrual	$250.8 million	6.5%

1. Storm Loss Analysis

Progress Energy Florida ("PEF") transmission and distribution (T & D) systems and general property are exposed to and in the past have sustained damage from hurricanes and tropical storms. The exposure of these assets to storm damage is described and potential losses are quantified. Loss analyses were performed by ABS Consulting, using an advanced computer model simulation program USWIND™ developed by EQECAT, an ABS Group Company. All results which are presented here have been calculated using USWIND, and the PEF provided T & D asset portfolio data.

The storm exposure is 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 thousands of 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. This study includes costs associated with storm damage, service restoration and insured property deductibles.

Factors considered in the analysis include the location of PEF'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.

Transmission and Distribution asset data are provided in the Tables 1-1 and 1-2 below. Distribution and transmission asset values by zip code are shown in Figure 1-1 and Figure 1-2 respectively.

Table 1-1

DISTRIBUTION ASSET REPLACEMENT VALUES BY COUNTY

County	Replacement Values in ($1000)
Alachua	$32,395
Bay	$3,493
Citrus	$211,089
Columbia	$3,027
Dixie	$12,040
Franklin	$50,795
Gilchrist	$10,086
Gulf	$25,061
Hamilton	$18,521
Hardee	$6,585
Hernando	$43,147
Highlands	$184,169
Hillsborough	$12,947
Jefferson	$31,284
Lafayette	$7,199
Lake	$211,529
Leon	$2,957
Levy	$35,691
Madison	$23,545
Manatee	$1,694
Marion	$246,964
Orange	$1,093,446
Osceola	$129,613
Pasco	$339,881
Pinellas	$1,449,445
Polk	$297,803
Seminole	$440,308
Sumter	$35,846
Suwannee	$5,199
Taylor	$28,967
Volusia	$218,068
Wakulla	$35,177
All others	$952
Totals	***$5,248,924***

Table 1-2

TRANSMISSION ASSET REPLACEMENT VALUES BY COUNTY

County	Replacement Values in ($1000)
Alachua	$86,484
Bay	$13,773
Citrus	$309,216
Columbia	$42,453
Dixie	$13,222
Franklin	$80,218
Gadsden	$39,548
Gilchrist	$64,645
Gulf	$58,638
Hamilton	$127,255
Hardee	$69,050
Hernando	$154,388
Highlands	$125,558
Hillsborough	$60,133
Jefferson	$37,889
Lafayette	$17,863
Lake	$258,392
Leon	$37,342
Levy	$115,567
Liberty	$27,727
Madison	$65,630
Manatee	$34,254
Marion	$221,245
Orange	$410,022
Osceola	$96,172
Pasco	$165,816
Pinellas	$378,832
Polk	$407,855
Seminole	$129,876
Sumter	$202,891
Suwannee	$113,187
Taylor	$64,011
Volusia	$151,920
Wakulla	$65,567
All Others	$363
Totals	***$4,247,000***

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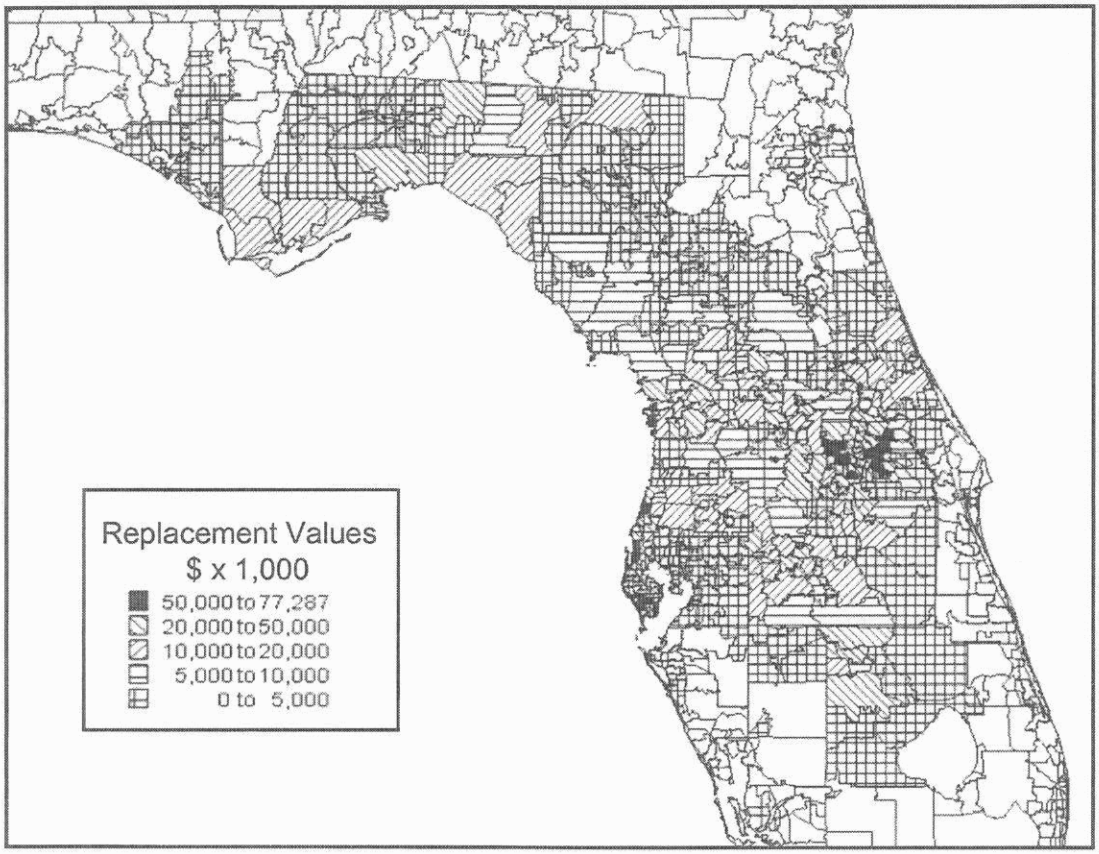

