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October 12, 2016

VIA ELECTRONIC FILING

Ms. Carlotta Stauffer  
Commission Clerk  
Florida Public Service Commission  
2540 Shumard Oak Boulevard  
Tallahassee, Florida 32399-0850

Re: Petition for an increase in rates by Gulf Power Company, Docket No. 160186-EI

Re: Petition for approval of 2016 depreciation and dismantlement studies, approval of proposed depreciation rates and annual dismantlement accruals and Plant Smith Units 1 and 2 regulatory asset amortization by Gulf Power Company, Docket No. 160170-EI

Dear Ms. Stauffer:

Attached is the Direct Testimony and Exhibits of Gulf Power Company Witness Steven P. Harris.

(Document 9 of 29)

Sincerely,

A handwritten signature in blue ink that reads "Robert L. McGee, Jr.".

Robert L. McGee, Jr.  
Regulatory & Pricing Manager

**BEFORE THE  
FLORIDA PUBLIC SERVICE COMMISSION**

**DOCKET NO. 160186-EI**



**Gulf Power**

**TESTIMONY AND EXHIBIT  
OF  
STEVEN P. HARRIS**

1 GULF POWER COMPANY

2 Before the Florida Public Service Commission

3 Direct Testimony of

4 Steven P. Harris

5 Docket No. 160186-EI

6 In Support of Rate Relief

7 Date of Filing: October 12, 2016

8 Q. Please state your name and business address.

9 A. My name is Steve Harris. My business address is 555 12th Street Suite  
10 1100, Oakland, California 94607.

11 Q. What is your position?

12 A. I am a Senior Manager with CoreLogic, Inc. Insurance & Spatial Services,  
13 Consulting Services Group. I was formerly with EQECAT, Inc. which was  
14 acquired by CoreLogic in December 2013.

15 Q. What are your responsibilities as Senior Manager with CoreLogic, Inc.  
16 Insurance & Spatial Services Consulting Services Group?

17 A. As a manager with CoreLogic's Consulting Services group, I provide  
18 catastrophic risk management consulting services to major insurers, re-  
19 insurers, corporations, governments and other financial institutions. These  
20 services provide catastrophic underwriting, pricing, risk management and  
21 risk transfer model analytics that are used extensively in the insurance  
22 industry. These services provide the financial, insurance and brokerage  
23 communities with a science and technology-based source of independent  
24 quantitative risk information.

25

1 Q. Please state your prior work experience and responsibilities.

2 A. Over the past 30 years, I have conducted and supervised independent risk  
3 and financial studies for public utilities, insurance companies and other  
4 entities both regulated and unregulated. My areas of expertise include  
5 natural hazard risk analysis, operational risk analysis, risk profiling and  
6 financial analysis, insurance loss analysis, loss prevention and control,  
7 business continuity planning and risk transfer. A significant portion of my  
8 consulting experience has involved the performance of multi-hazard risk  
9 studies, including earthquake, ice storm and windstorm perils, for electric,  
10 water and telephone utility companies, as well as insurance companies.

11  
12 I have performed or supervised storm loss and reserve analyses for utilities  
13 including Gulf Power Company (Gulf or the Company), Tampa Electric  
14 Company, Florida Power & Light Company, Duke Energy, and others.  
15 Additionally, I have performed loss analyses for earthquake hazards for  
16 utilities including the Los Angeles Department of Water and Power, the  
17 Sacramento Municipal Utility District, British Columbia Hydro, and others.

18  
19 For energy companies that have assets in a wide array of geographic  
20 locations, I have performed or supervised multi-peril analyses for all natural  
21 hazards, including earthquakes, windstorms and ice storms.

22  
23  
24  
25

1 Q. What is your educational background?

2 A. I received Bachelors and Masters Degrees in engineering from the  
3 University of California at Berkeley. I am a licensed civil engineer in the  
4 State of California.

5

6 Q. What is the purpose of your testimony?

7 A. The purpose of my testimony is to present the results of CoreLogic's 2015  
8 independent analyses of risk of uninsured hurricane loss to Gulf  
9 transmission and distribution assets. The study includes a Hurricane Loss  
10 Analysis and a Reserve Performance Analysis.