Figure 1-1: Distribution Asset Values by Zip Code

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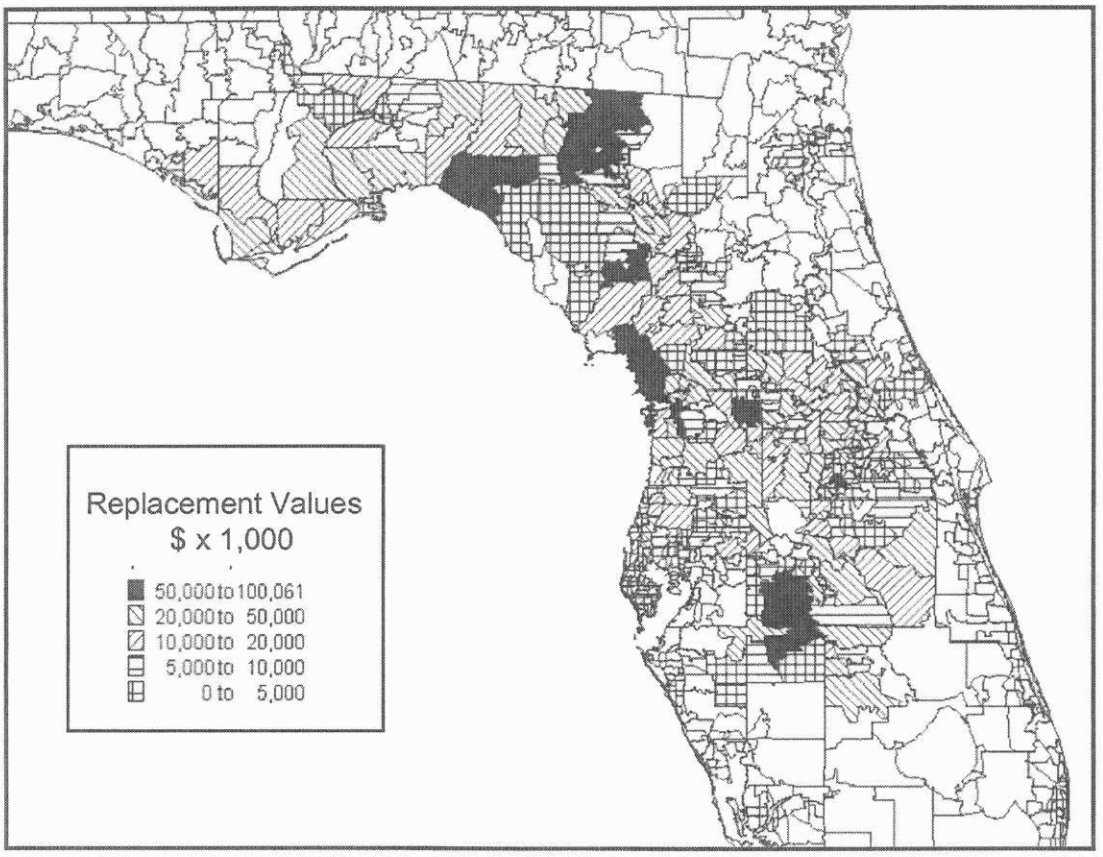

Figure 1-2: Transmission Asset Values by Zip Code

Transmission and Distribution Asset Vulnerabilities

The PEF loss history from the 2004 Hurricanes Charley, Frances, and Jeanne were considered in the calibration of the storm loss model. These hurricanes provide data on recent storm recovery costs from low intensity winds. The 2004 storm loss experience includes the effects of many factors including the post hurricane costs of labor and other factors associated with the storm restoration process utilized by PEF. The 2004 loss history is believed to be most reflective of the current PEF storm restoration practices and cost experience.

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

2. Hurricane Hazard

Hurricane Exposure

The hurricane exposure is analyzed from a probabilistic approach, which considers the full range of potential hurricane 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, Inc. 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.

The historical annual frequency of hurricanes has varied significantly over time. There are many causes for the temporal variability in hurricane formation. While stochastic variability is a significant factor, many scientists believe that the formation of hurricanes is also related to climate variability.

One of the primary climate cycles having a significant correlation with Hurricane activity is the Atlantic Multidecadal Oscillation (AMO). It has been suggested that the formation of hurricanes in the Atlantic Ocean off the coast of Africa is related to the amount of rainfall in the Western African Sahel region. Years in which rainfall is heavy have been associated with the formation of a greater number of hurricanes. The AMO cycle consists of a warm phase, during which the tropical and sub-tropical North Atlantic have warmer than average temperatures at the surface and in the upper portion relevant to hurricane activity, and a cool phase, during which these regions of the ocean have cooler than average temperatures. In the period 1900 through 2005, the AMO has gone through the following phases:

1900 through 1925	Cool	(Decreased Hurricane Activity)
1926 through 1969	Warm	(Increased Hurricane Activity)
1970 through 1994	Cool	(Decreased Hurricane Activity)
1995 through 2005	Warm	(Increased Hurricane Activity)

The National Oceanic and Atmospheric Administration (NOAA) believes that we entered a warm phase of AMO around 1995 which can be expected to continue for at least several years; historically, each phase of AMO has lasted approximately 25 to 40 years..

Probabilistic Annual Damage & Loss is computed using the results of thousands of random variable hurricanes considering the long term 100 year hurricane hazard. Annual damage estimates are developed for each individual site and aggregated to overall portfolio damage amounts. Damage is defined as the total cost including the operations and maintenance (O&M) and capital components 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 analysis include the location of PEF's overhead and underground T & D assets, the probability of hurricanes of different intensities and/or landfall points impacting those assets, the vulnerability of those assets to hurricane damage, and the costs to repair assets and restore electrical service.

3. Storm Loss Analysis Results

Aggregate Loss Exceedance and Expected Annual Loss

A probabilistic database of T&D and insured property deductible losses is developed using the storm hazard, assets at risk and their vulnerabilities. The analysis utilizes the long term 100 year hurricane hazard. For each hurricane, the center, shape, geographical orientation, track and wind speeds were defined. The wind field for each storm is integrated with the asset vulnerability and the asset locations to compute the damage. The annual frequency and the portfolio damage for each are simulated. By using this database of thousands of hurricane losses, various loss exceedance or non-exceedance distributions are generated.

The frequencies and computed damage for all hurricanes are combined to calculate the expected annual loss and the annual aggregate exceedance relations.

Aggregate damage exceedance calculations are developed by keeping a running total of damage from ***all possible events*** in a year. At the end of each time period, the aggregate damage for all events is then 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 a year.

A series of probabilistic analyses were performed, using the vulnerability curves derived for PEF assets and the computer program USWIND™. A summary of the analysis is presented in Table 3-1, which shows the aggregate damage exceedance probability for damage layers between zero and over $310 million dollars.

For each damage layer shown, the probability of damage exceeding a specified value is shown. For example, the probability of damage exceeding $100 million in one year is 4.48%. The analysis calculates the probability of damage from all storms and aggregates the total.

Table 3-1 provides the aggregate damage exceedance probabilities for the PEF T & D assets analyzed for a series of layers. Each layer has a layer amount of $10 million, except for the final layer which represents all damage $310 million and greater. The value in the first column, labeled Damage Layer, is the attachment point for each layer, with the exception of the last layer, for which the attachment point is $310 million.

The second column of the table, labeled 1 year Exceedance Probability, provides the annual modeled probability of penetrating each layer, i.e. the probability that the total damage from all events in a 1 year period will exceed the attachment point of the layer.