11

12 Q. Are you sponsoring any exhibits?

13 A. I sponsor Exhibits SPH-1 and SPH-2. The information contained in these  
14 exhibits is true and correct to the best of my knowledge.

15

16 Q. Are you sponsoring any of the Minimum Filing Requirements (MFRs)  
17 submitted by Gulf?

18 A. No.

19

20

21 **I. PURPOSE AND SUMMARY**

22

23 Q. Please briefly describe the studies performed for the Company.

24 A. CoreLogic performed two analyses relative to Gulf's property damage  
25 reserve (reserve): the Hurricane Loss Analysis and the Reserve

1 Performance Analysis. The Loss Analysis is a probabilistic storm analysis  
2 that uses proprietary software to develop an estimate of the expected  
3 annual amount of uninsured hurricane damage to which Gulf is exposed.  
4 The Performance Analysis is a dynamic financial simulation analysis that  
5 evaluates the performance of the reserve in terms of the expected balance  
6 of the reserve and the likelihood of inadequate funds over a five-year  
7 period. The Performance Analysis is based on the potential uninsured  
8 damage determined from the Loss Analysis, at a given initial reserve  
9 balance and annual accrual level.

10  
11 Q. Please summarize the results of your analyses.

12 A. The Loss Analysis concluded that the total expected annual, uninsured  
13 damage to Gulf's system from all hurricanes is estimated to be \$9,600,000.  
14 The annual reserve obligation (the portion of the expected annual damage  
15 that would be charged against the reserve) is estimated to be \$7,900,000  
16 based on Gulf's historical experience.

17  
18 The Reserve Performance Analysis demonstrated that, assuming a  
19 \$35,700,000 initial reserve balance and the currently approved accrual level  
20 of \$3,500,000, an expected reserve balance at the end of five years is only  
21 \$13,100,000, and there is a 23 percent probability that the reserve would be  
22 at zero or negative, at the end of the five year simulation time horizon.

## II. LOSS ANALYSIS

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Q. Please summarize the Loss Analysis.

A. The Loss Analysis determined the expected magnitude of hurricane damage to Gulf's transmission and distribution (T&D) system. These costs are associated with repair and/or replacement of Gulf's T&D assets necessary to promptly restore service in a post storm environment.

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

A. Risk Quantification and Engineering (RQE<sup>®</sup>) is a probabilistic catastrophe simulation model designed to estimate damage due to the occurrence of hurricanes. Probabilistic annual damage is computed using the results of thousands of random variable storms. Annual damage estimates are developed for assets and aggregated to produce the overall portfolio damage amounts. RQE's climatological models are based on the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) Technical Reports. CoreLogic's proprietary computer software model has been evaluated and determined acceptable by the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) for projecting hurricane loss costs.

Q. Why are catastrophe simulation models used for hurricane loss projection?

A. Catastrophe simulation modeling is the process of using computer-assisted calculations to estimate the damage that could be sustained due to natural disasters such as hurricane events. Catastrophe simulation modeling

1 combines actuarial science, engineering, meteorology, and computer  
2 science to allow loss estimation of infrequent events. The insurance  
3 industry and risk managers use catastrophe simulation modeling to assess  
4 and manage risks. Catastrophe simulation modeling is the current standard  
5 of risk assessment in the insurance industry.

6  
7 Q. Does RQE 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 112 year historical record.

10  
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. RQE includes the possibility of having multiple hurricane landfalls  
14 within Florida in any given year, including the impact of such landfalls on  
15 aggregate losses. So the possibility of having loss experiences like the  
16 2004-2005 hurricane seasons when multiple hurricanes hit Florida is  
17 captured in the model. Similarly, the storm frequency assumptions also  
18 capture the possibility of having no hurricane landfall in Florida. The use of  
19 the full 112 years of historic storm data to develop storm frequencies  
20 assures that the model simulates years without storm landfalls as well as  
21 years with single and multiple landfalls.

22  
23 Q. What were the results of the Loss Analysis?