The expected annual loss (EAL) and exposure to PEF's reserve from hurricane damage to T&D is $20.2 million. This value represents the average loss from all simulated storms. The EAL is not expected to occur each and every year. Some years will have no damage from storms, some years will have small amounts of damage and a few years will have large amounts of damage. The EAL represents the average of all storm years over a long period of time.

It should be noted that the National Oceanographic and Atmospheric Administration (NOAA) believes that in 1995 we entered a period of heightened hurricane formation in the Atlantic Basin and near term frequencies of hurricanes over the coming decade should be expected to be significantly higher than those over the long term. This could result in significantly greater annual hurricane losses than those determined from the long term hurricane hazard frequency.

Table 3-1

T & D ASSETS
AGGREGATE DAMAGE EXCEEDANCE PROBABILITIES

Damage Layer ($millions)	1 Year Exceedance Probability
(≥ 0.5)	41.8%
10	25.5%
20	19.4%
30	14.8%
40	11.6%
50	9.4%
60	7.8%
70	6.7%
80	5.8%
90	5.1%
100	4.5%
110	4.0%
120	3.6%
130	3.3%
140	3.0%
150	2.7%
160	2.5%
170	2.3%
180	2.2%
190	2.0%
200	1.9%
210	1.8%
220	1.6%
230	1.5%
240	1.5%
250	1.4%
260	1.3%
270	1.2%
280	1.2%
290	1.1%
300	1.1%
>310	1.0%

4. Hurricane Landfall Analyses for SSI Ranges

In order to provide further insight into Progress Electric Florida's risk profile, the full set of stochastic hurricane events were analyzed by landfall for four hurricane intensities, SSI 1 through 4. The landfall locations are at mileposts from about 1010 to 1250 on the Gulf Coast. The Figure 4-1 below illustrates these landfall locations. The mileposts include Spring Hill, FL near milepost 1070 to the north and Clearwater, FL near milepost 1210 to the south in 10 mile intervals.

The full set of stochastic hurricanes within each SSI category was analyzed for Progress Electric Florida's T&D portfolio. For each milepost and SSI category, the frequency-weighted average damage was computed from all stochastic hurricanes making landfall within 10 nautical miles of a given milepost and within that SSI category. Figures 4-2 through 4-5 provide these results.

Historic Hurricane 1921-06

In addition to the analysis of landfalls, the most significant historic hurricane to strike Progress Electric Florida's service territory was also analyzed. The Category 3 hurricane 1921-06 which made landfall in Pinellas County was modeled to estimate the damage that a recurrence of this event would cause. A recurrence of hurricane 1921-06 has an estimated damage to Progress Electric Florida's current system of about $250 million as shown on Figure 4-4.

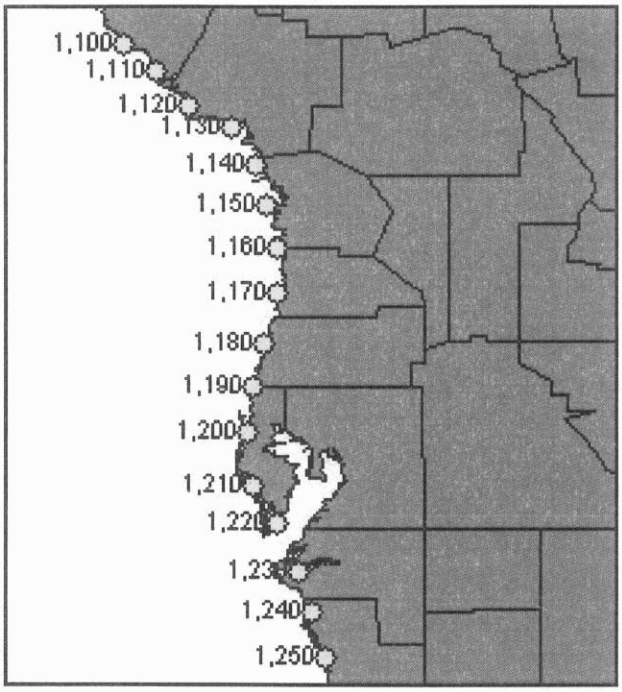

Figure 4-1: Storm Landfall Mile Posts

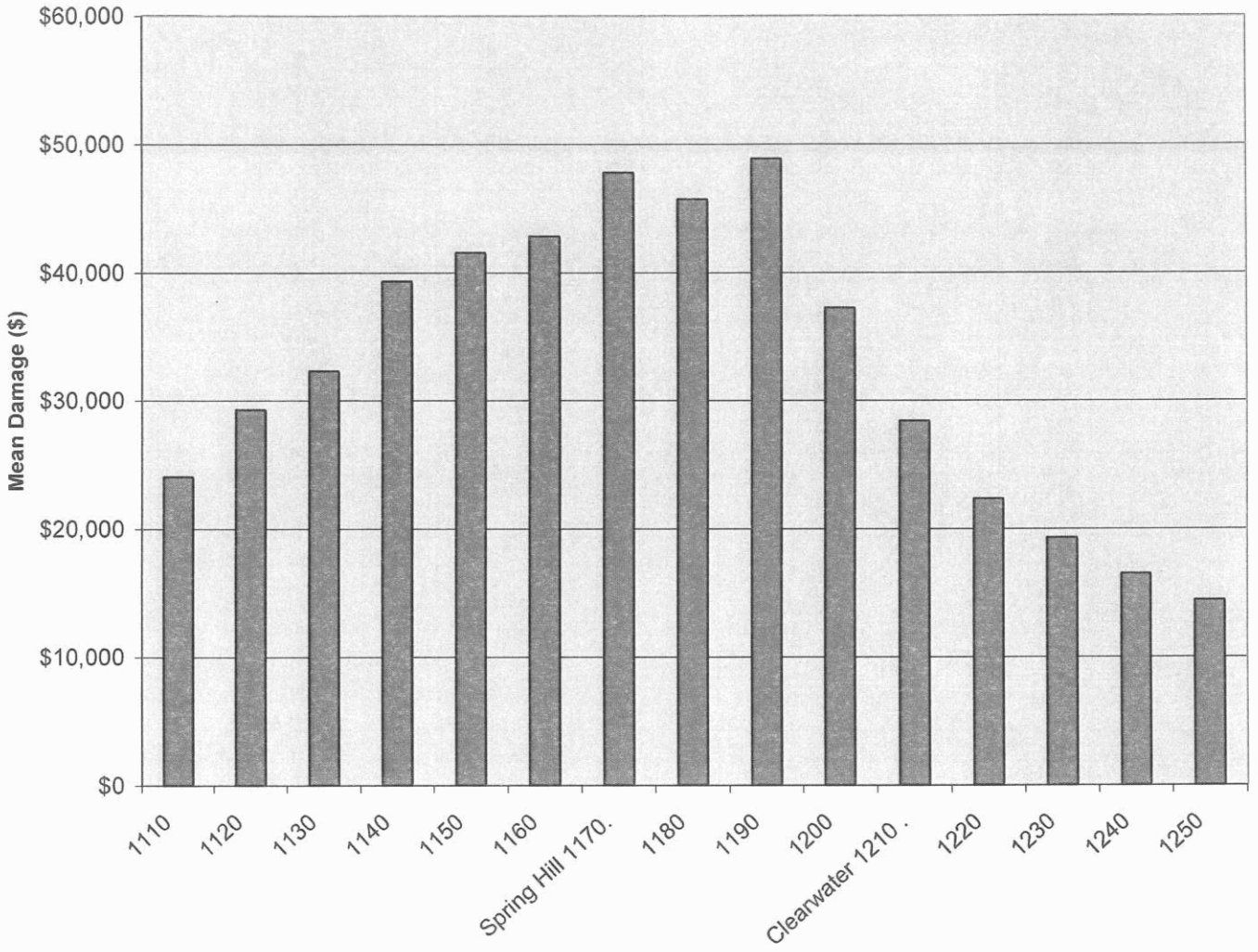

Figure 4-2: Frequency Weighted Average Transmission & Distribution Damage from SSI 1 Landfalls

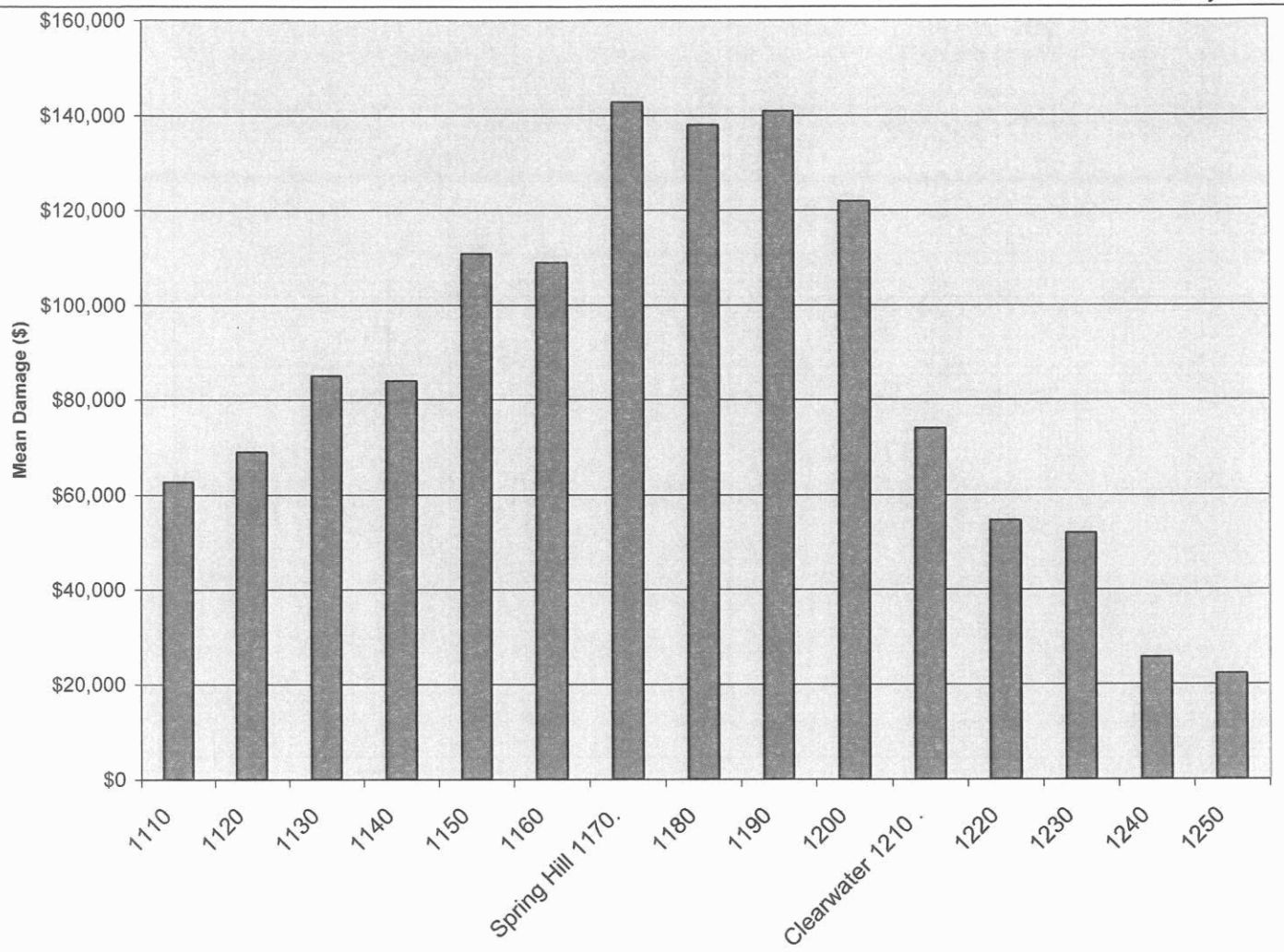

Figure 4-3: Frequency Weighted Average Transmission & Distribution Damage from SSI 2 Landfalls