24 A. I concluded that the total expected annual damage to Gulf's T&D system  
25 from all hurricanes is estimated to be \$9,600,000. The annual reserve



1 obligation associated with this total expected annual damage is estimated to  
2 be \$7,900,000. The \$1,700,000 difference reflects that some storm  
3 restoration expenditures are either capital costs or other O&M costs that are  
4 not allowed to be charged against the reserve based on Gulf's past storm  
5 experience.

6  
7 Q. What does this expected annual damage estimate represent?

8 A. The expected annual damage estimate represents the average annual cost  
9 associated with damage to T&D assets, resulting from hurricanes over a  
10 long period of time.

11  
12 Q. Did the Loss Analysis include consideration of the effects of Gulf's Storm  
13 Hardening Program?

14 A. Yes. Gulf's Witness Smith provided an opinion of the expected impact of  
15 the Program through 2015 on T&D system loss for our analysis.

16  
17 Q. Is the Loss Analysis performed for Gulf the same analysis performed for  
18 insurance companies to price an insurance premium?

19 A. Yes. Hurricane catastrophe-simulation modeling and analysis would be  
20 similar for an insurance company, electric utility or other entity. The  
21 expected annual damage is also known as the "Pure Premium," which,  
22 when insurance is available, is the insurance premium level needed to pay  
23 just the expected losses. Insurance companies add their expenses and  
24 profit margin to the Pure Premium to develop the total premium charged. If  
25 adequate insurance coverage was available, affordable, and Gulf obtained

1 such insurance, the premiums charged to customers as an expense would  
2 include the pure premium cost plus added expenses and profit.

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4  
5 **III. PERFORMANCE ANALYSIS**

6  
7 Q. Please summarize the Performance Analysis.

8 A. CoreLogic performed a dynamic financial simulation analysis of the impact  
9 of the estimated windstorm damage on the Gulf reserve for the specified  
10 initial reserve balance and level of annual funding. The starting assumption  
11 for the Reserve Performance Analysis was an actual balance in the property  
12 damage reserve of \$35,700,000 as of year-end, 2014. This analysis  
13 performed 10,000 simulations of windstorm damage within the Gulf service  
14 area, each covering a five year period, to determine the effect of the  
15 charges for damage on the reserve. Monte Carlo simulations were used to  
16 generate damage samples consistent with the expected \$7,900,000 annual  
17 Loss Analysis results chargeable to the reserve. The analysis provides the  
18 expected balance of the reserve in each year of the simulation accounting  
19 for the annual accrual, investment income, expenses, and damage using a  
20 financial model.

21  
22 Q. What is a Monte Carlo analysis?

23 A. Monte Carlo simulation is a widely used computational technique employed  
24 to understand the impact of uncertainties in financial, cost, and forecasting  
25 models. The Monte Carlo simulation technique is used to model the

1 reserve performance from multiple storm seasons and simulate the variable  
2 nature of storm damage. The storm damage for each of five consecutive  
3 years is stochastically (randomly) sampled consistent with the results of the  
4 Loss Analysis probabilities for single year losses. Many years have no  
5 damage, and some years have damage of varying amounts. A few years  
6 have catastrophic damage. Each five years of storm losses, along with the  
7 initial reserve balance, and the accruals are used to calculate the balance of  
8 the reserve in each year of a five-year simulation. Because storm seasons  
9 and damage are highly variable, 10,000 five year sample simulations are  
10 performed. The large number of simulations allows the determination of the  
11 average (expected or most probable) reserve balance, and it shows what  
12 range of reserve balances could occur.

13

14 Q. Are the results of the Loss Analysis incorporated in the Performance  
15 Analysis?

16 A. Yes. Both the likelihoods and amounts of uninsured annual damage  
17 determined in the Loss Analysis are used to simulate damage in each of the  
18 five years in the Reserve Performance Analysis in order to determine the  
19 likelihood of the reserve having adequate funds.

20

21 Q. Please summarize the results of the Performance Analysis.

22 A. The reserve performance can be viewed in terms of the expected balance  
23 of the reserve and the likelihood of inadequate funds occurring in any year  
24 of the five-year period. Based on an initial reserve balance of \$35,700,000  
25 and an annual accrual of \$3,500,000, the expected balance of the reserve

1 at the end of five years is only \$13,100,000, and there is a 23.1 percent  
2 chance of the fund reaching zero or becoming negative.

3

4 Q. What did your evaluation show with respect to a \$35,700,000 initial reserve  
5 balance and a \$3,500,000 annual accrual?

6 A. It showed that the reserve value of \$35,700,000 combined with annual  
7 accruals of \$3,500,000 is too small to pay for most storm damage. In fact, it  
8 is too little to pay for all Category 1, also referred to as Saffir-Simpson Scale  
9 (SSI) Category, or Category 2 single storm events.

10

11 For example, Schedules 1 and 2 of Exhibit SPH-1 show the frequency  
12 weighted average (“mean”) damage from single hurricane events of  
13 Category 1 and Category 2, respectively, that make landfall within 10 mile  
14 intervals along the Gulf Coast in and around Gulf’s service area. Also  
15 shown are the initial (Year 0) and final (Year 5) balance values of the  
16 reserve from the CoreLogic Reserve Performance Analysis for comparison  
17 with the potential hurricane damage. The reserve analysis shows the  
18 reserve balance to decline in each year from its initial value of \$35,700,000  
19 until it reaches \$13,100,000 at Year 5.

20

21 With a reserve balance of \$35,700,000, the reserve would be inadequate to  
22 cover all mean Category 2 hurricane landfall damage. The largest single  
23 Category 2 hurricane damage occurs at milepost 840 (near Pensacola) and  
24 is approximately \$110,000,000. A reserve balance of \$35,700,000 at Year

25

1           0, or \$13,100,000 at Year 5, is inadequate to cover the largest, as well as  
2           the mean damage, at milepost 840 from Category 2 events.

3

4    Q.    Did you evaluate the sufficiency of the reserve to cover damage from  
5           hurricanes that make landfall at various locations along the coast?

6    A.    Yes. The potential damage from Category 1 through Category 4 storms in  
7           the Storm Study at the various landfall mile posts show that the projected  
8           reserve would not be adequate to cover the mean estimated damage  
9           associated with the majority of Category 1 through Category 4 storms.

10

11           For example, in Category 1 storms a reserve of \$13,100,000 would cover  
12           mean Category 1 hurricane projected damage at only 10 of the 24 landfall  
13           mile posts. A reserve of \$35,700,000 would cover mean Category 1  
14           hurricane projected damage at 24 of the 24 landfall mile posts.

15

16           Similarly, for Category 2 storms a reserve of \$13,100 000 would cover  
17           mean Category 2 hurricane projected damage at only five of 24 landfall mile  
18           posts. A reserve of \$35,700,000 would cover mean Category 2 hurricane  
19           projected damage at only 17 of 24 landfall mile posts.

20

21           Similar figures for Category 3 and 4 storms are shown on pages 4-4 and 4-5  
22           of Exhibit SPH-2, "Gulf Power Company Hurricane Loss and Reserve  
23           Performance Analysis".

24

25

1 Category 3 storms. A reserve of \$13,100,000 would cover mean Category  
2 3 hurricane projected damage at only two of 24 landfall mile posts. A  
3 reserve of \$35,700,000 would cover mean Category 3 hurricane projected  
4 damage at only nine of 24 landfall mile posts.

5  
6 Category 4 storms. A reserve of \$13,100,000 would cover mean Category  
7 4 hurricane projected damage at only one of 24 landfall mile posts. A  
8 reserve of \$35,700,000 would cover mean Category 4 hurricane projected  
9 damage at only three of 24 landfall mile posts.

10  
11 Q. What would the expected reserve balance be if Gulf experienced little or no  
12 hurricane storm damage over the following five years?