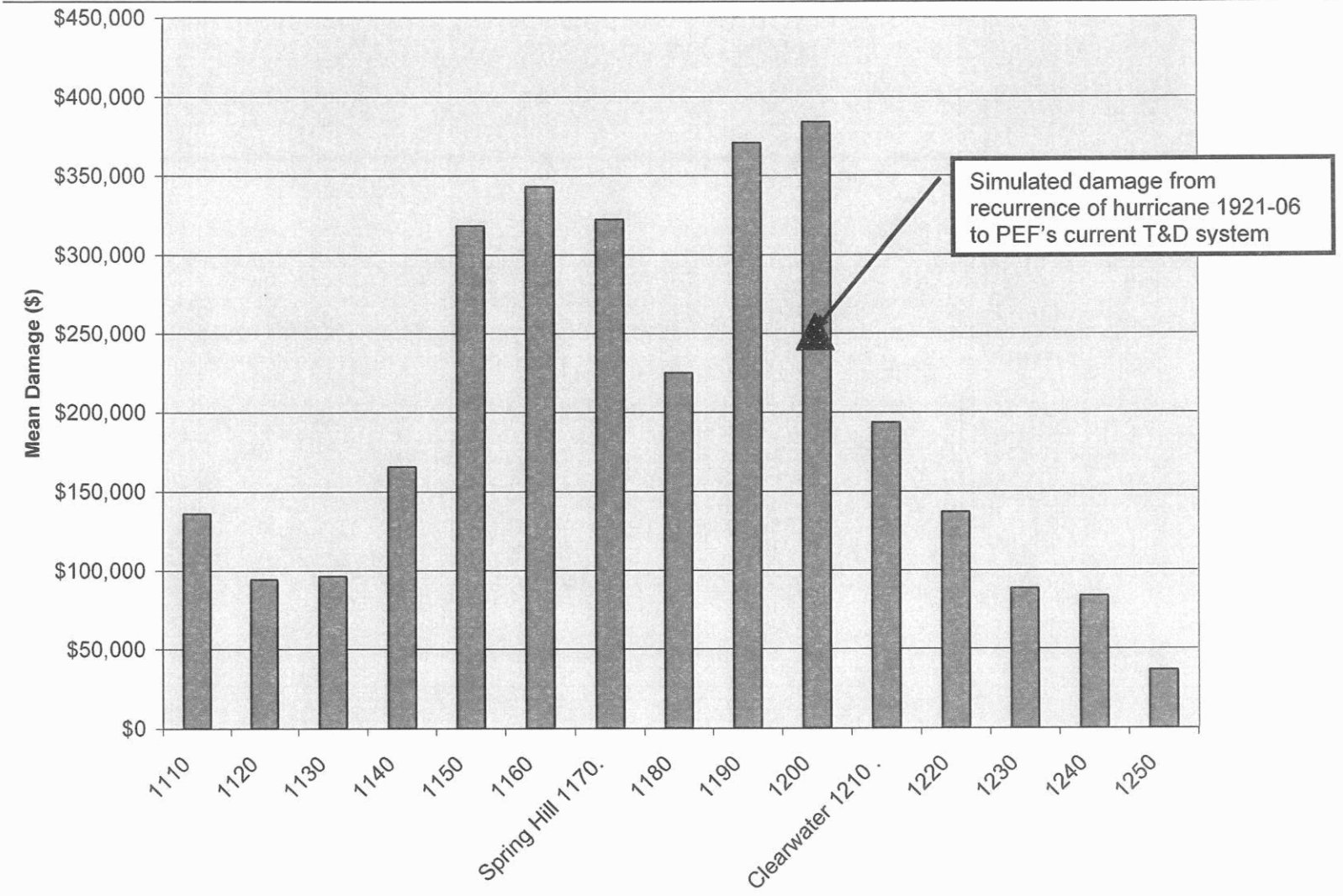

Figure 4-4: Frequency Weighted Average Transmission & Distribution Damage from SSI 3 Landfalls

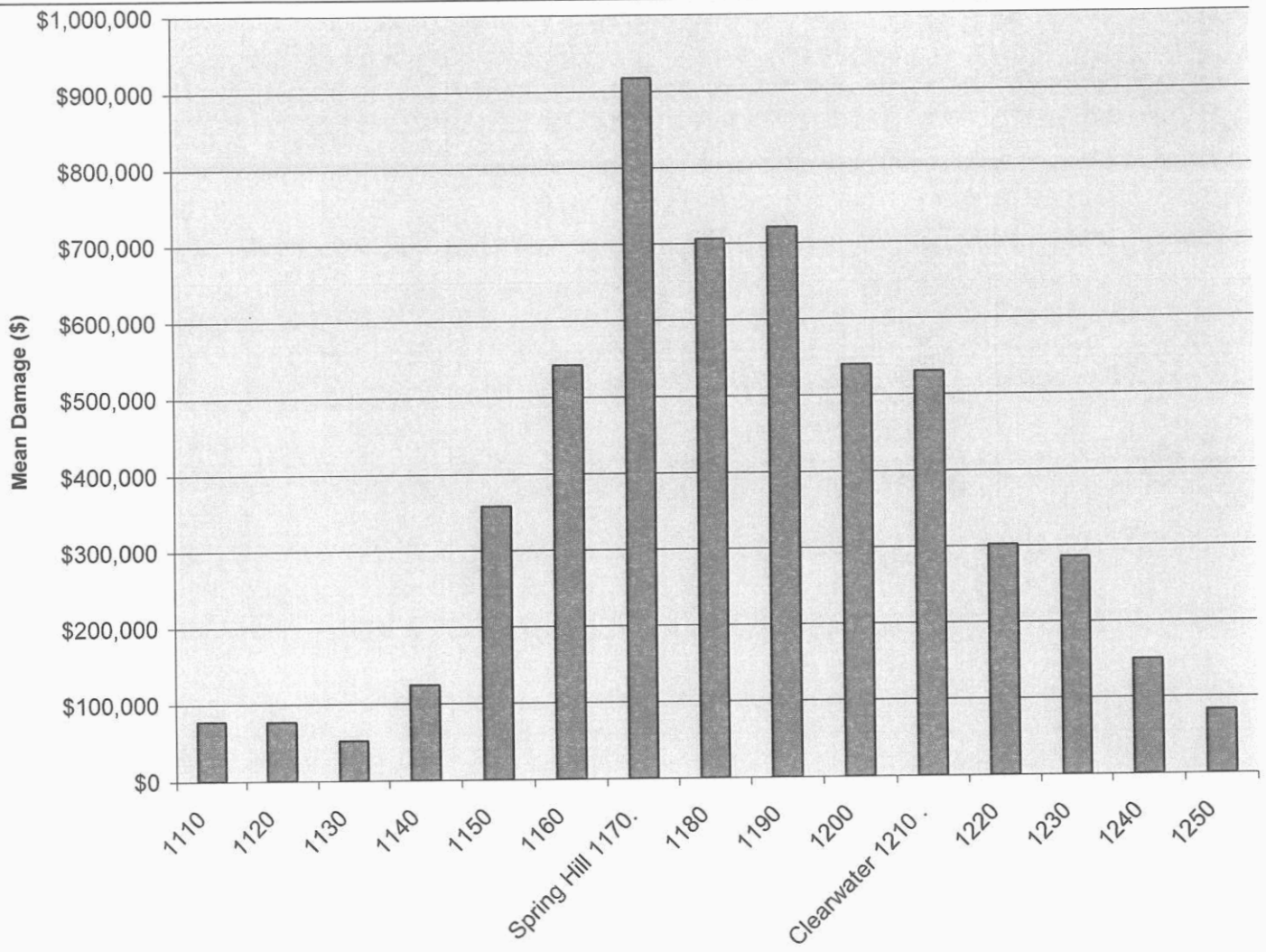

Figure 4-5: Frequency Weighted Average Transmission & Distribution Damage from SSI 4 Landfalls

5. Reserve Performance Analysis

A probabilistic analysis of losses from hurricanes was performed for Progress Energy Florida to determine their potential impact on the reserve. The analysis included transmission and distribution (T & D) damage as well as estimates of insurance deductibles paid on insured property assets.