13 A. Even if Gulf experienced little or no hurricane storm damage over the  
14 following five years (a less than 5 percent probability) and incurred no other  
15 property damage expenses, the reserve balance would grow only to  
16 \$58,821,395 at the existing \$3.5 million accrual. This reserve value is only  
17 about 7 percent greater than the maximum of the Target Range of  
18 \$48,000,000 to \$55,000,000 authorized by the FPSC in the 2012 test year  
19 rate case. More significantly, a \$58,821,395 reserve balance is only about  
20 half of the expected damage from the worst Category 2 storm. The effect of  
21 the Commission's 2012 order to increase the property damage reserve  
22 target was helpful, and if Gulf continues to have favorable storm experience,  
23 it will allow continued accumulations to the reserve, therefore increasing the  
24 amounts and numbers of possible storms that the reserve can fund. The  
25 reserve will not, however, be able to fund all Category 1 or Category 2

1 storms without higher accruals and a higher Target Range for the reserve  
2 than currently authorized.

3

4 Were the reserve to be adequately funded for Category 1 and Category 2  
5 storms, it would still be far below the levels of damage that might be  
6 expected from Category 3 and Category 4 storms. The mean damage from  
7 these events as shown on pages 4-4 and 4-5 of Exhibit SPH-2 can be in  
8 excess of \$100,000,000 to \$250,000,000, with the largest damage being  
9 much greater than these mean values.

10

11 Q. Is your analysis of the performance of the reserve conservative?

12 A. Yes, I believe my analysis of the reserve performance is conservative for  
13 several reasons.

14

15 First, the analysis estimates only hurricane losses and their effect on the  
16 reserve. While hurricane losses are believed to have the largest loss  
17 potential, there are several ways unrecovered losses to the reserve have  
18 occurred in the past and could again in the future. These include tropical  
19 storm losses (which are more frequent than hurricanes), winter storms,  
20 fires, floods, and other perils. Losses due to other perils, in addition to the  
21 hurricanes losses which I modeled, could result in an average annual loss  
22 that is significantly greater than the \$9.6 million estimated for hurricanes  
23 alone.

24

25

1 Other liabilities to the reserve that were not modeled include deductible  
2 costs associated with all-risk insurance policies covering general property,  
3 and power plants. Hurricanes, storms, floods, fires and other loss events  
4 could result in significant insurance policy deductibles. In addition, there is  
5 a small but real possibility that in extreme events, losses could exceed  
6 insurance policy coverage limits. Losses in excess of policy limits could be  
7 liabilities of the reserve.

8  
9 Lastly, the values of the T&D assets at risk that were used in the hurricane  
10 loss analyses are based on the available year end 2014 Gulf Power  
11 accounting records when our analyses were initiated. These values do not  
12 include any T&D assets placed into service after 2014. Also, for an  
13 assumed cost escalation for the T&D assets of 3.68 percent per year over  
14 two years (2014 to 2016), this represents about a 7.5 percent underestimate  
15 of the values at risk. Both the single year loss estimate and the five-year  
16 prospective analyses for the reserve performance from 2016 through 2021  
17 are therefore based on a low biased value of the assets at risk and  
18 contribute to a conservative estimate of the reserve performance.

19  
20 Q. Please summarize the results of your analyses.

21 A. The Loss Analysis concluded that the total expected annual damage to  
22 Gulf's system from all hurricanes is estimated to be \$9,600,000 in 2014  
23 dollars. The corresponding annual reserve obligation is estimated to be  
24 \$7,900,000.

25



1 The Reserve Performance Analysis demonstrated that assuming a  
2 \$35,700,000 initial reserve balance and an accrual level of \$3,500,000  
3 would result in an expected reserve balance of only \$13,100,000 and a 23.1  
4 percent probability of the reserve reaching zero or becoming negative at the  
5 end of the five year simulation time horizon.

6  
7 The \$35,700,000 reserve and combined annual accruals of \$3,500,000 are  
8 too small to pay for most storm damage. It would not even cover all the  
9 mean Category 1 and Category 2 single storm event damage, and it would  
10 only cover a small number of the mean Category 3 and Category 4 event  
11 damage.

12

13 Q. Does this conclude your direct testimony?

14 A. Yes.

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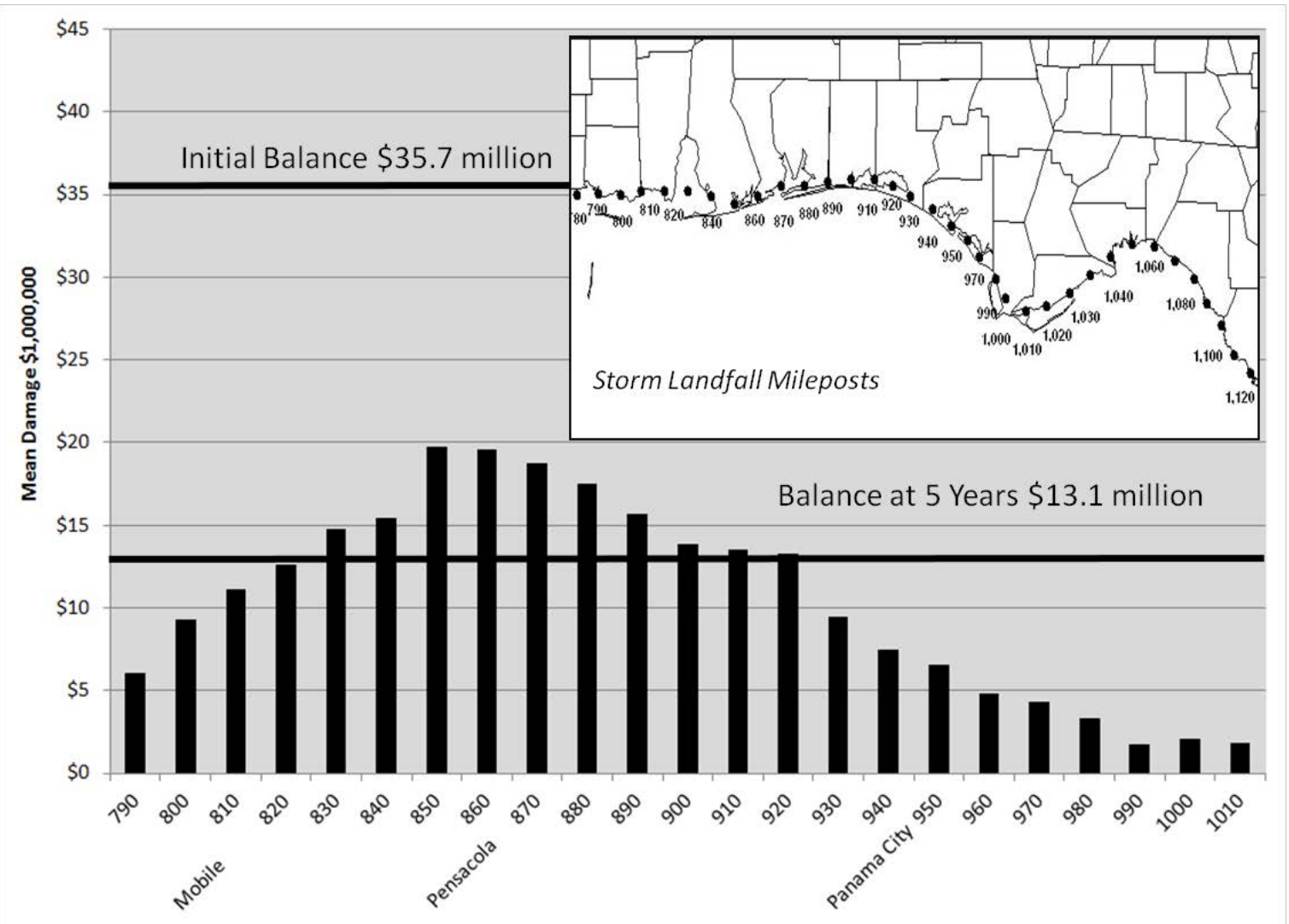
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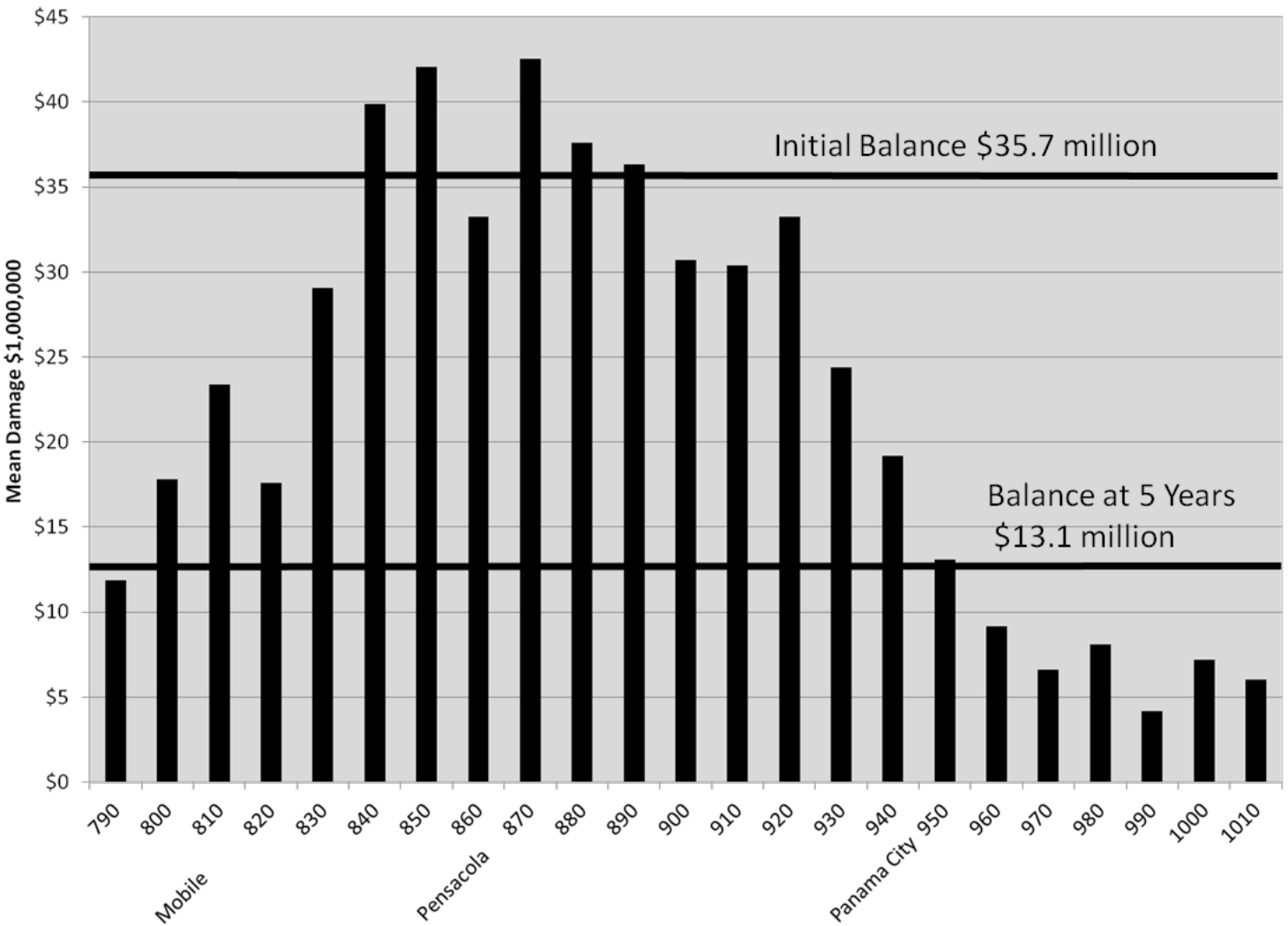
# Exhibit

Schedule 1:

Frequency Weighted Average Transmission & Distribution Damage from SSI 1 Landfalls Storm Landfall Mileposts, and Reserve Balances at Year 1 and Year 5



Schedule 2:  
Frequency Weighted Average Transmission & Distribution Damage from  
SSI 2 Landfalls, and Reserve Balances at Year 1 and Year 5



Florida Public Service Commission  
Docket No. 160186-EI  
GULF POWER COMPANY  
Witness: Steven P. Harris  
Exhibit No. \_\_\_\_ SPH-2  
Page 1 of 1

Gulf Power's revised 2016 Hurricane Loss and Reserve and Reserve Performance Analysis was filed on April 8, 2016 and is incorporated by reference.