Analysis

The reserve performance analysis consisted of performing 10,000 iterations of hurricane loss simulations within the Progress Energy Florida service territory, each covering a 5-year period, to determine the effect of the charges for damage on the PEF reserve. Monte Carlo simulations were used to generate damage samples for the analysis. The analysis provides an estimate of the reserve assets in each year of the simulation, accounting for the annual accrual and storm damage using a dynamic financial model.

The performance analyses consider four funding cases, each with an initial $133 million reserve balance. The funding cases have annual accruals of $6 million, $16 million, $25 million and $35 million over the five year period.

Assumptions

The analyses performed included the following assumptions:

- An initial reserve balance of $133 million for all cases.
- Hurricane losses are assumed to increase by 6.4% per year as replacement values of T&D increase due to inflation and system growth.
- In years that reserve has positive balances, the reserve is credited interest at a rate of 3.45%.
- In years when the reserve has a negative balance, the deficit is assumed to be recovered over the following five year period in equal increments.
- $16.4 million of the $20.2 million Expected Annual Loss, determined in the Loss Analysis, is assumed to be an obligation of the reserve annually.
- Hurricane losses include estimates of property insurance policy deductibles of $10 million per occurrence on non-T&D assets for major storms.

The analysis results for the cases analyzed are shown in Tables 5-1a and b below. The results show the annual reserve accrual amount, the mean (expected) reserve balance as well as the probability that the reserve balance will be negative in any one or more of the five years of the simulated time horizon.

Table 5-1a

PEF T & D
RESERVE ACCRUALS AND
RESERVE BALANCES FOR
ANNUAL ACCRUAL CASES
($ Millions)

Expected Annual Loss Obligation of Reserve		$16.4	
Reserve Balance at the end of 5 years			
Accrual	5%ile	Mean	95%ile
$6	($105)	$99	$179
$16	($53)	$153	$231
$25	($18)	$196	$278
$35	$34	$251	$330

Table 5-1b

PEF T & D
RESERVE ACCRUALS AND
PROBABILITY OF RESERVE BALANCES
($ Millions)

Accrual	Mean Reserve Balance at the end of 5 years	Probability of Balance <$0 in 5 years	Probability of Balance >$250m in 5 years
$6	$99	14%	0%
$16	$153	10%	0%
$25	$196	8.8%	40%
$35	$251	6.5%	75%

Figures 5-1 through 5-4 show the results of the $133 million initial balance, and $6 million, $16 million, $25 million, and $35 million contribution cases. These results show the mean (expected) reserve balance as well as the 5th and 95th percentiles reserve balances.

For example, given an initial reserve balance of $133 million and the specified $6 million, Figures 5-1 illustrates the expected performance of the reserve. The reserve has a mean (expected) balance of $99 million. The 5th percentile and 95th percentile 5 year ending reserve balances are negative ($105 million) and $179 million respectively. The reserve has a 14% chance of a negative balance in one or more years of the five-year simulation. The reserve has no chance of a balance greater than $250 million in one or more years of the five-year simulation.

The annual accrual of $6 million is less than the Expected Annual Loss to the reserve from storms of $16.4 million. Therefore with each passing year, the reserve ending balance has a decreasing likelihood of accumulating surpluses and an increasing likelihood of insufficient funds. The expected (mean) reserve balance declines gradually over the five-year simulation.

In Figures 5-2 through 5-4 below shows the results of the $16 million, $25 million, and $35 million annual accrual cases. The first year of each simulation begins with a $133 million reserve balance.

The annual accruals of $16 million and greater are near or larger than the expected annual loss to the reserve obligation to the reserve of $16.4 million. Therefore with each passing year, the reserve ending balance has an increasing likelihood of accumulating surpluses and a decreasing likelihood of negative balances. The expected (mean) reserve balance increases gradually over the five-year simulation from the initial balance of $133 million.

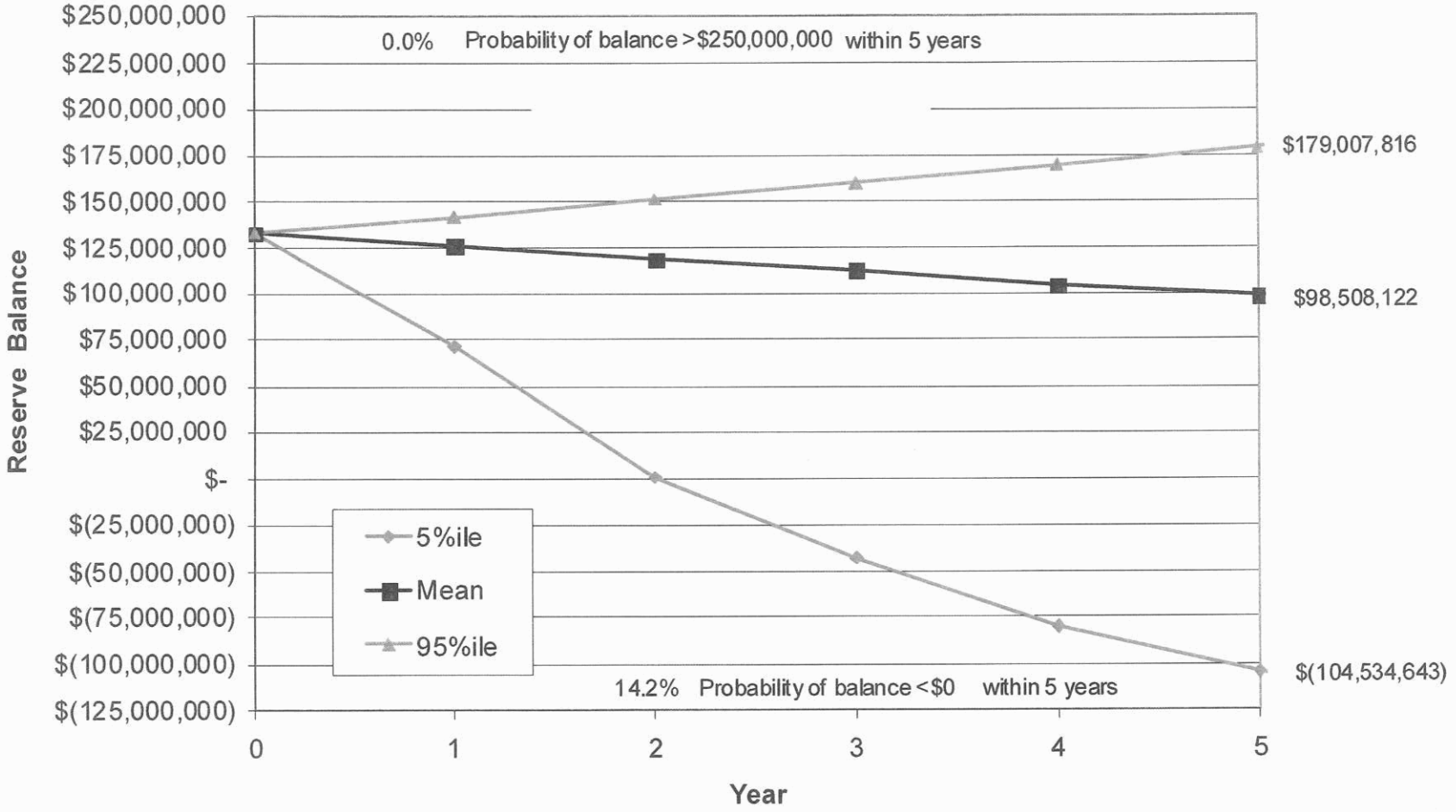

Figure 5-1: Reserve Performance Analyses: $133 million initial balance, $6 million Annual Accrual

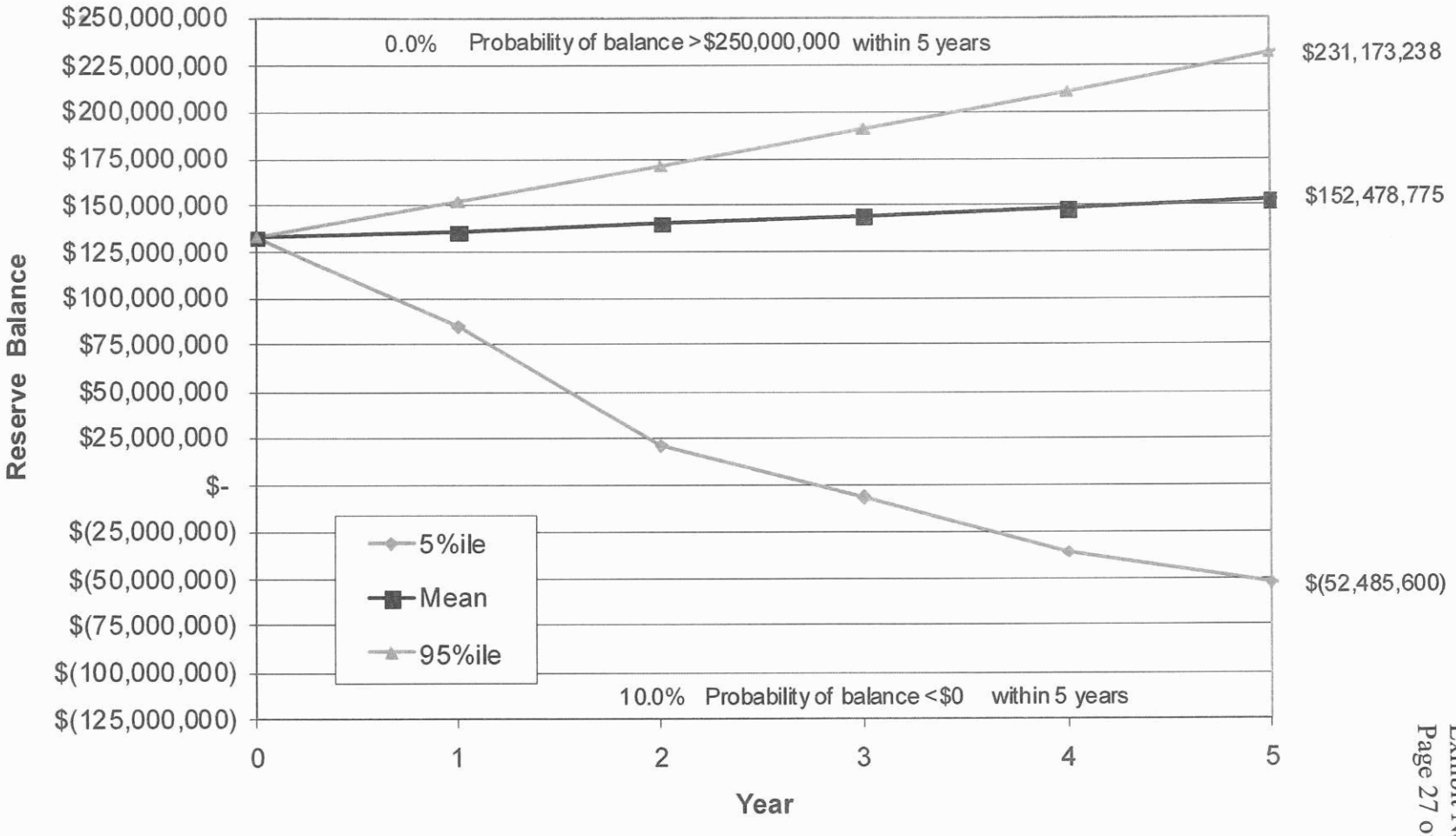

Figure 5-2: Reserve Performance Analyses: $133 million initial balance, $16 million Annual Accrual

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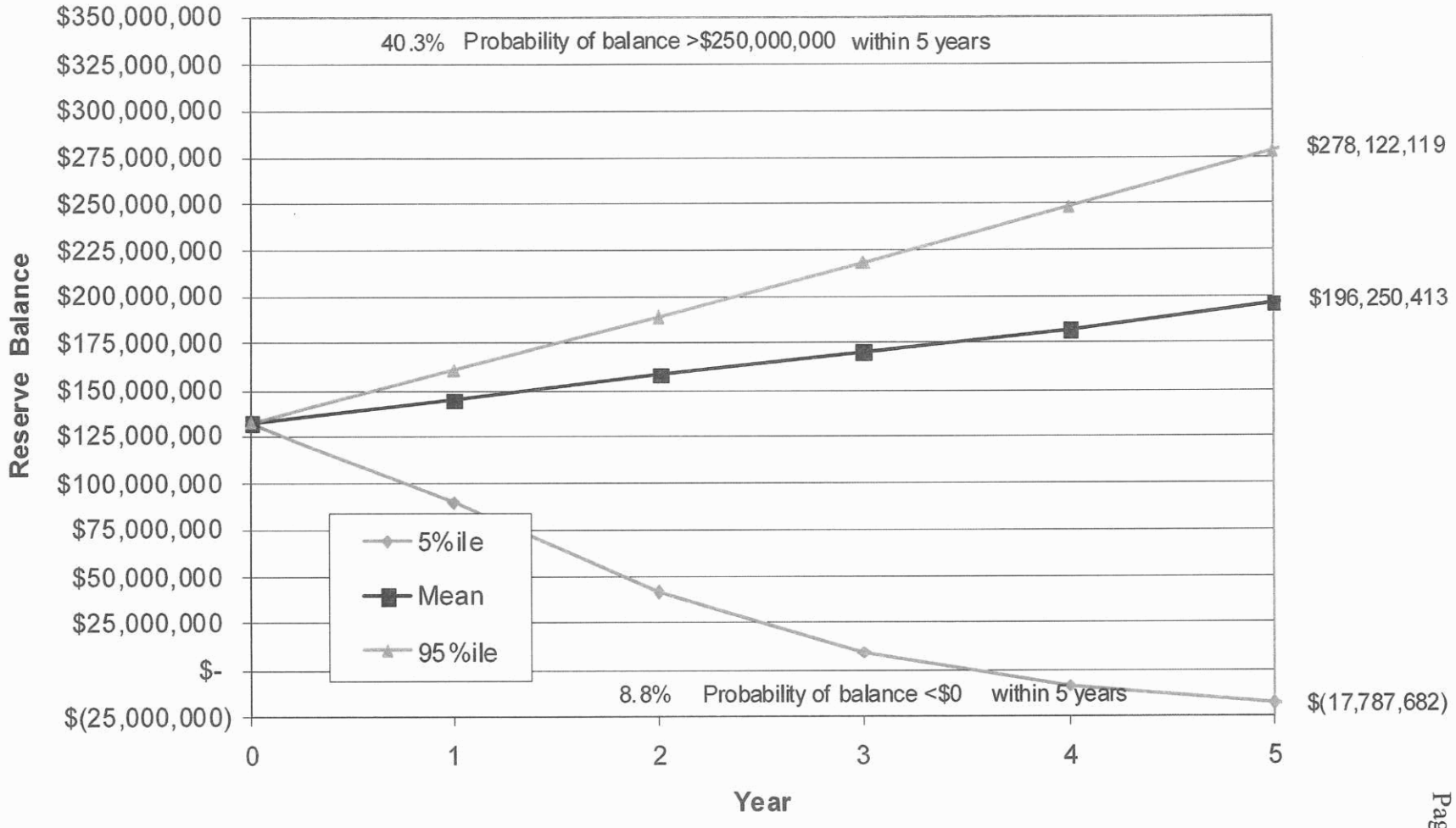

Figure 5-3: Reserve Performance Analyses: $133 million initial balance, $25 million Annual Accrual

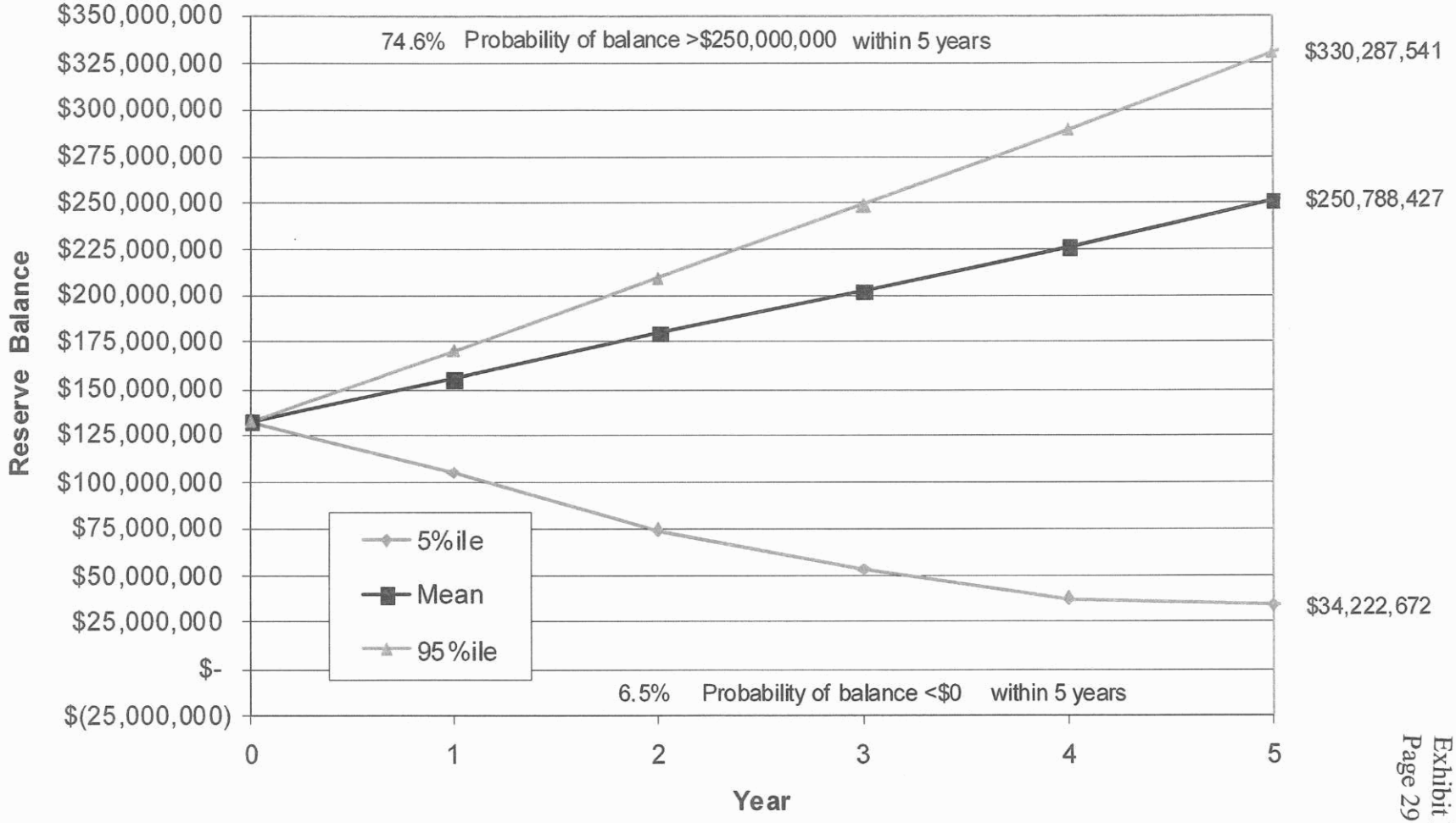

Figure 5-4: Reserve Performance Analyses: $133 million initial balance, $35 million Annual Accrual

6. References

1. "Florida Commission on Hurricane Loss Projection Methodology", EQECAT, an ABS Group Company, February 2006 Submission.

475 14th Street, Suite 550
Oakland, CA 94612 USA
Tel: 510-817-3100/Fax: 510-663-1046
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